

**20MCA136Networking & System
Administration Lab(Lab)
RECORD**

Submitted By:

Akshay Murali

Roll No: 07

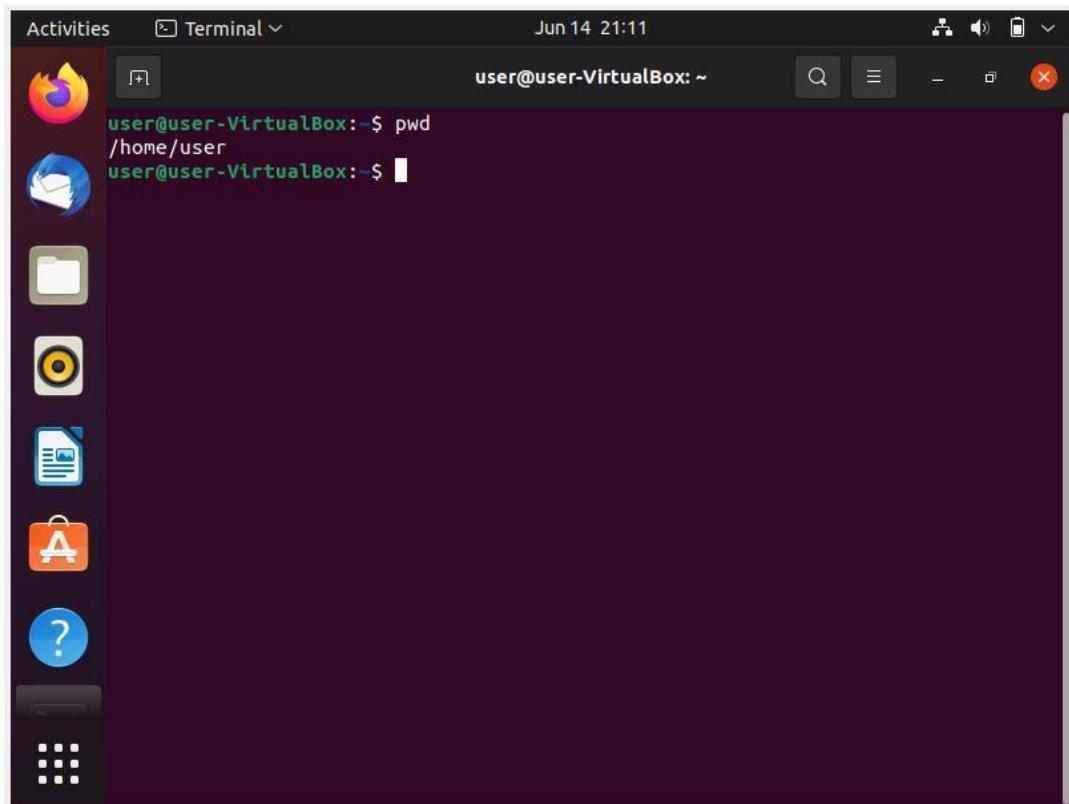
Subject: Network Lab

Batch: MCA A

BASIC LINUX COMMANDS

1. pwd (Print Working Directory)

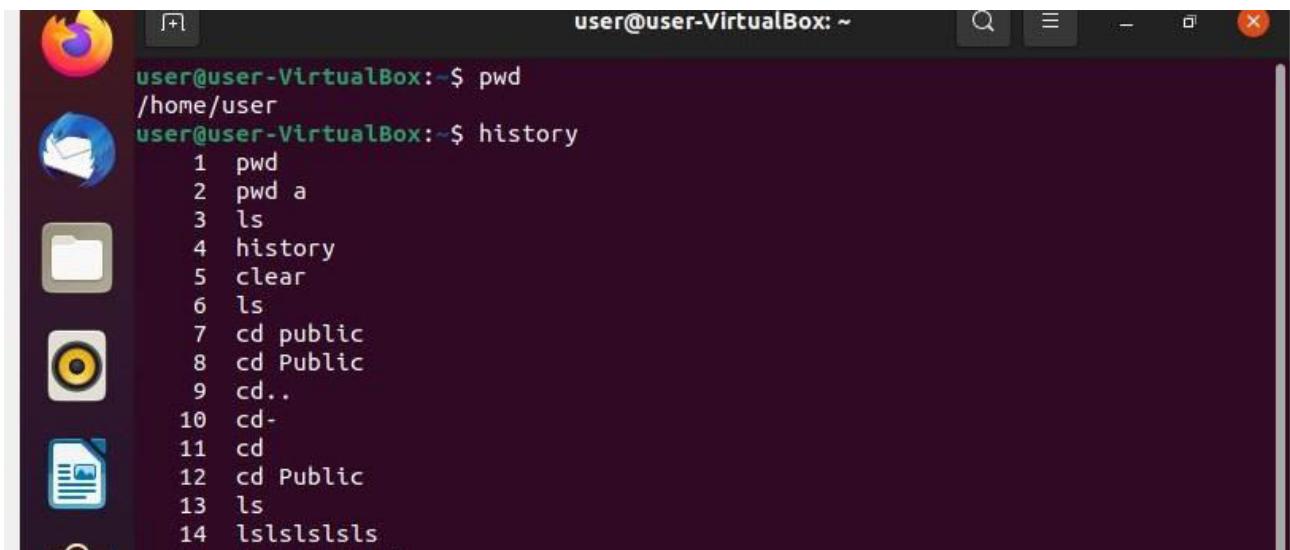
Use the `pwd` command to find out the path of the current working directory (folder) you're in.



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. ➤ history
- !command number to run a command from history



A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. It displays the following session:

```
user@user-VirtualBox:~$ pwd
/home/user
user@user-VirtualBox:~$ history
 1  pwd
 2  pwd a
 3  ls
 4  history
 5  clear
 6  ls
 7  cd public
 8  cd Public
 9  cd..
10  cd-
11  cd
12  cd Public
13  ls
14  lslslslsls
```

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**

```
Activities Terminal Jun 14 21:15
user@user-VirtualBox: ~ LS(1) User Commands LS(1)

NAME      ls - list directory contents
SYNOPSIS  ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

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

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

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

--author
        with -l, print the author of each file

-b, --escape
        print C-style escapes for nongraphic characters

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 "user@user-VirtualBox: ~". The terminal shows the following command sequence:

```
user@user-VirtualBox:~$ cd Public
user@user-VirtualBox:/Public$ cd
user@user-VirtualBox:~$
```

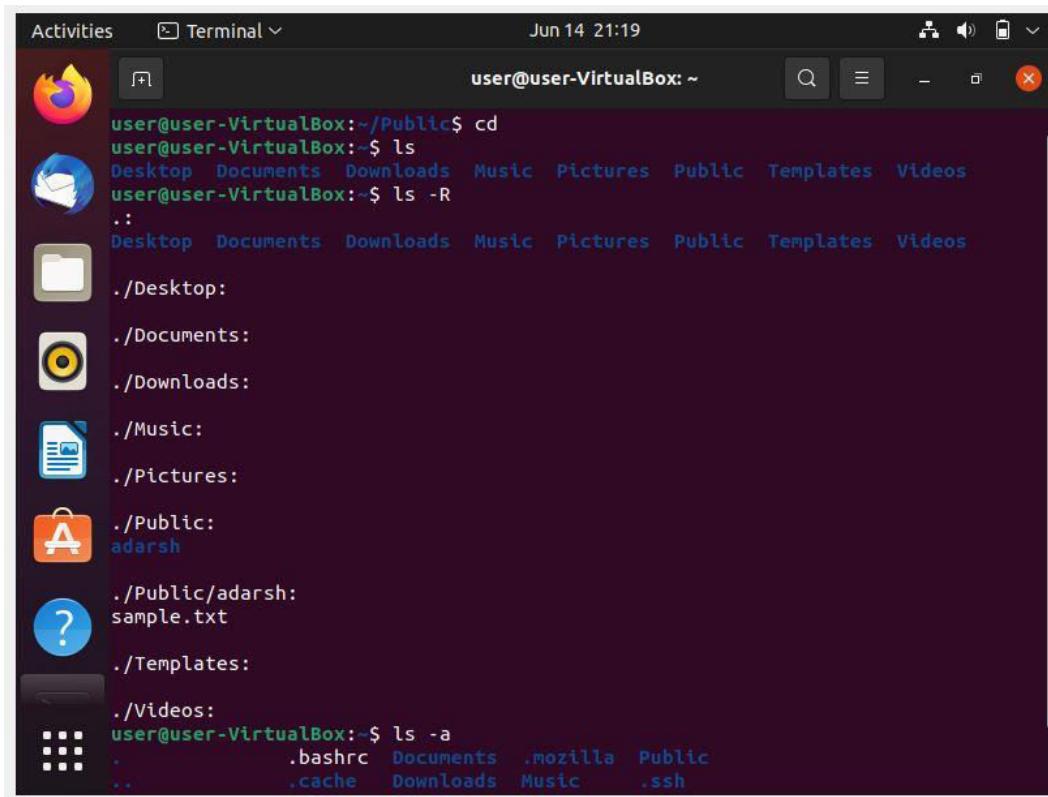
5. ls

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 all 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 other switches such as ls -tr. This will reverse the time-wise listing.



The screenshot shows a terminal window titled "Terminal" with the command line interface. The terminal window has a dark background and light-colored text. It displays the following commands and their outputs:

```

Activities Terminal Jun 14 21:19
user@user-VirtualBox:~/Public$ cd
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$ ls -R
.:
Desktop Documents Downloads Music Pictures Public Templates Videos
./Desktop:
./Documents:
./Downloads:
./Music:
./Pictures:
./Public:
./Public/adarsh:
sample.txt
./Templates:
./Videos:
user@user-VirtualBox:~$ ls -a
. .bashrc Documents .mozilla Public
.. .cache Downloads Music .ssh

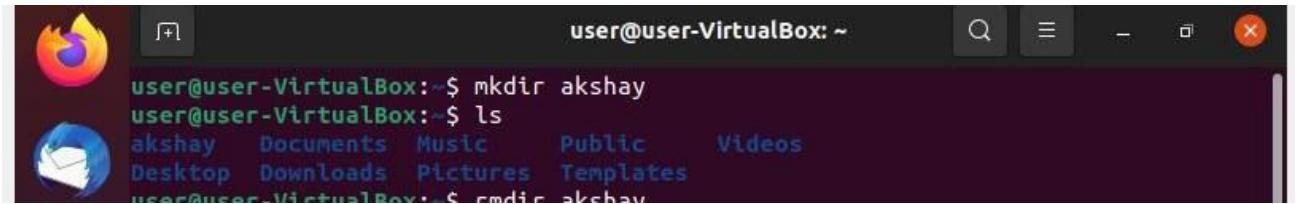
```

The terminal window also shows icons for various applications in the top left corner, including a browser, file manager, and terminal.

6. mkdir

Use mkdir command to make a new directory .

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

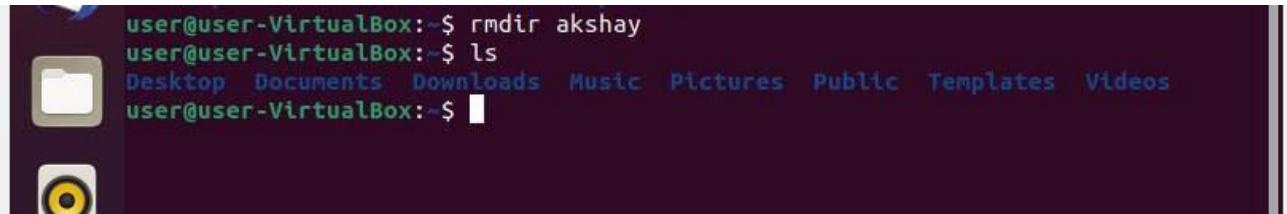


A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark purple background and a dark purple title bar. In the title bar, it says "user@user-VirtualBox: ~". The terminal window contains the following text:

```
user@user-VirtualBox:~$ mkdir akshay
user@user-VirtualBox:~$ ls
akshay  Documents  Music  Public  Videos
Desktop  Downloads  Pictures  Templates
user@user-VirtualBox:~$ cd akshay
```

7. rmdir

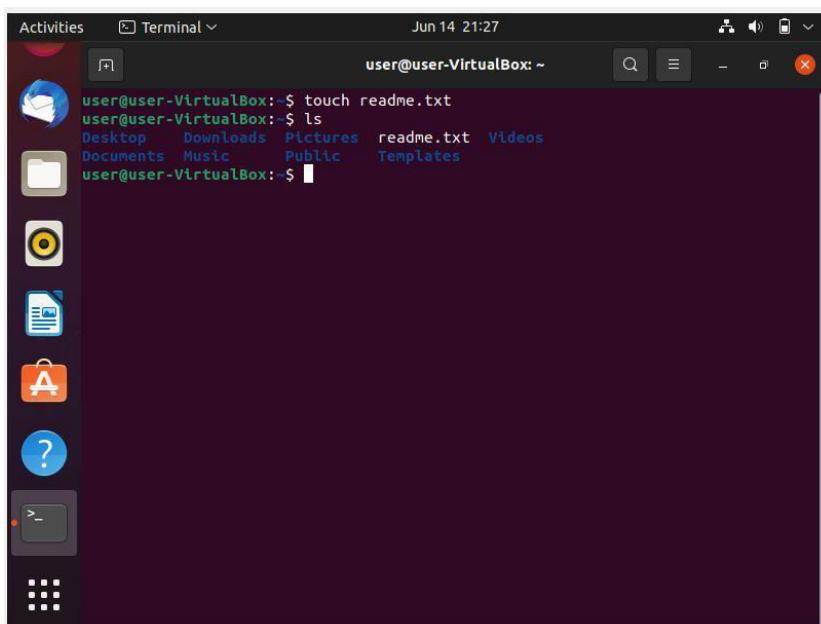
If you need to delete a directory, use the rmdir command. However, rmdir only allows you to delete empty directories.



```
user@user-VirtualBox:~$ rmdir akshay
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$
```

8. touch

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



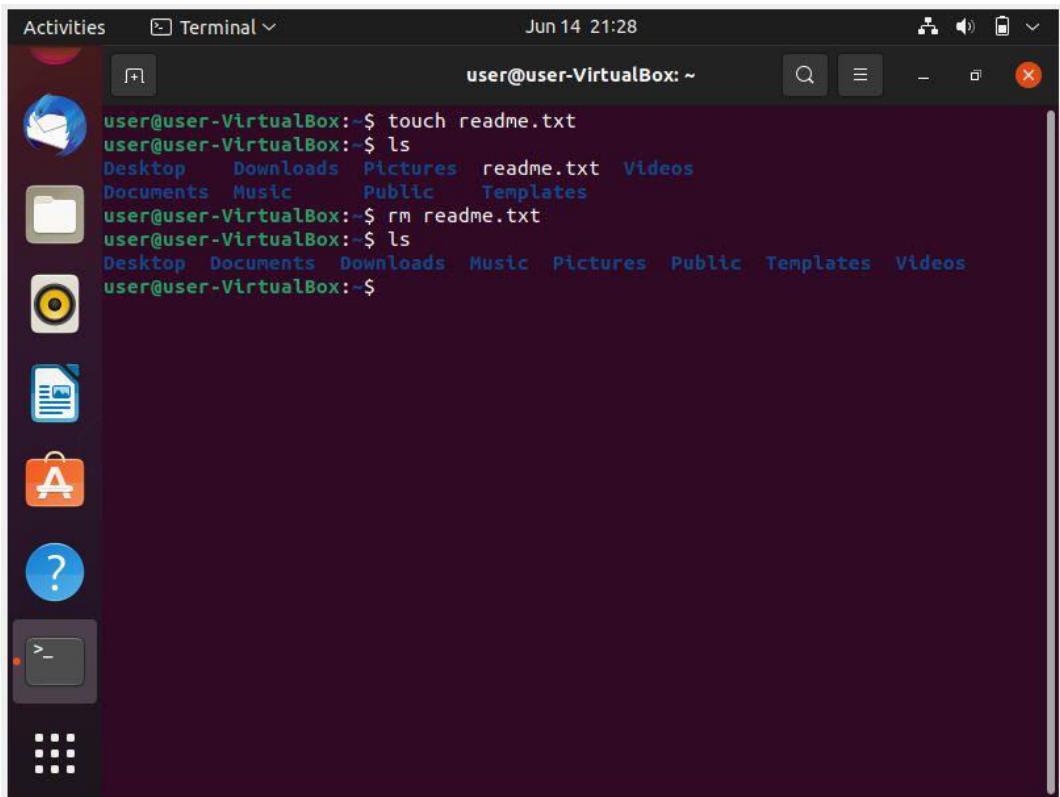
```
Activities Terminal Jun 14 21:27
user@user-VirtualBox:~$ touch readme.txt
user@user-VirtualBox:~$ ls
Desktop Downloads Pictures readme.txt Videos
Documents Music Public Templates
user@user-VirtualBox:~$
```

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 Linux desktop environment. On the left is a dock with various icons: a user profile, terminal, file manager, system settings, help, and a search bar. The main area shows a terminal window titled "Terminal" with the command line "user@user-VirtualBox: ~". The terminal displays the following session:

```
user@user-VirtualBox:~$ touch readme.txt
user@user-VirtualBox:~$ ls
Desktop Downloads Pictures readme.txt Videos
Documents Music Public Templates
user@user-VirtualBox:~$ rm readme.txt
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$
```

The terminal window has a standard title bar with "Activities", "Terminal", date/time "Jun 14 21:28", and a close button.

10. cat

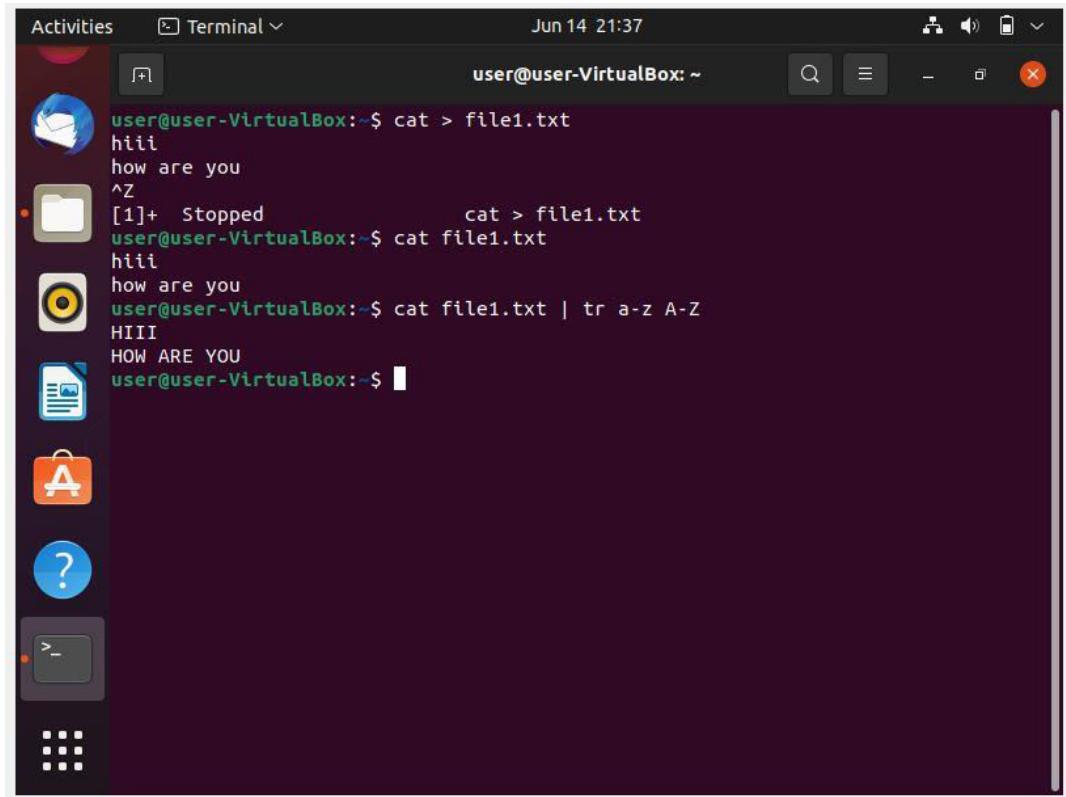
cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout .

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
- **cat filename1 filename2>filename3** joins two files (1 and 2) 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



A screenshot of a terminal window in the Unity desktop environment. The window title is "Terminal". The terminal session shows the following commands and output:

```
user@user-VirtualBox:~$ cat > file1.txt
hiii
how are you
^Z
[1]+  Stopped                  cat > file1.txt
user@user-VirtualBox:~$ cat file1.txt
hiii
how are you
user@user-VirtualBox:~$ cat file1.txt | tr a-z A-Z
HIII
HOW ARE YOU
user@user-VirtualBox:~$
```

The terminal window has a dark purple background. To the left of the terminal is a vertical dock containing icons for various applications: a mail icon, a folder icon, a target icon, a document icon, a terminal icon, a question mark icon, and a terminal icon with a red dot.

Networking and Systems Administration Lab

ASSIGNMENT 3: BASIC LINUX COMMANDS

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MCA A BATCH
SEM-2

Explain linux commands usermod, groupadd, groups, groupmod, groupdel, chmod, chown, id, ps, top with examples

1. usermod

- usermod command is used to change the properties of a user in Linux through the command line
- command-line utility that allows you to modify a user's login information
- #usermod --help
- #usermod -u akshay07

```
akshay07@akshay07-VirtualBox:~$ usermod -u 2000 akshay07
usermod: user akshay07 is currently used by process 1153
akshay07@akshay07-VirtualBox:~$ █
```

2. groupadd

- groupadd command creates a new group account using the values specified on the command line and the default values from the system.
- #groupadd akshay01

```
akshay07@akshay07-VirtualBox:~$ sudo groupadd student
[sudo] password for akshay07:
akshay07@akshay07-VirtualBox:~$ sudo groupadd akshay01
akshay07@akshay07-VirtualBox:~$ sudo groupadd akshay02
akshay07@akshay07-VirtualBox:~$ █
```

3. groups - print the groups a user is in

- #groups akshay

```
akshay07@akshay07-VirtualBox: $ groups akshay07
akshay07 : akshay07 adm cdrom sudo dip plugdev lpadmin lxd sambashare
akshay07@akshay07-VirtualBox: $ █
```

4. groupdel - groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist
- #groupdel akshay01

```
akshay07@akshay07-VirtualBox:~$ compgen -g akshay
akshay07
akshay01
akshay02
akshay07@akshay07-VirtualBox:~$ sudo groupdel akshay01
akshay07@akshay07-VirtualBox:~$ compgen -g akshay
akshay07
akshay02
```

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

```
# groupmod -n group1 group2
```

```
akshay07@akshay07-VirtualBox:~$ compgen -g akshay
akshay07
akshay02
akshay07@akshay07-VirtualBox:~$ sudo groupmod -n new_group akshay07
akshay07@akshay07-VirtualBox:~$ compgen -g akshay07
akshay07@akshay07-VirtualBox:~$ compgen -g akshay
akshay02
akshay07@akshay07-VirtualBox:~$ compgen -g new_group
new_group
```

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

```
#chmod whowhatwhich file/directory
• chmod +rwx filename to add permissions.
• chmod -rwx directoryname to remove permissions.
• chmod +x filename to allow executable permissions.
• chmod -wx filename to take out write and executable permissions.
```

```
#chmod u+x test #chmod g-rwx test #chmod o-r test
```

```
akshay07@akshay07-VirtualBox:/mnt/f$ chmod +rwx akshay.txt
akshay07@akshay07-VirtualBox:/mnt/f$ chmod -w akshay.txt
chmod: akshay.txt: new permissions are r-xrwxrwx, not r-xr-xr-x
akshay07@akshay07-VirtualBox:/mnt/f$
```

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

```
#chown akshay akshay.txt
```

```
akshay07@akshay07-VirtualBox:/mnt/.. ls -l akshay.txt
-rwxrwxrwx 1 akshay akshay 0 Aug 10 22:15 akshay.txt
akshay07@akshay07-VirtualBox:/mnt/f$
```

8. 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
```

```
akshay07@akshay07-VirtualBox:~$ id akshay07
uid=1000(akshay07) gid=1000(new_group) groups=1000(new_group),4(adm),24(cdrom),
27(sudo),30(dip),46(plugdev),121(lpadmin),132(lxd),133(sambashare)
```

9. 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 process ID
- TTY – This is the type of terminal that the user is logged in to
- TIME – This is the time in minutes and seconds that the process has been running
- CMD – The command that launched the process #ps -a

```
akshay07@akshay07-VirtualBox:~$ ps -a
  PID TTY      TIME CMD
1208 pts/2    00:00:00 gnome-session-b
2396 pts/1    00:00:00 ps
```

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

```
#top -u akshay07
```

```
top - 16:27:03 up 58 min,  1 user,  load average: 0.01, 0.04, 0.00
Tasks: 175 total,   1 running, 174 sleeping,   0 stopped,   0 zombie
%Cpu(s):  5.1 us,  1.4 sy,  0.0 ni, 93.6 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem : 1978.7 total, 725.8 free, 631.2 used, 621.7 buff/cache
MiB Swap: 448.4 total, 448.4 free,     0.0 used. 1183.7 avail Mem

      PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
1317 akshay07  20   0 4002156 333932 126008 S  5.0 16.5  0:48.12 gnome-
2129 akshay07  20   0 413128 51960 39896 S  1.0  2.6  0:06.63 gnome-
2397 akshay07  20   0 21436  4168  3504 R  0.3  0.2  0:00.13 top
  1 root     20   0  99008 10976  7912 S  0.0  0.5  0:01.52 systemd
  2 root     20   0      0     0      0 S  0.0  0.0  0:00.00 kthrea-
  3 root     0 -20    0     0      0 I  0.0  0.0  0:00.00 rcu_gp
  4 root     0 -20    0     0      0 I  0.0  0.0  0:00.00 rcu_pa+
  5 root     0 -20    0     0      0 I  0.0  0.0  0:00.05 lvmflush
```

ADVANCED COMPUTER NETWORK

ASSIGNMENT 4

Topic: - Take screenshots of basic Linux commands IV

Submitted By:

Akshay Murali
Roll no: 07
MCA A BATCH
SEM-2

BASIC LINUX COMMANDS

1. wc

- wc stands for word count.
- Used for counting purpose.
- It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.
 - #wc state.txt
 - #wc state.txt capital.txt
 - wc -l state.txt
 - wc -w state.txt capital.txt
 - wc -c state.txt
 - wc -m state.txt

```
akshay07@akshay07-VirtualBox:~/Documents$ wc akshay.txt
4 13 58 akshay.txt
akshay07@akshay07-VirtualBox:~/Documents$ wc -l akshay.txt
4 akshay.txt
akshay07@akshay07-VirtualBox:~/Documents$ wc -w akshay.txt
13 akshay.txt
akshay07@akshay07-VirtualBox:~/Documents$ wc -c akshay.txt
58 akshay.txt
akshay07@akshay07-VirtualBox:~/Documents$ wc -m akshay.txt
58 akshay.txt
```

2. 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 tbzip
- W : Verify a archive file
- r : update or add file or directory in already existed .tar file

```
#tar cf archive.tar state.txt capital.txt //create archive file
```

```
#ls archive.tar
```

```
#tar tf /archive.tar // list contents of tar archive file
```

- Extract an archive created with tar

```
#mkdir backup
```

```
#cd backup
```

```
#tar xf /home/kaj/Documents/Kaj_Linux/archive.tar
```

- Compression Types

```
gzip(z),bzip2(j), xz(J)
```

```
#tar czf /abc.tar.gz /etc
```

```
#tar cjf /abcd.tar.bz2 /etc
```

```
#tar cJf /abcde.tar.xz /etc
```

- Extract an archive

```
#mkdir backup1
```

```
#cd backup1  
#tar xzf /abc.tar.gz  
#mkdir backup2  
#cd backup2  
#tar xjf /abcd.tar.bz2  
#mkdir backup3  
#cd backup3  
#tar xjf /abcde.tar.xz
```

● tar commands

```
akshay07@akshay07-VirtualBox:~/Documents$ tar czf archive.tar.gz akshay.txt  
akshay07@akshay07-VirtualBox:~/Documents$ ls  
akshay.txt  archive.tar.gz  
akshay07@akshay07-VirtualBox:~/Documents$ sudo tar cJf mca.tar.dz2 /etc  
[sudo] password for akshay07:  
Sorry, try again.  
[sudo] password for akshay07:  
tar: Removing leading '/' from member names  
akshay07@akshay07-VirtualBox:~/Documents$ ls  
akshay.txt  archive.tar.gz  mca.tar.dz2  
akshay07@akshay07-VirtualBox:~/Documents$ sudo tar cJf mca.tar.xz /etc  
tar: Removing leading '//' from member names  
akshay07@akshay07-VirtualBox:~/Documents$ ls  
akshay.txt  archive.tar.gz  mca.tar.dz2  mca.tar.xz  
akshay07@akshay07-VirtualBox:~/Documents$ mkdir lab  
akshay07@akshay07-VirtualBox:~/Documents$ cd lab  
akshay07@akshay07-VirtualBox:~/Documents/lab$ tar xzf /home/akshay07/Doc
```

3.expr

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

- Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
- Evaluating regular expressions, string operations like substring, length of strings etc.
- Performing operations on variables inside a shell script

```
#expr 10 + 2
```

```
akshay07@akshay07-VirtualBox:~/Documents/lab$ expr --version
expr (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Mike Parker, James Youngman, and Paul Eggert.
```

3. 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 so on.

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

```
#cat /etc.passwd.txt | head -7 | tail -5
```

```
akshay07@akshay07-VirtualBox:~/Documents/lab$ ls -l
total 12
-rw-rw-r-- 1 akshay07 new_group    45 Aug 12 18:25 archive.tar.gz
-rw----- 1 akshay07 new_group 2675 Aug 12 19:35 key1
-rw-r--r-- 1 akshay07 new_group   582 Aug 12 19:35 key1.pub
akshay07@akshay07-VirtualBox:~/Documents/lab$ ls -l | wc -m -w
      29      188
```

4. 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
```

```
akshay07@akshay07-VirtualBox:~/Documents/lab$ ssh localhost
ssh: connect to host localhost port 22: Connection refused
akshay07@akshay07-VirtualBox:~/Documents/lab$ sudo apt install openssh-client
[sudo] password for akshay07:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-client is already the newest version (1:8.4p1-5ubuntu1).
openssh-client set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 147 not upgraded.
```

5. scp

SCP (secure copy) is a command-line utility that allows you to securely

- copy files and directories between two locations.
 - With scp, you can copy a file or directory:
 - From your local system to a remote system.
 - From a remote system to your local system.
 - Between two remote systems from your local system.
- Remote file system locations are specified in format [user@]host:/path

Syntax:

```
scp [OPTION] [user@]SRC_HOST:]file1 [user@]DEST_HOST:]file2
```

```
$scp /etc/yum.config /etc/hosts ServerX:/home/student
```

```
$scp ServerX:/etc/hostname /home/student
```

6. 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
```

```
akshay07@akshay07-VirtualBox:~/Documents/lab$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/akshay07/.ssh/id_rsa): key1
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in key1
Your public key has been saved in key1.pub
The key fingerprint is:
SHA256:hxgWYTK8gdj/W+4qp1lajD/wthpvcUQp1UYXhjcCslw akshay07@akshay07-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
| o oo =oE=...+.
| . o o=.=o =oo
|   . o=o . o .
|     o. o..
|       ...S .
|       .oo o.
|       oo+*
|       .OB .
|       =B==.
+----[SHA256]-----+
```

7. ssh-copy-id

The ssh-copy-id command allows you to install an SSH key on a remote server's authorized keys.

- This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

```
$ssh-copy-id username@remote_host
```

+

Assignment Managing Files, Creating Users and Groups Using Command-line tools

Name: Akshay Murali

Roll No.: 07

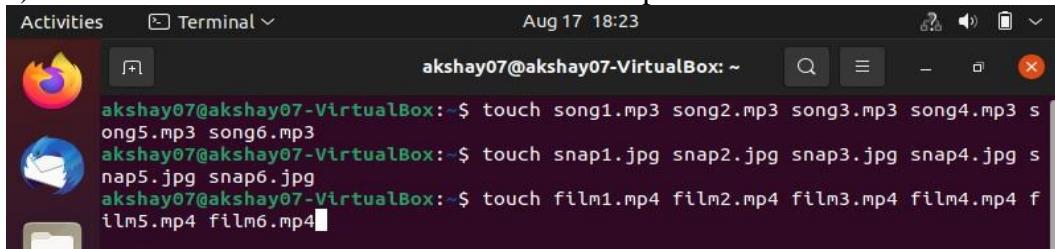
Section: MCA A BATCH

Subject: Networking And System Administration Lab

Date of Submission: 17/08/2021

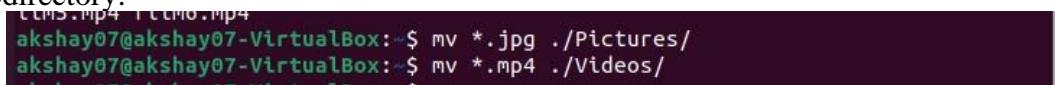
1.a) Create six files with name of the form songX.mp3

- b) Create six files with name of the form snapX.mp3
- c) Create six files with name of the form filmX.mp3



```
Activities Terminal Aug 17 18:23
akshay07@akshay07-VirtualBox:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
akshay07@akshay07-VirtualBox:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg
akshay07@akshay07-VirtualBox:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4 film6.mp4
```

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

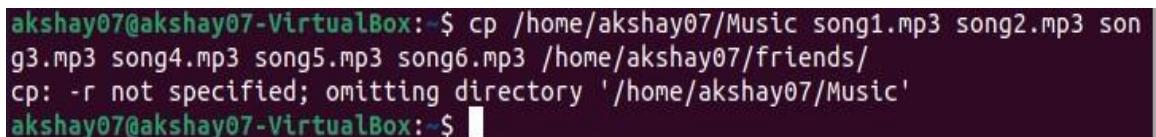


```
lens.mp4 film0.mp4
akshay07@akshay07-VirtualBox:~$ mv *.jpg ./Pictures/
akshay07@akshay07-VirtualBox:~$ mv *.mp4 ./Videos/
```

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

```
akshay07@akshay07-VirtualBox:~$ mkdir -p {friends,family,work}
akshay07@akshay07-VirtualBox:~$
```

4.Copy song files to the friends folder and snap files to family folder.



```
akshay07@akshay07-VirtualBox:~$ cp /home/akshay07/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/akshay07/friends/
cp: -r not specified; omitting directory '/home/akshay07/Music'
akshay07@akshay07-VirtualBox:~$
```

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

```
akshay07@akshay07-VirtualBox:~$ rmdir {friends,family}
```

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

```
akshay07@akshay07-VirtualBox:~$ rm -r friends family
```

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

```
akshay07@akshay07-VirtualBox:~$ ls -a > allfiles.txt  
akshay07@akshay07-VirtualBox:~$
```

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

```
akshay07@akshay07-VirtualBox:~$ date  
Tuesday 17 August 2021 06:53:31 PM IST  
akshay07@akshay07-VirtualBox:~$
```

9.Add the user Juliet

```
akshay07@akshay07-VirtualBox:~$ sudo useradd Juliet  
[sudo] password for akshay07:  
akshay07@akshay07-VirtualBox:~$
```

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

```
akshay07@akshay07-VirtualBox:~$ cat /etc/passwd | grep Juliet  
Juliet:x:1001:1009::/home/Juliet:/bin/sh  
akshay07@akshay07-VirtualBox:~$
```

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

```
akshay07@akshay07-VirtualBox:~$ sudo passwd Juliet  
New password:  
Retype new password:  
passwd: password updated successfully  
akshay07@akshay07-VirtualBox:~$
```

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

```
akshay07@akshay07-VirtualBox:~$ sudo groupadd -g 30000 shakespeare  
akshay07@akshay07-VirtualBox:~$
```

13.Create a supplementary group called artists

```
akshay07@akshay07-VirtualBox:~$ sudo groupadd artists  
akshay07@akshay07-VirtualBox:~$
```

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

```
Juliet:x:1009:  
shakesphere:x:30000:  
artists:x:30001:  
(END)
```

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

```
akshay07@akshay07-VirtualBox:~$ sudo usermod -G shakesphere Juliet  
akshay07@akshay07-VirtualBox:~$ id Juliet
```

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

```
akshay07@akshay07-VirtualBox:~$ id Juliet  
uid=1001(Juliet) gid=1009(Juliet) groups=1009(Juliet),30000(shakesphere)  
akshay07@akshay07-VirtualBox:~$
```

17. Add Romeo and Hamlet to the Shakespeare group.

```
akshay07@akshay07-VirtualBox:~$ sudo useradd Romeo  
akshay07@akshay07-VirtualBox:~$ sudo useradd Hamlet  
akshay07@akshay07-VirtualBox:~$ sudo usermod -G shakesphere Romeo  
akshay07@akshay07-VirtualBox:~$ sudo usermod -G shakesphere Hamlet
```

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

```
akshay07@akshay07-VirtualBox:~$ sudo usermod -G artists Reba  
akshay07@akshay07-VirtualBox:~$ sudo usermod -G artists Dolly  
akshay07@akshay07-VirtualBox:~$ sudo usermod -G artists Elvis
```

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

```
Juliet:x:1009:  
shakesphere:x:30000:Juliet,Romeo,Hamlet  
artists:x:30001:Reba,Dolly,Elvis  
Romeo:x:30002:  
Hamlet:x:30003:  
Reba:x:1004:  
Dolly:x:30004:  
Elvis:x:30005:  
(END)
```

20. Attempt to remove user Dolly.

```
akshay07@akshay07-VirtualBox:~$ sudo userdel Dolly  
akshay07@akshay07-VirtualBox:~$
```

Networking & System Administration Lab

ASSIGNMENT 6: LAB EXCERCISE

**Akshay Murali
Roll No.: 07
MCA A BATCH
SEM-2**

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, Ip Config, NetStat .

WINDOWS

Ping:

```
C:\Users\DELL>ping google.com

Pinging google.com [2404:6800:4009:804::200e] with 32 bytes of data:
Reply from 2404:6800:4009:804::200e: time=67ms
Reply from 2404:6800:4009:804::200e: time=72ms
Reply from 2404:6800:4009:804::200e: time=73ms
Reply from 2404:6800:4009:804::200e: time=255ms

Ping statistics for 2404:6800:4009:804::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 67ms, Maximum = 255ms, Average = 116ms

C:\Users\DELL>
```

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

Pinging google.com [2404:6800:4009:804::200e] with 32 bytes of data:
Reply from 2404:6800:4009:804::200e: time=190ms
Reply from 2404:6800:4009:804::200e: time=71ms
Reply from 2404:6800:4009:804::200e: time=160ms
Reply from 2404:6800:4009:804::200e: time=102ms

Ping statistics for 2404:6800:4009:804::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 71ms, Maximum = 190ms, Average = 130ms

C:\Users\DELL>
```

```
C:\Users\DELL>ping -t google.com
Pinging google.com [2404:6800:4009:804::200e] with 32 bytes of data:
Reply from 2404:6800:4009:804::200e: time=1469ms
Reply from 2404:6800:4009:804::200e: time=616ms
Reply from 2404:6800:4009:804::200e: time=1236ms
Reply from 2404:6800:4009:804::200e: time=167ms
Reply from 2404:6800:4009:804::200e: time=107ms
Reply from 2404:6800:4009:804::200e: time=105ms
Reply from 2404:6800:4009:804::200e: time=73ms
Reply from 2404:6800:4009:804::200e: time=293ms
Reply from 2404:6800:4009:804::200e: time=155ms
Reply from 2404:6800:4009:804::200e: time=69ms
Reply from 2404:6800:4009:804::200e: time=168ms
Reply from 2404:6800:4009:804::200e: time=180ms
Reply from 2404:6800:4009:804::200e: time=100ms
Reply from 2404:6800:4009:804::200e: time=165ms
Reply from 2404:6800:4009:804::200e: time=98ms
Reply from 2404:6800:4009:804::200e: time=77ms
Reply from 2404:6800:4009:804::200e: time=132ms
Reply from 2404:6800:4009:804::200e: time=65ms
Reply from 2404:6800:4009:804::200e: time=85ms
Reply from 2404:6800:4009:804::200e: time=392ms
Reply from 2404:6800:4009:804::200e: time=261ms
Reply from 2404:6800:4009:804::200e: time=99ms
Reply from 2404:6800:4009:804::200e: time=75ms
Reply from 2404:6800:4009:804::200e: time=65ms
Reply from 2404:6800:4009:804::200e: time=170ms
Reply from 2404:6800:4009:804::200e: time=126ms
Reply from 2404:6800:4009:804::200e: time=84ms
Reply from 2404:6800:4009:804::200e: time=115ms

Ping statistics for 2404:6800:4009:804::200e:
    Packets: Sent = 28, Received = 28, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 65ms, Maximum = 1469ms, Average = 240ms
Control-C
```

```
C:\Users\DELL>ping -j google.com
Pinging google.com [216.58.203.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 216.58.203.14:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\DELL>
```

```
C:\Users\DELL>ping -4 google.com
Pinging google.com [216.58.203.14] with 32 bytes of data:
Reply from 216.58.203.14: bytes=32 time=1434ms TTL=114
Reply from 216.58.203.14: bytes=32 time=653ms TTL=114
Reply from 216.58.203.14: bytes=32 time=530ms TTL=114
Reply from 216.58.203.14: bytes=32 time=278ms TTL=114

Ping statistics for 216.58.203.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 278ms, Maximum = 1434ms, Average = 723ms
```

Route:

```
C:\Users\Dell>route print
=====
Interface List
13...c0 3e ba 28 d5 fb ....Realtek PCIe GbE Family Controller
 4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
 8...ac 12 03 50 5a 51 ....Microsoft Wi-Fi Direct Virtual Adapter
18...ae 12 03 50 5a 50 ....Microsoft Wi-Fi Direct Virtual Adapter #
19...ac 12 03 50 5a 50 ....Intel(R) Wireless-AC 9462
10...ac 12 03 50 5a 54 ....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0      0.0.0.0    192.168.43.1  192.168.43.195    55
         127.0.0.0    255.0.0.0        On-link     127.0.0.1    331
         127.0.0.1    255.255.255.255        On-link     127.0.0.1    331
127.255.255.255 255.255.255.255        On-link     127.0.0.1    331
         192.168.43.0    255.255.255.0        On-link   192.168.43.195    311
 192.168.43.195 255.255.255.255        On-link   192.168.43.195    311
 192.168.43.255 255.255.255.255        On-link   192.168.43.195    311
         192.168.56.0    255.255.255.0        On-link   192.168.56.1    281
 192.168.56.1 255.255.255.255        On-link   192.168.56.1    281
 192.168.56.255 255.255.255.255        On-link   192.168.56.1    281
         224.0.0.0      240.0.0.0        On-link     127.0.0.1    331
 224.0.0.0 240.0.0.0        On-link   192.168.56.1    281
 224.0.0.0 240.0.0.0        On-link   192.168.43.195    311
 255.255.255.255 255.255.255.255        On-link     127.0.0.1    331
 255.255.255.255 255.255.255.255        On-link   192.168.56.1    281
 255.255.255.255 255.255.255.255        On-link   192.168.43.195    311
=====
Persistent Routes:
 None
=====
IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
19    71 ::/0           fe80::e0e9:35ff:febff3:b1
1    331 ::1/128        On-link
19    71 2402:3a80:108c:b194::/64 On-link
19    311 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8/128
                                         On-link
19    311 2402:3a80:108c:b194:859c:5139:1bea:9b8d/128
                                         On-link
 4    281 fe80::/64        On-link
19    311 fe80::/64        On-link
=====
```

```
C:\Users\Dell>route print -4
=====
Interface List
13...c0 3e ba 28 d5 fb ....Realtek PCIe GbE Family Controller
 4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
 8...ac 12 03 50 5a 51 ....Microsoft Wi-Fi Direct Virtual Adapter
18...ae 12 03 50 5a 50 ....Microsoft Wi-Fi Direct Virtual Adapter #2
19...ac 12 03 50 5a 50 ....Intel(R) Wireless-AC 9462
10...ac 12 03 50 5a 54 ....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask          Gateway        Interface Metric
  0.0.0.0          0.0.0.0    192.168.43.1  192.168.43.195    55
 127.0.0.0         255.0.0.0          On-link       127.0.0.1     331
 127.0.0.1         255.255.255.255          On-link       127.0.0.1     331
127.255.255.255  255.255.255.255          On-link       127.0.0.1     331
 192.168.43.0     255.255.255.0          On-link    192.168.43.195    311
 192.168.43.195  255.255.255.255          On-link    192.168.43.195    311
 192.168.43.255  255.255.255.255          On-link    192.168.43.195    311
 192.168.56.0     255.255.255.0          On-link    192.168.56.1     281
 192.168.56.1     255.255.255.255          On-link    192.168.56.1     281
 192.168.56.255  255.255.255.255          On-link    192.168.56.1     281
 224.0.0.0          240.0.0.0          On-link       127.0.0.1     331
 224.0.0.0          240.0.0.0          On-link    192.168.56.1     281
 224.0.0.0          240.0.0.0          On-link    192.168.43.195    311
255.255.255.255  255.255.255.255          On-link       127.0.0.1     331
255.255.255.255  255.255.255.255          On-link    192.168.56.1     281
255.255.255.255  255.255.255.255          On-link    192.168.43.195    311
=====
Persistent Routes:
 None
```

```
C:\Users\Dell>route print -6
=====
Interface List
13...c0 3e ba 28 d5 fb ....Realtek PCIe GbE Family Controller
 4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
 8...ac 12 03 50 5a 51 ....Microsoft Wi-Fi Direct Virtual Adapter
18...ae 12 03 50 5a 50 ....Microsoft Wi-Fi Direct Virtual Adapter #2
19...ac 12 03 50 5a 50 ....Intel(R) Wireless-AC 9462
10...ac 12 03 50 5a 54 ....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
 19   71 ::/0           fe80::e0e9:35ff:febff:fe3b1
 1   331 ::1/128        On-link
 19   71 2402:3a80:108c:b194::/64 On-link
 19   311 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8/128
                                On-link
 19   311 2402:3a80:108c:b194:859c:5139:1bea:9b8d/128
                                On-link
 4   281 fe80::/64        On-link
 19   311 fe80::/64        On-link
 19   311 fe80::1483:bd4:a1d2:d8a8/128
                                On-link
 4   281 fe80::550d:c0a0:6151:d3c8/128
                                On-link
 1   331 ff00::/8         On-link
 4   281 ff00::/8         On-link
 19   311 ff00::/8         On-link
=====
Persistent Routes:
 None
```

```
C:\Users\Dell>route print *157
=====
Interface List
13...c0 3e ba 28 d5 fb .....Realtek PCIe GbE Family Controller
 4...0a 00 27 00 00 04 .....VirtualBox Host-Only Ethernet Adapter
 8...ac 12 03 50 5a 51 .....Microsoft Wi-Fi Direct Virtual Adapter
18...ae 12 03 50 5a 50 .....Microsoft Wi-Fi Direct Virtual Adapter #2
19...ac 12 03 50 5a 50 .....Intel(R) Wireless-AC 9462
10...ac 12 03 50 5a 54 .....Bluetooth Device (Personal Area Network)
 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\Dell>tracert 192.168.1.1
Tracing route to 192.168.1.1 over a maximum of 30 hops
 1  1 ms  <1 ms  <1 ms  192.168.43.1
 2  223 ms  190 ms  188 ms  100.91.255.254
 3  *        *        *        Request timed out.
 4  153 ms  216 ms  75 ms  10.174.173.81
 5  *        *        *        Request timed out.
 6  66 ms   65 ms   77 ms  192.168.100.13
 7  *        *        *        Request timed out.
 8  470 ms  917 ms  1097 ms  10.174.173.65
 9  *        *        *        Request timed out.
10  *        *        *        Request timed out.
11  *        *        *        Request timed out.
12  *        *        *        Request timed out.
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.
```

```
C:\Users\Dell>tracert www.google.com
Tracing route to www.google.com [2404:6800:4009:81e::2004]
over a maximum of 30 hops:
 1  1 ms   1 ms   <1 ms  2402:3a80:108c:b194::be
 2  *        *        *        Request timed out.
 3  80 ms   47 ms   49 ms  fd00:0:17:1c::2
 4  *        *        *        Request timed out.
 5  *        2094 ms  218 ms  fd00:0:17:1c::2
 6  262 ms  81 ms   106 ms  fd00:0:16:38::1
 7  126 ms  156 ms  72 ms  fd00:0:16:3a::2
 8  305 ms   *       3085 ms  fd00:0:17:29::3
 9  52 ms   41 ms   56 ms  2400:5200:2c10:1::12
10  533 ms  647 ms  145 ms  2400:5200:401:a::11
11  *        *        *        Request timed out.
12  78 ms   *       1440 ms  2404:6800:80dc::1
13  211 ms  74 ms   67 ms  2001:4860:0:1::43d8
14  *        *        *        Request timed out.
15  *        *        *        Request timed out.
16  98 ms   96 ms   83 ms  2001:4860:0:1::4fe1
17  142 ms  93 ms   121 ms  bom07s28-in-x04.le100.net [2404:6800:4009:81e::2004]

Trace complete.
```

```
C:\Users\DELL>tracert -d www.yahoo.com
Tracing route to new-fp-shed.wg1.b.yahoo.com [2406:2000:e4:1605::9000]
over a maximum of 30 hops:
 1   1 ms    1 ms    2 ms  2402:3a80:108c:b194:be
 2   *        *        * Request timed out.
 3  267 ms   45 ms   168 ms  fd00:0:17:1c::2
 4   *        *        * Request timed out.
 5   73 ms   48 ms   121 ms  fd00:0:17:1c::2
 6   36 ms   43 ms   57 ms  fd00:0:16:38::1
 7   97 ms   38 ms   49 ms  fd00:0:16:3a::2
 8  482 ms   331 ms  217 ms  fd00:0:17:29::3
 9   49 ms   46 ms   99 ms  2400:5200:2c10:1::12
10  255 ms   83 ms   86 ms  2400:5200:1800:37::2
11   *        *        * Request timed out.
12   *      522 ms   * 2403:e800:508:2c::2
13  193 ms   * 1646 ms 2406:2000:f01f:201::1
14   * 1108 ms  245 ms 2406:2000:e4:fc:c01::1
15   * 277 ms  236 ms 2406:2000:e4:f815::1
16   * 323 ms  218 ms 2406:2000:e4:a08::1
17  266 ms  190 ms  196 ms 2406:2000:e4:1605::9000
Trace complete.
```

```
C:\Users\DELL>tracert 22.110.0.1
Tracing route to 22.110.0.1 over a maximum of 30 hops
 1   1 ms    <1 ms    <1 ms  192.168.43.1
 2  1546 ms   661 ms   665 ms  100.91.255.254
 3   *        *        * Request timed out.
 4   626 ms  1934 ms   653 ms  10.174.173.81
 5   *        *        * Request timed out.
 6   205 ms   78 ms   64 ms  192.168.100.13
 7   *        *        * Request timed out.
 8   * 1601 ms  372 ms  10.174.173.65
 9   163 ms   76 ms   67 ms  118.185.245.1
10   100 ms   83 ms  224 ms  182.19.106.200
11   258 ms  217 ms  218 ms  ae11-100-xcr1.mar.cw.net [213.185.219.53]
12   181 ms  174 ms  231 ms  ae10-xcr1.ptl.cw.net [195.2.30.213]
13   269 ms  218 ms  216 ms  10gigabitethernet-2-2.par2.he.net [195.42.144.104]
14  784 ms  617 ms  728 ms  100ge12-2.core2.ash1.he.net [184.104.196.241]
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\DELL>nslookup
Default Server: Unknown
Address: 192.168.43.1
```

```
C:\Users\DELL>nslookup google.com
Server: Unknown
Address: 192.168.43.1

Non-authoritative answer:
DNS request timed out.
    timeout was 2 seconds.
Name: google.com
Address: 142.250.192.110

C:\Users\DELL>
```

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

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

aspmx.l.google.com      AAAA IPv6 address = 64:ff9b::4a7d:181a
aspmx.l.google.com      AAAA IPv6 address = 2404:6800:4003:c04::1a
alt2.aspmx.l.google.com AAAA IPv6 address = 64:ff9b::8efa:8d1a
alt2.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:c0b::1b
alt4.aspmx.l.google.com AAAA IPv6 address = 64:ff9b::40e9:ab1a
alt4.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4003:c15::1b
alt1.aspmx.l.google.com AAAA IPv6 address = 64:ff9b::adc2:ca1a
alt1.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:400e:c00::1b
alt3.aspmx.l.google.com AAAA IPv6 address = 64:ff9b::8efa:731a
alt3.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:1004::1b
```

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

DNS request timed out.
    timeout was 2 seconds.

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

ns3.google.com  AAAA IPv6 address = 64:ff9b::d8ef:240a
ns3.google.com  AAAA IPv6 address = 2001:4860:4802:36::a
ns4.google.com  AAAA IPv6 address = 64:ff9b::d8ef:260a
ns4.google.com  AAAA IPv6 address = 2001:4860:4802:38::a
ns1.google.com  AAAA IPv6 address = 64:ff9b::d8ef:200a
ns1.google.com  AAAA IPv6 address = 2001:4860:4802:32::a
ns2.google.com  AAAA IPv6 address = 64:ff9b::d8ef:220a
ns2.google.com  AAAA IPv6 address = 2001:4860:4802:34::a
```

Ip Config:

```
C:\Users\Dell>ipconfig
```

```
Windows IP Configuration
```

```
Ethernet adapter Ethernet:
```

```
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . : maa.apac.dell.com
```

```
Ethernet adapter VirtualBox Host-Only Network:
```

```
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . . : fe80::550d:c0a0:6151:d3c8%4  
    IPv4 Address. . . . . : 192.168.56.1  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . :
```

```
Wireless LAN adapter Local Area Connection* 1:
```

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

```
Wireless LAN adapter Local Area Connection* 2:
```

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

```
Wireless LAN adapter Wi-Fi:
```

```
    Connection-specific DNS Suffix . :  
    IPv6 Address. . . . . : 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8  
    Temporary IPv6 Address. . . . . : 2402:3a80:108c:b194:859c:5139:1bea:9b8d  
    Link-local IPv6 Address . . . . . : fe80::1483:bd4:a1d2:d8a8%19  
    IPv4 Address. . . . . : 192.168.43.195  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . : fe80::e0e9:35ff:febff3b1%19  
    192.168.43.1
```

```
Ethernet adapter Bluetooth Network Connection:
```

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

```
C:\Users\Dell>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.
```

```
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.
```

```
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.
```

```
Ethernet adapter Ethernet:
```

```
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . : maa.apac.dell.com
```

```
Ethernet adapter VirtualBox Host-Only Network:
```

```
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . . : fe80::550d:c0a0:6151:d3c8%4  
    IPv4 Address. . . . . : 192.168.56.1  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . :
```

```
Wireless LAN adapter Local Area Connection* 1:
```

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

```
Wireless LAN adapter Local Area Connection* 2:
```

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

```
Wireless LAN adapter Wi-Fi:
```

```
    Connection-specific DNS Suffix . :  
    IPv6 Address. . . . . : 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8  
    Temporary IPv6 Address. . . . . : 2402:3a80:108c:b194:859c:5139:1bea:9b8d  
    Link-local IPv6 Address . . . . . : fe80::1483:bd4:a1d2:d8a8%19  
    Default Gateway . . . . . : fe80::e0e9:35ff:febff3b1%19
```

```
Ethernet adapter Bluetooth Network Connection:
```

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

```
C:\Users\Dell>ipconfig /displaydns
Windows IP Configuration

safebrowsing.googleapis.com
-----
Record Name . . . . . : safebrowsing.googleapis.com
Record Type . . . . . : 28
Time To Live . . . . . : 42
Data Length . . . . . : 16
Section . . . . . : Answer
AAAA Record . . . . . : 2404:6800:4009:821::200a

safebrowsing.googleapis.com
-----
Record Name . . . . . : safebrowsing.googleapis.com
Record Type . . . . . : 1
Time To Live . . . . . : 39
Data Length . . . . . : 4
Section . . . . . : Answer
A (Host) Record . . . . : 142.250.183.42

mtalk.google.com
-----
Record Name . . . . . : mtalk.google.com
Record Type . . . . . : 5
Time To Live . . . . . : 160
Data Length . . . . . : 8
Section . . . . . : Answer
CNAME Record . . . . . : mobile-gtalk.l.google.com

Record Name . . . . . : mobile-gtalk.l.google.com
Record Type . . . . . : 28
Time To Live . . . . . : 160
Data Length . . . . . : 16
Section . . . . . : Answer
AAAA Record . . . . . : 2404:6800:4003:c00::bc

mtalk.google.com
```

```
C:\Users\Dell>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.

The default is to display only the IP address, subnet mask and default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address leases for all adapters bound to TCP/IP will be released or renewed.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is removed.

Examples:

> ipconfig	... Show information
> ipconfig /all	... Show detailed information
> ipconfig /renew	... renew all adapters
> ipconfig /renew EL*	... renew any connection that has its name starting with EL

NetStat:

```
C:\Users\Dell>netstat
Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    127.0.0.1:54170     DESKTOP-PCFNB09:54171 ESTABLISHED
  TCP    127.0.0.1:54171     DESKTOP-PCFNB09:54170 ESTABLISHED
  TCP    127.0.0.1:54172     DESKTOP-PCFNB09:54173 ESTABLISHED
  TCP    127.0.0.1:54173     DESKTOP-PCFNB09:54172 ESTABLISHED
  TCP    127.0.0.1:54174     DESKTOP-PCFNB09:54175 ESTABLISHED
  TCP    127.0.0.1:54175     DESKTOP-PCFNB09:54174 ESTABLISHED
  TCP    127.0.0.1:54176     DESKTOP-PCFNB09:54177 ESTABLISHED
  TCP    127.0.0.1:54177     DESKTOP-PCFNB09:54176 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:50507 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https CLOSE_WAIT
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51887 [64:ff9b::14c6:a24e]:https ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51888 [64:ff9b::14c6:a24e]:https ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51889 [64:ff9b::14c6:a24e]:https ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:58745 sa-in-xbc:5228 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:58770 1drv:https TIME_WAIT
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:63260 bom12s11-in-x0a:https ESTABLISHED
```

```
C:\Users\Dell>netstat -n
Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    127.0.0.1:54170     127.0.0.1:54171 ESTABLISHED
  TCP    127.0.0.1:54171     127.0.0.1:54170 ESTABLISHED
  TCP    127.0.0.1:54172     127.0.0.1:54173 ESTABLISHED
  TCP    127.0.0.1:54173     127.0.0.1:54172 ESTABLISHED
  TCP    127.0.0.1:54174     127.0.0.1:54175 ESTABLISHED
  TCP    127.0.0.1:54175     127.0.0.1:54174 ESTABLISHED
  TCP    127.0.0.1:54176     127.0.0.1:54177 ESTABLISHED
  TCP    127.0.0.1:54177     127.0.0.1:54176 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:50507 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 CLOSE_WAIT
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51887 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51888 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51889 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:58745 [2404:6800:4003:c00::bc]:5228 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:63260 [2404:6800:4009:821::200a]:443 ESTABLISHED
```

```
C:\Users\Dell>netstat -n 5
Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    127.0.0.1:54170     127.0.0.1:54171 ESTABLISHED
  TCP    127.0.0.1:54171     127.0.0.1:54170 ESTABLISHED
  TCP    127.0.0.1:54172     127.0.0.1:54173 ESTABLISHED
  TCP    127.0.0.1:54173     127.0.0.1:54172 ESTABLISHED
  TCP    127.0.0.1:54174     127.0.0.1:54175 ESTABLISHED
  TCP    127.0.0.1:54175     127.0.0.1:54174 ESTABLISHED
  TCP    127.0.0.1:54176     127.0.0.1:54177 ESTABLISHED
  TCP    127.0.0.1:54177     127.0.0.1:54176 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:50507 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 CLOSE_WAIT
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51887 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51888 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51889 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:58745 [2404:6800:4003:c00::bc]:5228 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:63260 [2404:6800:4009:821::200a]:443 ESTABLISHED

Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    127.0.0.1:54170     127.0.0.1:54171 ESTABLISHED
  TCP    127.0.0.1:54171     127.0.0.1:54170 ESTABLISHED
  TCP    127.0.0.1:54172     127.0.0.1:54173 ESTABLISHED
  TCP    127.0.0.1:54173     127.0.0.1:54172 ESTABLISHED
  TCP    127.0.0.1:54174     127.0.0.1:54175 ESTABLISHED
  TCP    127.0.0.1:54175     127.0.0.1:54174 ESTABLISHED
  TCP    127.0.0.1:54176     127.0.0.1:54177 ESTABLISHED
  TCP    127.0.0.1:54177     127.0.0.1:54176 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:50507 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 CLOSE_WAIT
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51887 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51888 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:51889 [64:ff9b::14c6:a24e]:443 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:58745 [2404:6800:4003:c00::bc]:5228 ESTABLISHED
  TCP    [2402:3a80:108c:b194:859c:5139:1bea:9b8d]:63260 [2404:6800:4009:821::200a]:443 ESTABLISHED
```

Active Connections			
Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:8139	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:443	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:5940	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:7680	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49664	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49665	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49666	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49667	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49668	DESKTOP-PCFN09:0	LISTENING
TCP	0.0.0.0:49685	DESKTOP-PCFN09:0	LISTENING
TCP	127.0.0.1:18884	DESKTOP-PCFN09:0	LISTENING
TCP	127.0.0.1:154170	DESKTOP-PCFN09:54171	ESTABLISHED
TCP	127.0.0.1:154214	DESKTOP-PCFN09:54173	ESTABLISHED
TCP	127.0.0.1:154217	DESKTOP-PCFN09:54172	ESTABLISHED
TCP	127.0.0.1:154173	DESKTOP-PCFN09:54173	ESTABLISHED
TCP	127.0.0.1:154174	DESKTOP-PCFN09:54175	ESTABLISHED
TCP	127.0.0.1:154175	DESKTOP-PCFN09:54174	ESTABLISHED
TCP	127.0.0.1:154176	DESKTOP-PCFN09:54177	ESTABLISHED
TCP	127.0.0.1:154177	DESKTOP-PCFN09:54176	ESTABLISHED
TCP	127.0.0.1:154178	DESKTOP-PCFN09:54178	ESTABLISHED
TCP	127.168.43.195:63202	a-0001:https	ESTABLISHED
TCP	127.168.43.195:63202	DESKTOP-PCFN09:0	LISTENING
TCP	127.168.56.11:139	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:1135	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:445	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:7680	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:14664	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:14665	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:49666	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:49667	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:49668	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:49669	DESKTOP-PCFN09:0	LISTENING
TCP	[::]:49670	DESKTOP-PCFN09:0	LISTENING
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51887	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51888	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51889	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51890	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51891	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:51892	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:63261	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:63263	[2606:2800:147:120f:30c1:bedf:265a]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:63264	[64:ffffb:146c:a24e]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:63265	[64:ffffb:146c:a24f:c5de]::https	ESTABLISHED
TCP	[2402]:3a80:106:b194:859c:5139:1bea:9b8d:63266	[2606:1901::1::6e:]::https	ESTABLISHED

UBUNTU

Ping

```
akshay07@akshay07-VirtualBox:~$ ping www.google.com
PING www.google.com (142.250.182.196) 56(84) bytes of data.
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=1 ttl=54 tim
e=496 ms
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=2 ttl=54 tim
e=379 ms
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=3 ttl=54 tim
e=495 ms
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=4 ttl=54 tim
e=134 ms
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=5 ttl=54 tim
e=313 ms
64 bytes from bom07s28-in-f4.1e100.net (142.250.182.196): icmp_seq=6 ttl=54 tim
e=365 ms
^C
--- www.google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5005ms
rtt min/avg/max/mdev = 134.127/363.812/496.340/122.708 ms
akshay07@akshay07-VirtualBox:~$
```

```
akshay07@akshay07-VirtualBox:~$ ping -a google.com
PING google.com (216.58.203.14) 56(84) bytes of data.
64 bytes from hkg12s09-in-f14.1e100.net (216.58.203.14): icmp_seq=1 ttl=113 tim
e=87.3 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=2 ttl=113 tim
e=356 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=3 ttl=113 tim
e=389 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=4 ttl=113 tim
e=494 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=5 ttl=113 tim
e=231 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=6 ttl=113 tim
e=308 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=7 ttl=113 tim
e=201 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=8 ttl=113 tim
e=235 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=9 ttl=113 tim
e=382 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=10 ttl=113 ti
me=396 ms
^C
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9011ms
rtt min/avg/max/mdev = 87.318/307.912/493.743/113.210 ms
```

```
rtt Min/avg/Max/Mdev = 87.318/307.912/493.743/113.210 ms
akshay07@akshay07-VirtualBox:~$ ping -V google.com
ping from iputils 20210202
```

```
akshay07@akshay07-VirtualBox:~$ ping -b google.com
PING google.com (216.58.203.14) 56(84) bytes of data.
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=1 ttl=113 time=159 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=2 ttl=113 time=165 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=3 ttl=113 time=410 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=4 ttl=113 time=302 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=5 ttl=113 time=336 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=6 ttl=113 time=285 ms
64 bytes from bom12s04-in-f14.1e100.net (216.58.203.14): icmp_seq=7 ttl=113 time=449 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6017ms
rtt min/avg/max/mdev = 158.509/300.780/448.692/102.737 ms
```

Route

```
akshay07@akshay07-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3
```

```
akshay07@akshay07-VirtualBox:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3
```

```
akshay07@akshay07-VirtualBox:~$ route -Cn
Kernel IP routing cache
Source          Destination      Gateway        Flags Metric Ref    Use Iface
akshay07@akshay07-VirtualBox:~$
```

```
akshay07@akshay07-VirtualBox:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
```

Traceroute

```
akshay07@akshay07-VirtualBox:~$ traceroute google.com
traceroute to google.com (216.58.203.14), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  2.027 ms  1.965 ms  1.932 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 * * *
 8 * * *
 9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
```

```
akshay07@akshay07-VirtualBox:~$ traceroute -4 google.com
traceroute to google.com (216.58.203.14), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  0.440 ms  0.396 ms  0.378 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 * * *
 8 * * *
 9 * * *
10 * * *
11 * * *
12 * *^C
```

```
akshay07@akshay07-VirtualBox:~$ traceroute -6 google.com
traceroute to google.com (2404:6800:4009:804::200e), 30 hops max, 80 byte packets
connect: Network is unreachable
akshay07@akshay07-VirtualBox:~$
```

```
akshay07@akshay07-VirtualBox:~$ traceroute -d google.com
traceroute to google.com (216.58.203.14), 30 hops max, 60 byte packets
setsockopt SO_DEBUG: Permission denied
akshay07@akshay07-VirtualBox:~$
```

Nslookup

```
akshay07@akshay07-VirtualBox:~$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 216.58.203.14
Name:   google.com
Address: 2404:6800:4009:804::200e
```

```
akshay07@akshay07-VirtualBox:~$ nslookup -q=MX google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

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

Authoritative answers can be found from:
```

```
akshay07@akshay07-VirtualBox:~$ 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:
```

```
akshay07@akshay07-VirtualBox:~$ nslookup -type=a google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 216.58.203.14
```

Ifconfig

```

TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

akshay07@akshay07-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::e039:15f3:471e:c364 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:f5:e7:35 txqueuelen 1000 (Ethernet)
            RX packets 159887 bytes 231254702 (231.2 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 45039 bytes 2770127 (2.7 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 448 bytes 43519 (43.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 448 bytes 43519 (43.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

```

0 upgraded, 0 newly installed, 0 to remove and 259 not upgraded.
akshay07@akshay07-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::e039:15f3:471e:c364 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:f5:e7:35 txqueuelen 1000 (Ethernet)
            RX packets 159887 bytes 231254702 (231.2 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 45039 bytes 2770127 (2.7 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 448 bytes 43519 (43.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 448 bytes 43519 (43.5 KB)
            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
enp0s3	1500	159887	0	0 0		45039	0	0	0	BMRU
lo	65536	448	0	0 0		448	0	0	0	LRU

```

lo      65536      448      0      0 0      448      0      0      0 LRU
akshay07@akshay07-VirtualBox:~$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::e039:15f3:471e:c364 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:f5:e7:35 txqueuelen 1000 (Ethernet)
            RX packets 159887 bytes 231254702 (231.2 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 45039 bytes 2770127 (2.7 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 448 bytes 43519 (43.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 448 bytes 43519 (43.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

Netstat

```

akshay07@akshay07-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp        0      0 akshay07-Virtual:bootpc _gateway:bootps      ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node      Path
unix    2      [ ]      DGRAM                    21873      /run/user/1000/systemd/
md/notify
unix    3      [ ]      DGRAM                    15462      /run/systemd/notify
unix    2      [ ]      DGRAM                    15476      /run/systemd/journal
/syslog
unix   17      [ ]      DGRAM                    15485      /run/systemd/journal
/dev-log
unix    8      [ ]      DGRAM                    15487      /run/systemd/journal
/socket
unix    2      [ ]      DGRAM                    24167
unix    3      [ ]      STREAM     CONNECTED    23773
unix    3      [ ]      STREAM     CONNECTED    24320      /run/user/1000/bus
unix    3      [ ]      STREAM     CONNECTED    22123
unix    3      [ ]      STREAM     CONNECTED    24525      /run/user/1000/bus
unix    3      [ ]      STREAM     CONNECTED    23723      /run/systemd/journal
/stdout
unix    3      [ ]      STREAM     CONNECTED    37139
unix    3      [ ]      STREAM     CONNECTED    24165      /run/dbus/system_bus
/socket
unix    3      [ ]      STREAM     CONNECTED    24262      /run/user/1000/wayla
nd-0
unix    3      [ ]      STREAM     CONNECTED    24319

```

```
akshay07@akshay07-VirtualBox:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 10.0.2.15:68              10.0.2.2:67          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix    2      [ ]     DGRAM           21873   /run/user/1000/syste
md/notify
unix    3      [ ]     DGRAM           15462   /run/systemd/notify
unix    2      [ ]     DGRAM           15476   /run/systemd/journal
/syslog
unix   17      [ ]     DGRAM           15485   /run/systemd/journal
/dev-log
unix    8      [ ]     DGRAM           15487   /run/systemd/journal
/socket
unix    2      [ ]     DGRAM           24167
unix    3      [ ]     STREAM  CONNECTED    23773
unix    3      [ ]     STREAM  CONNECTED    24320   /run/user/1000/bus
unix    3      [ ]     STREAM  CONNECTED    22123
unix    3      [ ]     STREAM  CONNECTED    24525   /run/user/1000/bus
unix    3      [ ]     STREAM  CONNECTED    23723   /run/systemd/journal
/stdout
unix    3      [ ]     STREAM  CONNECTED    37139
unix    3      [ ]     STREAM  CONNECTED    24165   /run/dbus/system_bus
_socket
unix    3      [ ]     STREAM  CONNECTED    24262   /run/user/1000/wayla
nd-0
unix    3      [ ]     STREAM  CONNECTED    24319
```

```

akshay07@akshay07-VirtualBox:~$ 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:*
tcp6     0      0 [::]:http            [::]:*
tcp6     0      0 ip6-localhost:ipp      [::]:*
udp      0      0 akshay07-VirtualB:54727 192.168.43.1:domain ESTABLISHED
udp      0      0 0.0.0.0:37492        0.0.0.0:*
udp      0      0 0.0.0.0:631         0.0.0.0:*
udp      0      0 localhost:domain       0.0.0.0:*
udp      0      0 akshay07-Virtual:bootpc _gateway:bootps      ESTABLISHED
udp      0      0 0.0.0.0:mdns        0.0.0.0:*
udp6     0      0 [::]:36318          [::]:*
udp6     0      0 [::]:mdns          [::]:*
raw6     0      0 [::]:ipv6-icmp      [::]:*                7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags     Type      State     I-Node   Path
unix    2 [ ACC ]     STREAM    LISTENING  22647   @/tmp/.ICE-unix/1457
unix    2 [ ACC ]     STREAM    LISTENING  23181   @/tmp/.X11-unix/X0
unix    2 [ ACC ]     STREAM    LISTENING  23183   @/tmp/.X11-unix/X1
unix    2 [ ACC ]     STREAM    LISTENING  22144   @/tmp/dbus-bcW5J0en
unix    2 [ ]          DGRAM     LISTENING  21873   /run/user/1000/systemd
md/notify
unix    2 [ ACC ]     STREAM    LISTENING  21876   /run/user/1000/systemd
md/private
unix    2 [ ACC ]     STREAM    LISTENING  21944   /run/user/1000/bus
unix    2 [ ACC ]     STREAM    LISTENING  18460   @/tmp/dbus-e02CLTHI
unix    2 [ ACC ]     STREAM    LISTENING  21946   /run/user/1000/gnupg

```

```

akshay07@akshay07-VirtualBox:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 10.0.2.15:68           10.0.2.2:67        ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type      State     I-Node   Path
unix    2 [ ]          DGRAM     LISTENING  21873   /run/user/1000/systemd
md/notify
unix    3 [ ]          DGRAM     LISTENING  15462   /run/systemd/notify
unix    2 [ ]          DGRAM     LISTENING  15476   /run/systemd/journal
/syslog
unix   17 [ ]          DGRAM     LISTENING  15485   /run/systemd/journal
/dev-log
unix    8 [ ]          DGRAM     LISTENING  15487   /run/systemd/journal
/socket
unix    2 [ ]          DGRAM     CONNECTED  24167
unix    3 [ ]          STREAM    CONNECTED  23773
unix    3 [ ]          STREAM    CONNECTED  24320   /run/user/1000/bus
unix    3 [ ]          STREAM    CONNECTED  22123
unix    3 [ ]          STREAM    CONNECTED  24525   /run/user/1000/bus
unix    3 [ ]          STREAM    CONNECTED  23723   /run/systemd/journal
/stdout
unix    3 [ ]          STREAM    CONNECTED  37139
unix    3 [ ]          STREAM    CONNECTED  24165   /run/dbus/system_bus
/_socket
unix    3 [ ]          STREAM    CONNECTED  24262   /run/user/1000/wayla
nd-0

```

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 an 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\Dell>arp -a

Interface: 192.168.56.1 --- 0x4
Internet Address      Physical Address      Type
192.168.56.255        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

Interface: 192.168.43.195 --- 0x13
Internet Address      Physical Address      Type
192.168.43.1           e2-e9-35-bf-f3-b1    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

C:\Users\Dell>S...
```

ii. NbtStat

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, 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 NetBIOS name.

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

Of course, NetBIOS 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 NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

```
C:\Users\DELL>nbtstat -r  
NetBIOS Names Resolution and Registration Statistics  
-----  
Resolved By Broadcast = 0  
Resolved By Name Server = 0  
Registered By Broadcast = 210  
Registered By Name Server = 0  
C:\Users\DELL>
```

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\DELL>hostname  
DESKTOP-PCFNB09  
C:\Users\DELL>
```

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 host name 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\DELL>pathping www.google.com  
  
Tracing route to www.google.com [2404:6800:4009:81e::2004]  
over a maximum of 30 hops:  
 0  DESKTOP-PCFNB09 [2402:3a80:108c:b194:859c:5139:1bea:9b8d]  
  1  2402:3a80:108c:b194::be  
  2  *       *       *  
Computing statistics for 25 seconds...  
          Source to Here  This Node/Link  
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address  
   0                DESKTOP-PCFNB09 [2402:3a80:108c:b194:859c:5139:1bea:9b8d]  
   1  24ms    1/ 100 =  1%    0/ 100 =  0%  2402:3a80:108c:b194::be  
  
Trace complete.
```

v. getmac Command

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

```
C:\Users\Dell>getmac
Physical Address      Transport Name
===== =====
C0-3E-BA-28-D5-FB  Media disconnected
AC-12-03-50-5A-50  \Device\Tcpip_{F7D6C595-508A-4AF3-86FD-8A50CF8A9974}
AC-12-03-50-5A-54  Media disconnected
0A-00-27-00-00-04  \Device\Tcpip_{3CB6DBD7-45C8-4C86-B2B8-AB058476FBE7}
```

Basic Linux Commands

Submitted By:

Akshay Murali

Roll No: 07

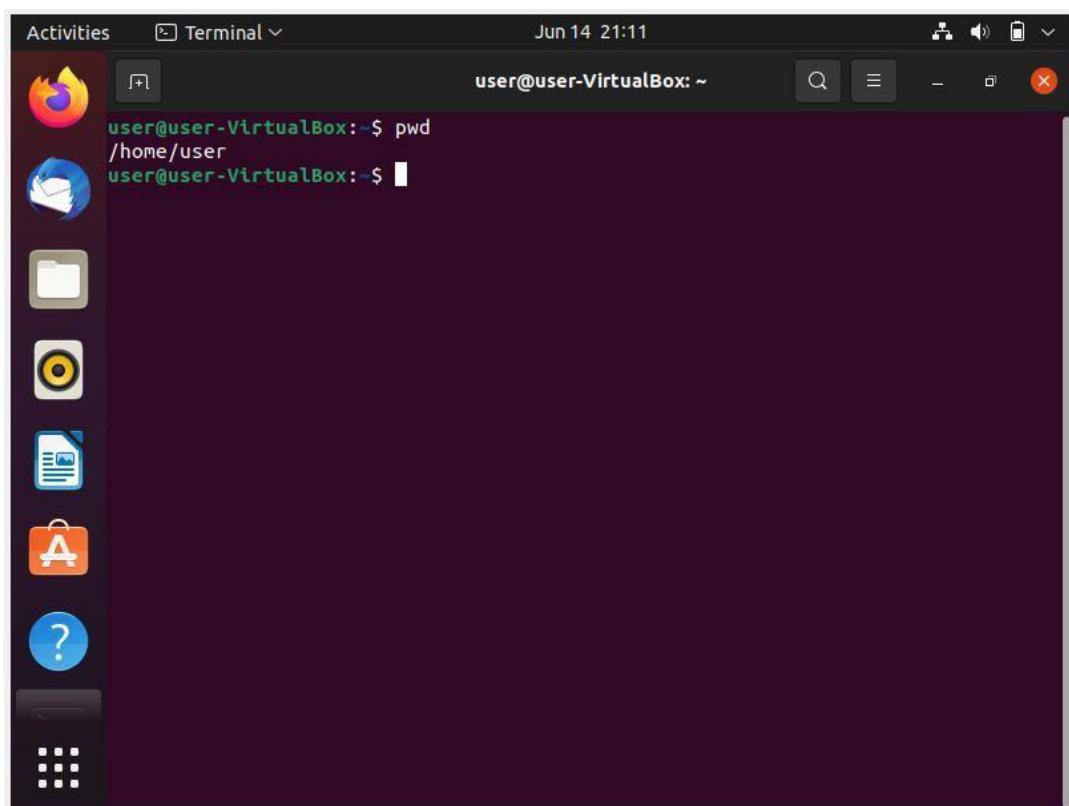
Subject: Network Lab

Batch: MCA A

BASIC LINUX COMMANDS

1. pwd (Print Working Directory)

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



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. ➤ history
- !command number to run a command from history



A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. It displays the following session:

```
user@user-VirtualBox:~$ pwd
/home/user
user@user-VirtualBox:~$ history
 1  pwd
 2  pwd a
 3  ls
 4  history
 5  clear
 6  ls
 7  cd public
 8  cd Public
 9  cd..
10  cd-
11  cd
12  cd Public
13  ls
14  lslslslsls
```

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**

```
Activities Terminal Jun 14 21:15
user@user-VirtualBox: ~ LS(1) User Commands LS(1)

NAME      ls - list directory contents
SYNOPSIS  ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

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

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

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

--author
        with -l, print the author of each file

-b, --escape
        print C-style escapes for nongraphic characters

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 "user@user-VirtualBox: ~". The window shows a dark purple background with white text. The user has entered three commands: "cd Public", "cd", and then pressed the Enter key again. The terminal window has a standard Linux-style header with icons for minimize, maximize, and close.

```
user@user-VirtualBox:~$ cd Public
user@user-VirtualBox:~/Public$ cd
user@user-VirtualBox:~$
```

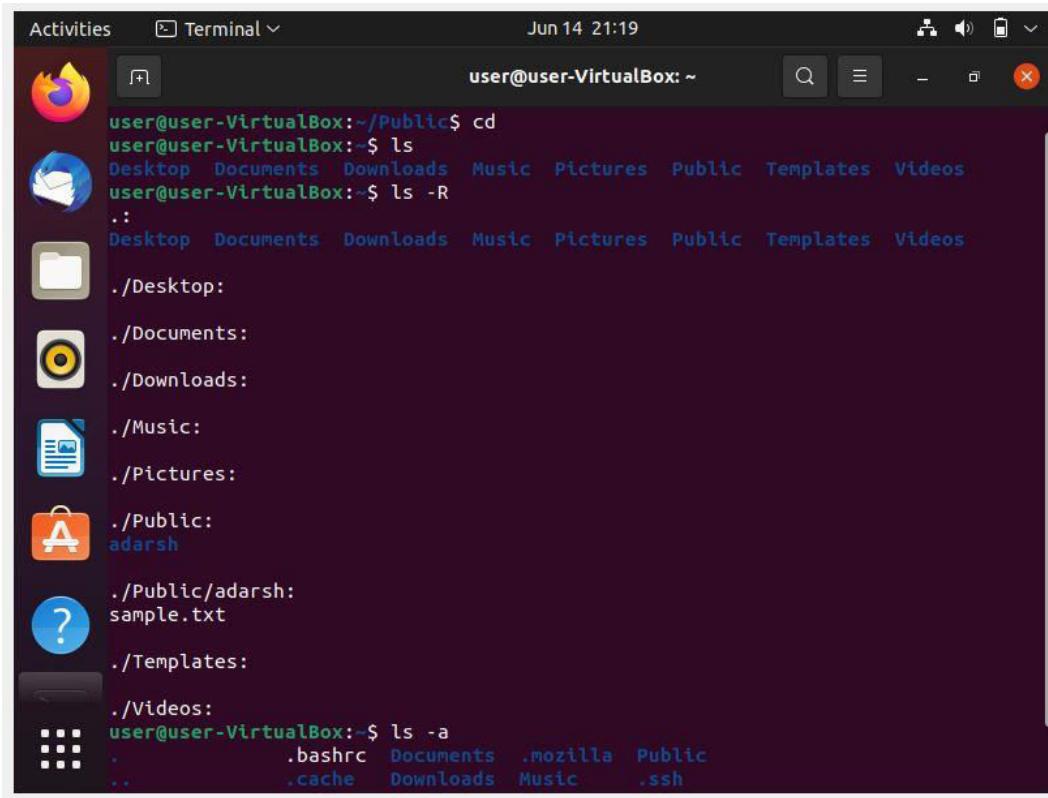
5. ls

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 all 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 other switches such as ls -tr. This will reverse the time-wise listing.



The screenshot shows a terminal window titled "Terminal" with the command line interface. The terminal window has a dark background and light-colored text. It displays the following commands and their outputs:

```

Activities Terminal Jun 14 21:19
user@user-VirtualBox:~/Public$ cd
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$ ls -R
.:
Desktop Documents Downloads Music Pictures Public Templates Videos
./Desktop:
./Documents:
./Downloads:
./Music:
./Pictures:
./Public:
./Public/adarsh:
sample.txt
./Templates:
./Videos:
user@user-VirtualBox:~$ ls -a
. .bashrc Documents .mozilla Public
.. .cache Downloads Music .ssh

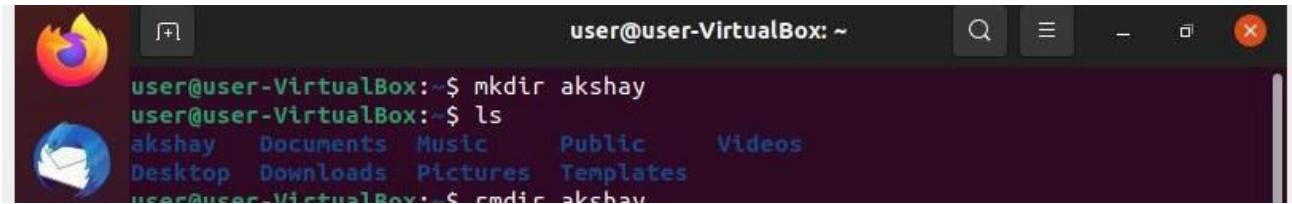
```

The terminal window also shows icons for various applications in the top left corner, including a browser, file manager, and terminal.

6. mkdir

Use mkdir command to make a new directory .

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

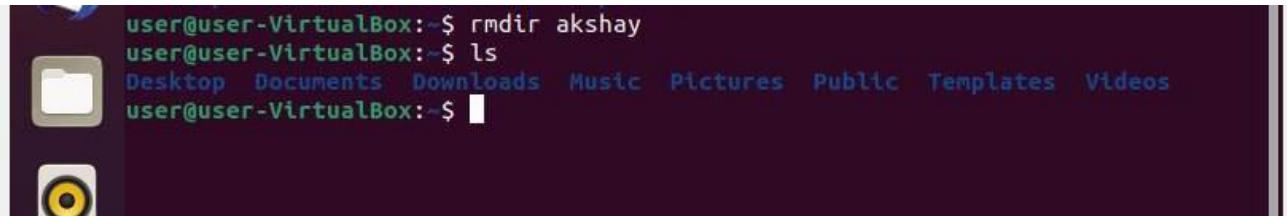


A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark purple background and a dark purple header bar. In the header bar, there are icons for a browser (Firefox), a file manager (Nautilus), and a terminal. The terminal window title is "user@user-VirtualBox: ~". The terminal content shows the following commands and output:

```
user@user-VirtualBox:~$ mkdir akshay
user@user-VirtualBox:~$ ls
akshay  Documents  Music  Public  Videos
Desktop  Downloads  Pictures  Templates
user@user-VirtualBox:~$ cd akshay
```

7. rmdir

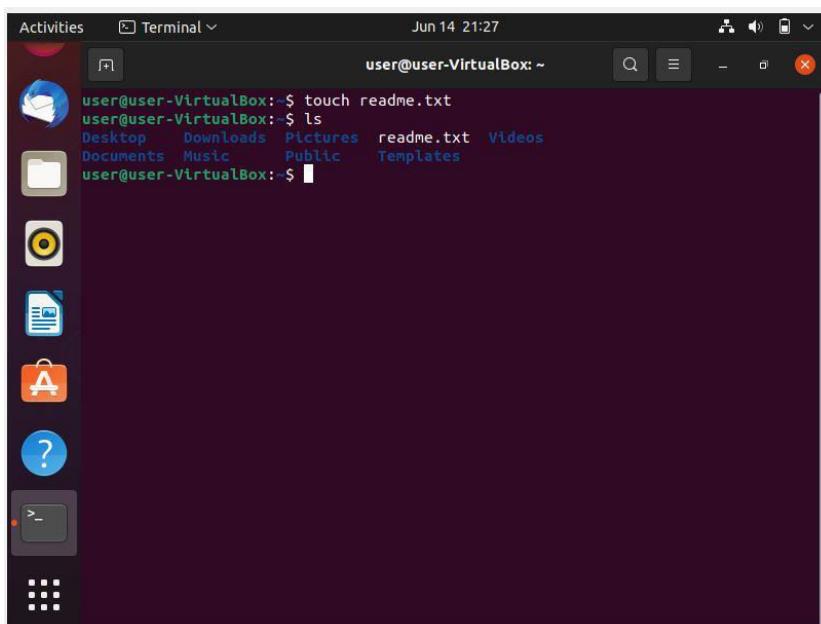
If you need to delete a directory, use the rmdir command. However, rmdir only allows you to delete empty directories.



```
user@user-VirtualBox:~$ rmdir akshay
user@user-VirtualBox:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
user@user-VirtualBox:~$
```

8. touch

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



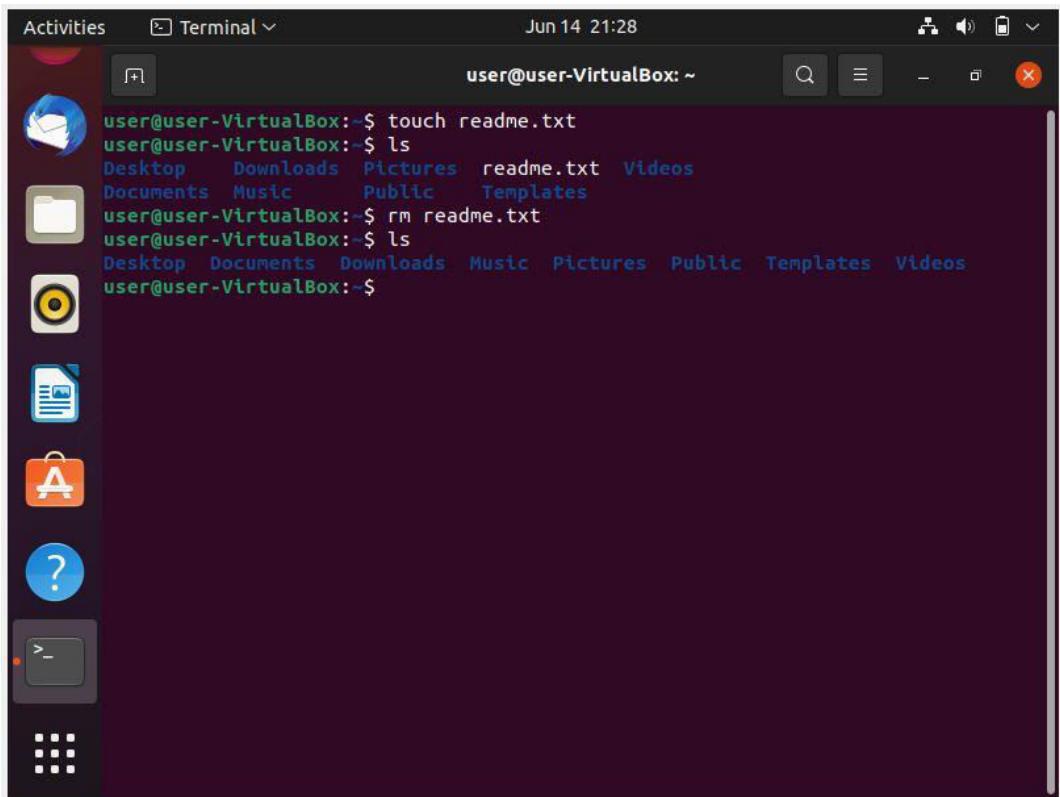
```
Activities Terminal Jun 14 21:27
user@user-VirtualBox:~$ touch readme.txt
user@user-VirtualBox:~$ ls
Desktop  Downloads  Pictures  readme.txt  Videos
Documents  Music  Public  Templates
user@user-VirtualBox:~$
```

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 Linux desktop environment. On the left is a dock with various icons: a user profile, terminal, file manager, system settings, help, and a terminal icon. The main area shows a terminal window titled "Terminal" with the command line "user@user-VirtualBox: ~". The terminal displays the following session:

```
user@user-VirtualBox:~$ touch readme.txt
user@user-VirtualBox:~$ ls
Desktop Downloads Pictures readme.txt Videos
Documents Music Public Templates
user@user-VirtualBox:~$ rm readme.txt
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$
```

The terminal window has a dark background and light-colored text. The desktop interface includes a header bar with "Activities", the terminal icon, the date "Jun 14 21:28", and system status icons.

10. cat

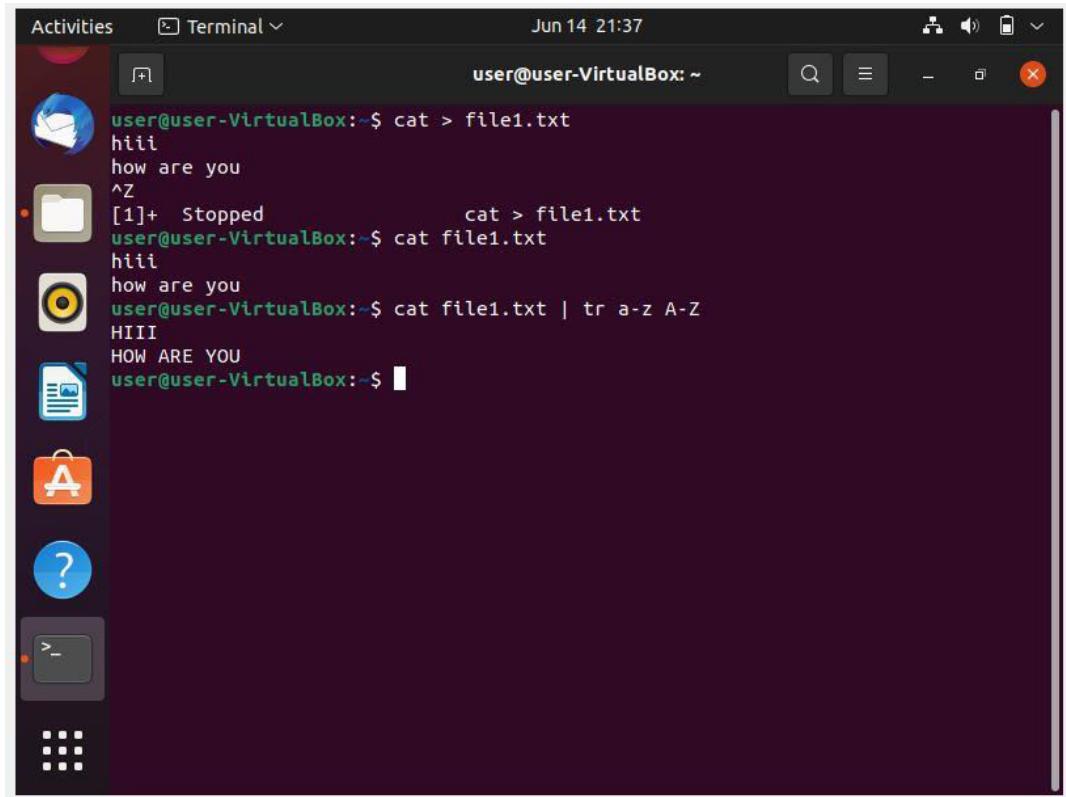
cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout .

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
- **cat filename1 filename2>filename3** joins two files (1 and 2) 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



A screenshot of a Linux terminal window titled "Terminal". The window shows a terminal session with the following commands and output:

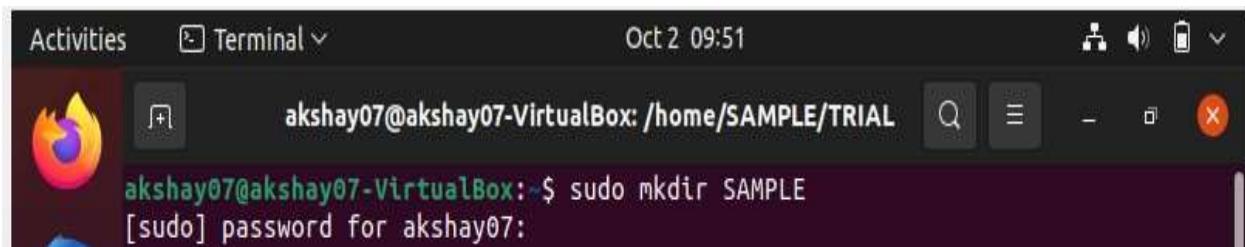
```
Activities Terminal Jun 14 21:37 user@user-VirtualBox: ~
user@user-VirtualBox:~$ cat > file1.txt
hiii
how are you
^Z
[1]+  Stopped                  cat > file1.txt
user@user-VirtualBox:~$ cat file1.txt
hiii
how are you
user@user-VirtualBox:~$ cat file1.txt | tr a-z A-Z
HIII
HOW ARE YOU
user@user-VirtualBox:~$
```

The terminal window has a dark background with light-colored text. To the left of the terminal is a vertical dock containing icons for various applications like a file browser, terminal, and help.

**NETWORKING & SYSTEM
ADMINISTRATION LAB MODEL EXAM
MODEL EXAM**

**Akshay Murali
Roll no: 07
RMCA-A BATCH**

1. Create a directory SAMPLE under your home directory



A screenshot of a Linux desktop environment, likely Ubuntu. At the top, there's a header bar with "Activities", "Terminal", the date "Oct 2 09:51", and system icons. Below the header is a terminal window titled "Terminal". The terminal shows the command: "akshay07@akshay07-VirtualBox:~\$ sudo mkdir SAMPLE". A password prompt follows: "[sudo] password for akshay07:".

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

```
bash: cd: /SAMPLE: No such file or directory  
akshay07@akshay07-VirtualBox:/home$ cd SAMPLE  
akshay07@akshay07-VirtualBox:/home/SAMPLE$ sudo mkdir TRIAL  
akshay07@akshay07-VirtualBox:/home/SAMPLE$ cd TRIAL
```

3. Create file1,file2, file3, file4, file5, file6under TRIALdirectory using a single command.

```
akshay07@akshay07-VirtualBox:/home/SAMPLE$ cd TRIAL  
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo touch file1.txt file2.txt  
file3.txt file4.txt file5.txt file6.txt
```

4. Create files myfileand yourfileunder Present Working Directory.

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo touch myfile.txt yourfile.txt
```

5. Display the contents in myfile and yourfile.

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo gedit myfile.txt  
^C  
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ cat myfile.txt  
my name is akshay murali  
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo gedit yourfile.txt  
^C  
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ cat yourfile.txt  
I am studying in amal jyothi college of engineering
```

6. Copy myfile file to emp

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ cd /home  
akshay07@akshay07-VirtualBox:/home$ sudo mkdir emp  
[sudo] password for akshay07:
```

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

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo groupadd -g 30000 College
[sudo] password for akshay07:
groupadd: GID '30000' already exists
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo groupdel shakespeare
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ sudo groupadd -g 30000 College
```

8.Execute the following commands and write their output

a.Ping

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
^C
--- 8.8.8.8 ping statistics ---
12 packets transmitted, 0 received, 100% packet loss, time 11268ms
```

b.Traceroute

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.250 ms  0.184 ms  0.166 ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
```

c.Netstat

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
```

d.Ifconfig

```
akshay07@akshay07-VirtualBox:/home/SAMPLE/TRIAL$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fe80::e039:15f3:471e:c364  prefixlen 64  scopeid 0x20<link>
          ether 08:00:27:f5:e7:35  txqueuelen 1000  (Ethernet)
            RX packets 581  bytes 263658 (263.6 KB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 697  bytes 83123 (83.1 KB)
            TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
          loop  txqueuelen 1000  (Local Loopback)
            RX packets 313  bytes 27927 (27.9 KB)
            RX errors 0  dropped 0  overruns 0  frame 0
            TX packets 313  bytes 27927 (27.9 KB)
            TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

e.tcpdump

Networking and System Administration Lab

Lab Assignment: Ansible Installation

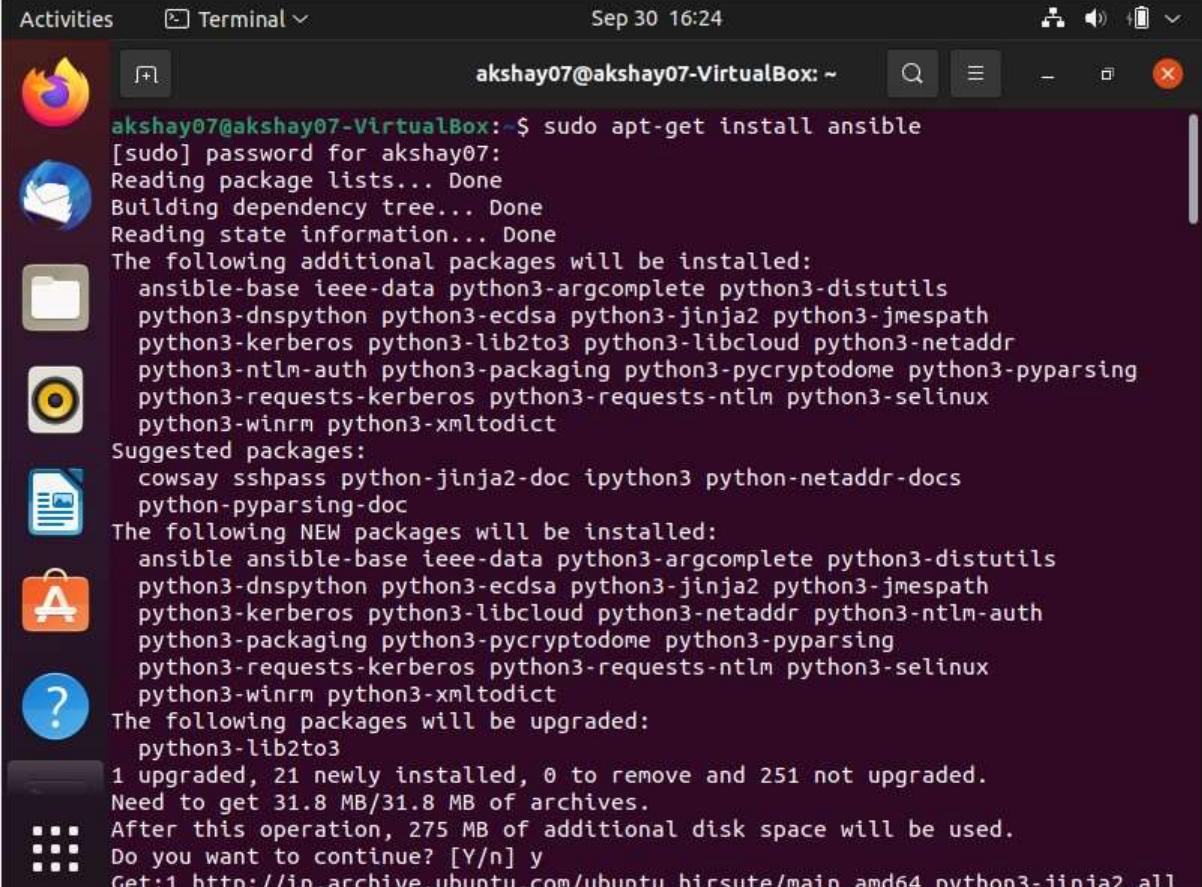
Akshay Murali

Roll No: 07

MCA A BATCH

Ansible Installation

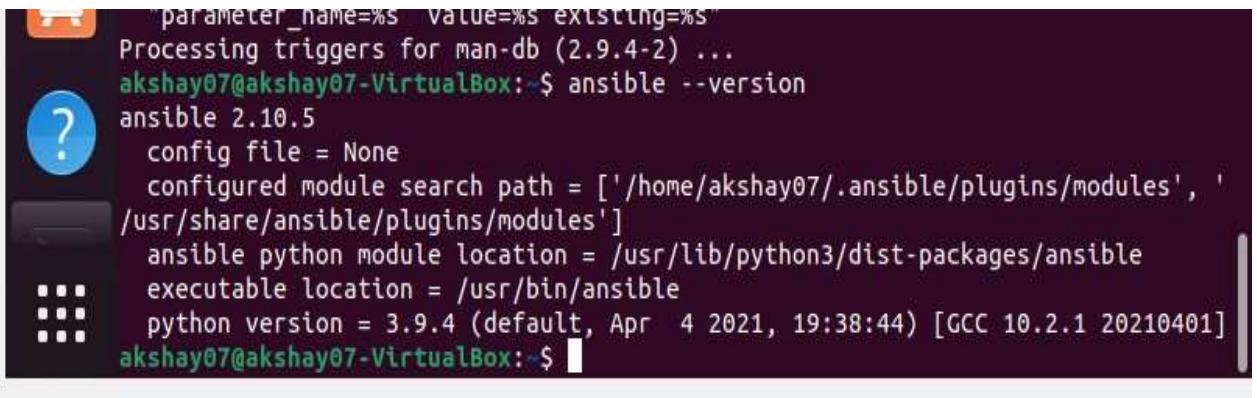
Step1: sudo apt-get install ansible



```
akshay07@akshay07-VirtualBox:~$ sudo apt-get install ansible
[sudo] password for akshay07:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-lib2to3 python3-libcloud python3-netaddr
  python3-ntlm-auth python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
  python-pyparsing-doc
The following NEW packages will be installed:
  ansible ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-libcloud python3-netaddr python3-ntlm-auth
  python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
The following packages will be upgraded:
  python3-lib2to3
1 upgraded, 21 newly installed, 0 to remove and 251 not upgraded.
Need to get 31.8 MB/31.8 MB of archives.
After this operation, 275 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-jinja2 all
```

Installation check

Step2:ansible --version



```
Processing triggers for man-db (2.9.4-2) ...
akshay07@akshay07-VirtualBox:~$ ansible --version
ansible 2.10.5
  config file = None
  configured module search path = ['/home/akshay07/.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 = 3.9.4 (default, Apr  4 2021, 19:38:44) [GCC 10.2.1 20210401]
akshay07@akshay07-VirtualBox:~$
```

NETWORKING AND SYSTEM ADMINISTRATION LAB

LAB ASSIGNMENT: LAMP STACK INSTALLATION

**Akshay Murali
Roll No: 07
MCA A BATCH**

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.

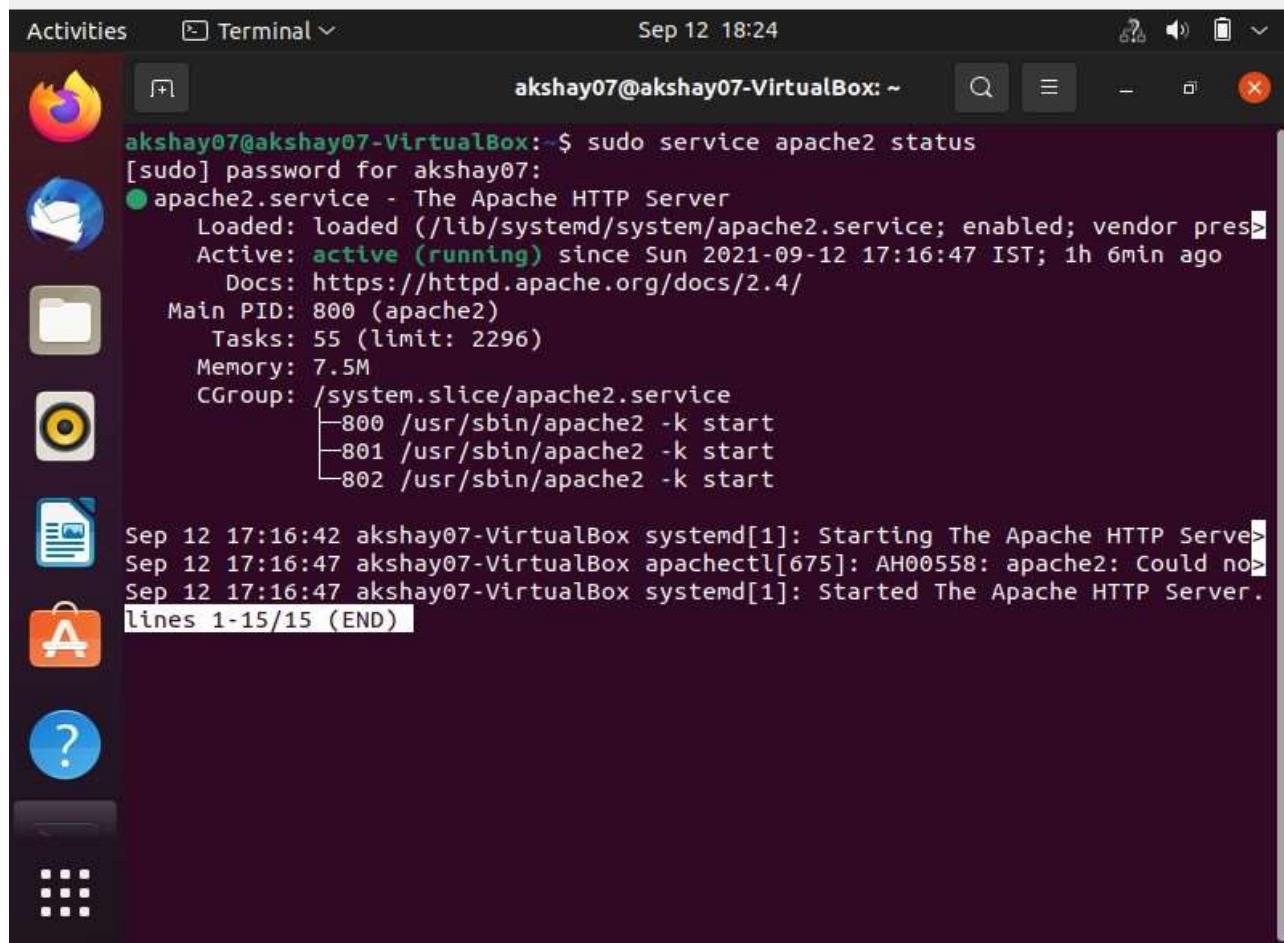
Command:

```
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
```



```
akshay07@akshay07-VirtualBox:~$ sudo service apache2 status
[sudo] password for akshay07:
● apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
  Active: active (running) since Sun 2021-09-12 17:16:47 IST; 1h 6min ago
    Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 800 (apache2)
     Tasks: 55 (limit: 2296)
    Memory: 7.5M
      CPU: 0.000 CPU(s) since start
     CGroup: /system.slice/apache2.service
             ├─800 /usr/sbin/apache2 -k start
             ├─801 /usr/sbin/apache2 -k start
             ├─802 /usr/sbin/apache2 -k start
Sep 12 17:16:42 akshay07-VirtualBox systemd[1]: Starting The Apache HTTP Server...
Sep 12 17:16:47 akshay07-VirtualBox apachectl[675]: AH00558: apache2: Could no>
Sep 12 17:16:47 akshay07-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
```

2. Installation of MariaDB

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

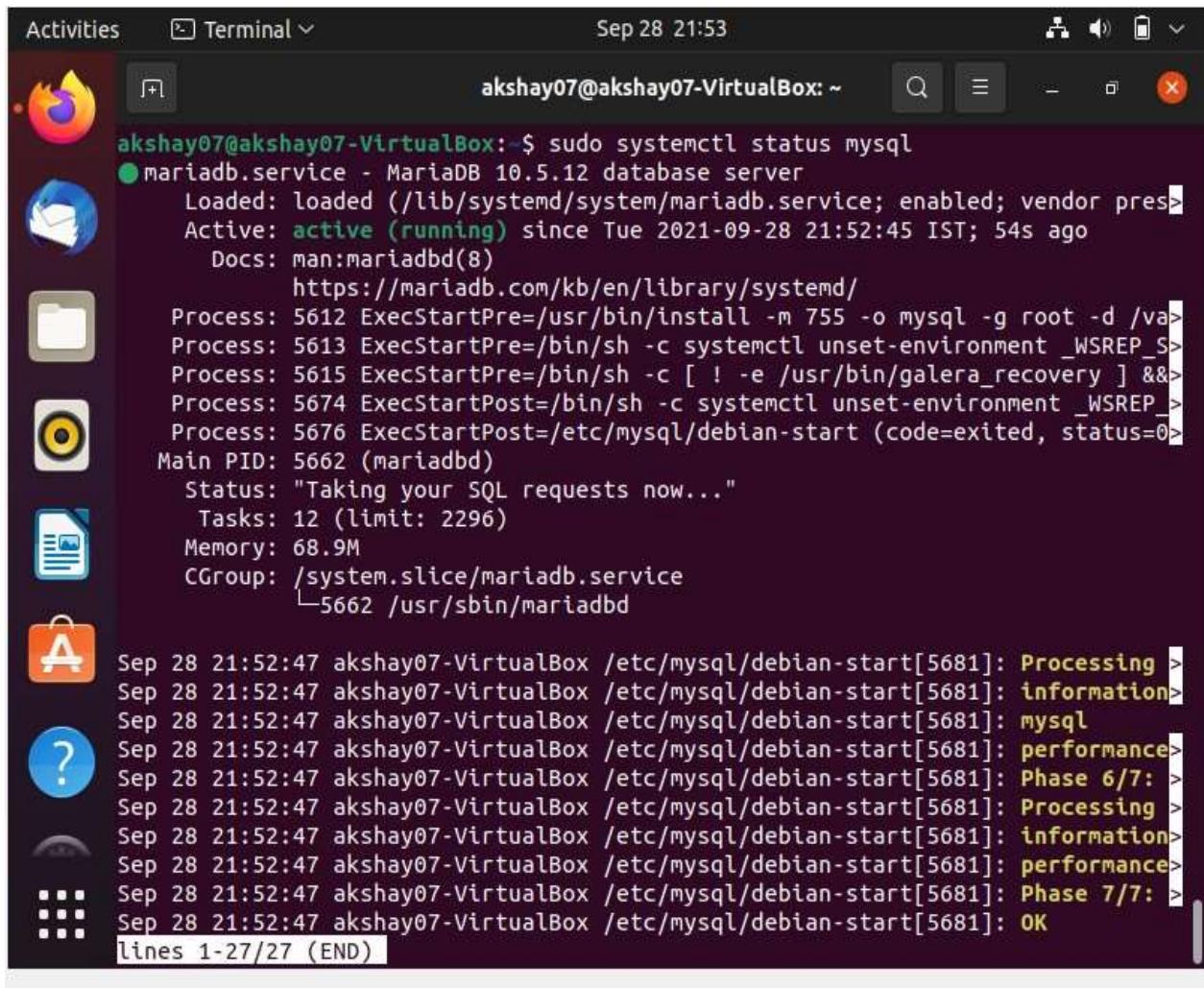
Command:

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

Check mariadb Installation

```
sudo systemctl status mysql
```

```
(if it is not working sudo systemctl start mysql )
```



```
akshay07@akshay07-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
  Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
  Active: active (running) since Tue 2021-09-28 21:52:45 IST; 54s ago
    Docs: man:mariadbd(8)
           https://mariadb.com/kb/en/library/systemd/
   Process: 5612 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run/mariadb
   Process: 5613 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_S...
   Process: 5615 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && [
   Process: 5674 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_S...
   Process: 5676 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0>
 Main PID: 5662 (mariadbd)
   Status: "Taking your SQL requests now..."
      Tasks: 12 (limit: 2296)
     Memory: 68.9M
        CPU: 0.000 CPU(s) since start
       CGroup: /system.slice/mariadb.service
                 └─5662 /usr/sbin/mariadbd

Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: Processing >
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: information>
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: mysql
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: performance>
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: Phase 6/7: >
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: Processing >
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: information>
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: performance>
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: Phase 7/7: >
Sep 28 21:52:47 akshay07-VirtualBox /etc/mysql/debian-start[5681]: OK
lines 1-27/27 (END)
```

3. Install PHP

Command:

```
sudo apt install php libapache2-mod-php php-ocache 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 webserver select apache2, select db-configuration and set  
password)
```

Restart apache2

```
sudo systemctl restart apache2
```

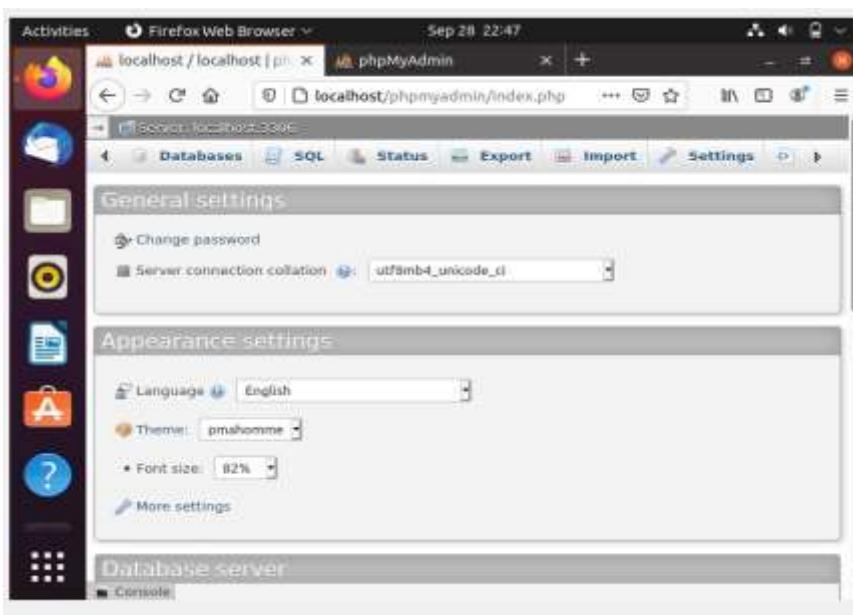
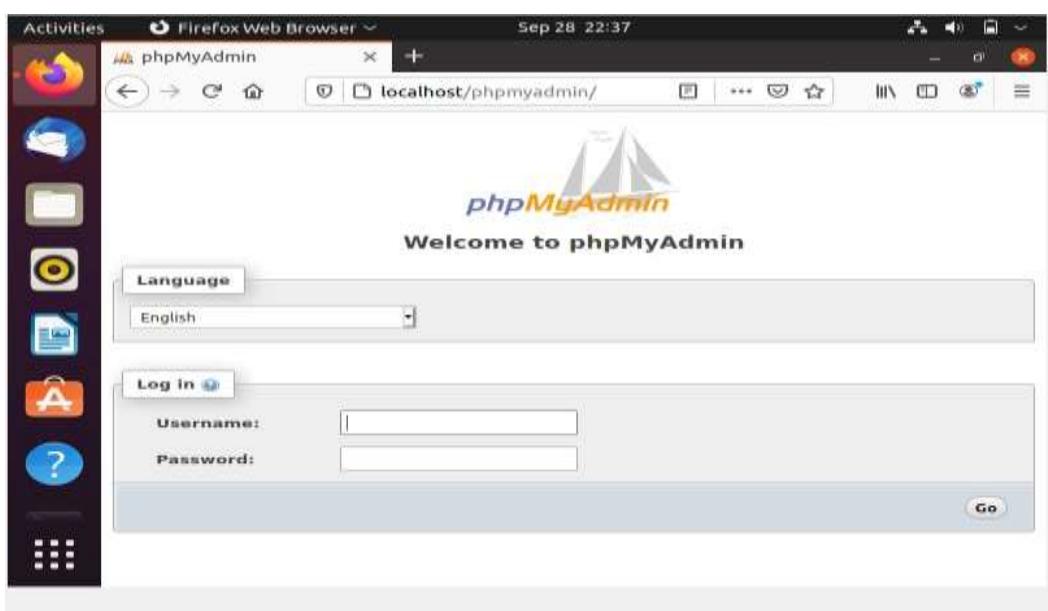
Check phpmyadmin

Open a browser

<http://localhost/phpmyadmin>

username : root

password : yourpassword



20MCA136-NETWORKING & ADMINISTRATION LAB

Docker Installation & Run Ubuntu image in docker

SUBMITTED BY,

Akshay Murali

MCA A BATCH

ROLL NO : 07

SUBMITTED TO ,

RINI MISS

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

Step 1: Install WSL 2backend

Open windows PowerShell as administrator as run then command:

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

Step 2: Enable Virtual Machine feature

Open windows PowerShell as administrator and run

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

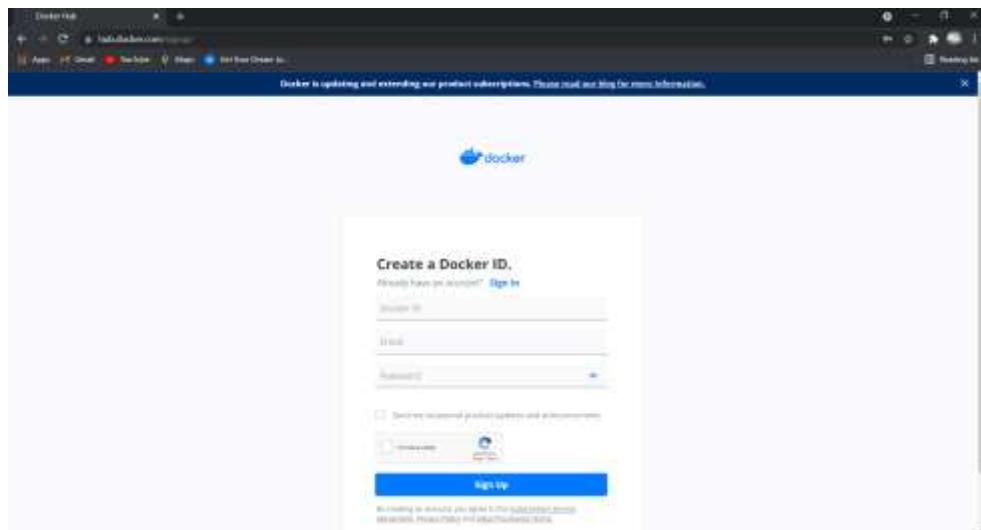
Step 3: Download the linux kernel update package from

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

And run and check version in powershell by

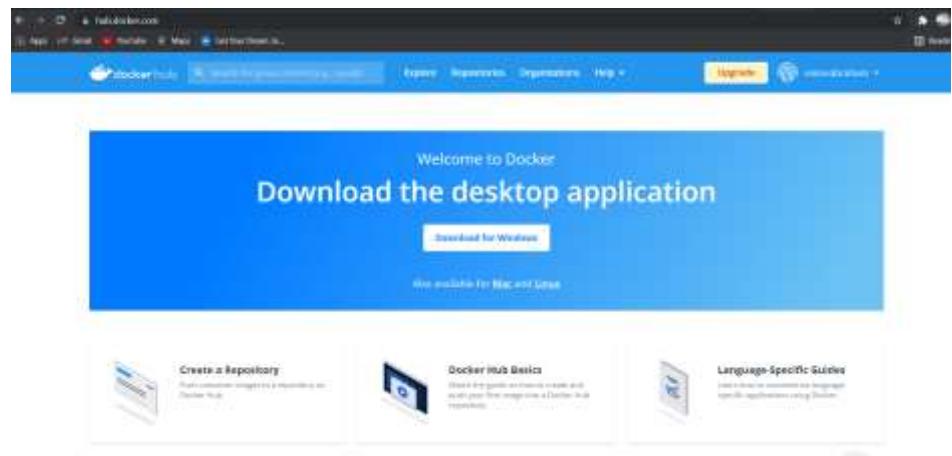
```
wsl --set-default-version 2
```

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

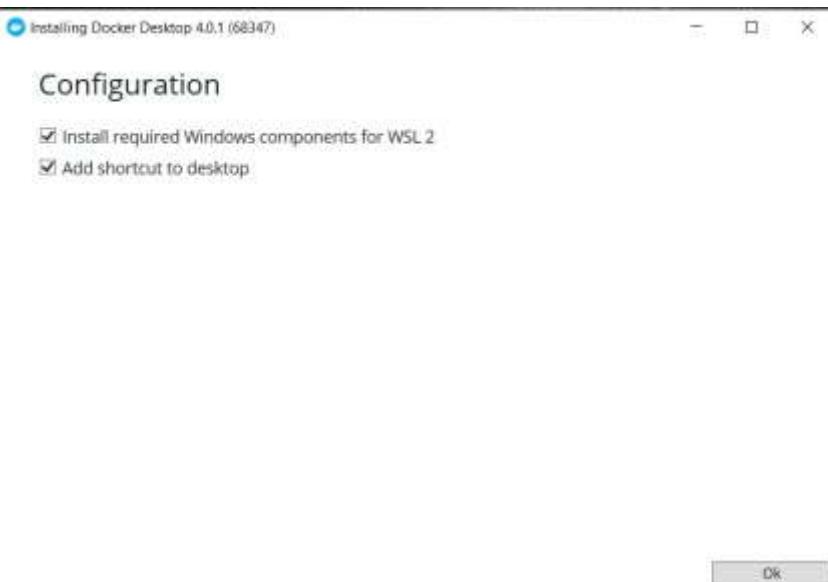
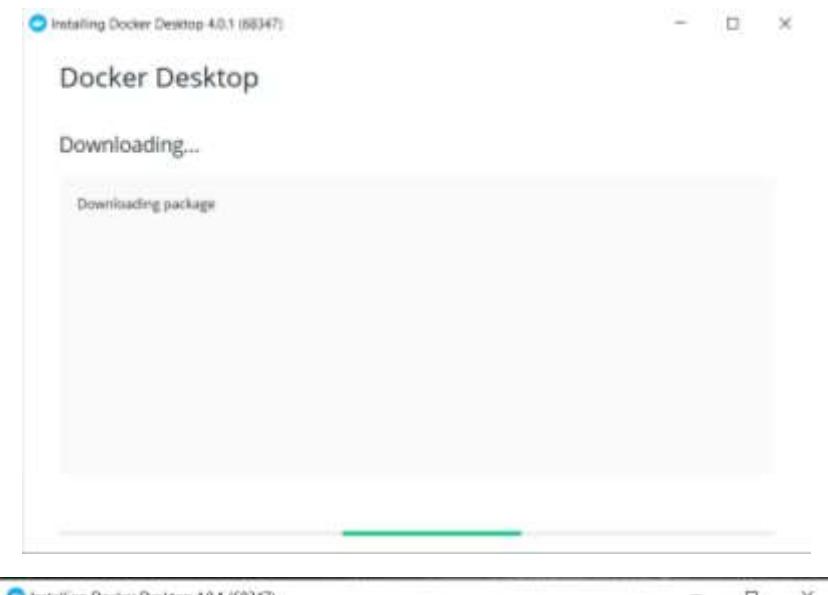


- **Sign in**

- **Download Docker for desktop**

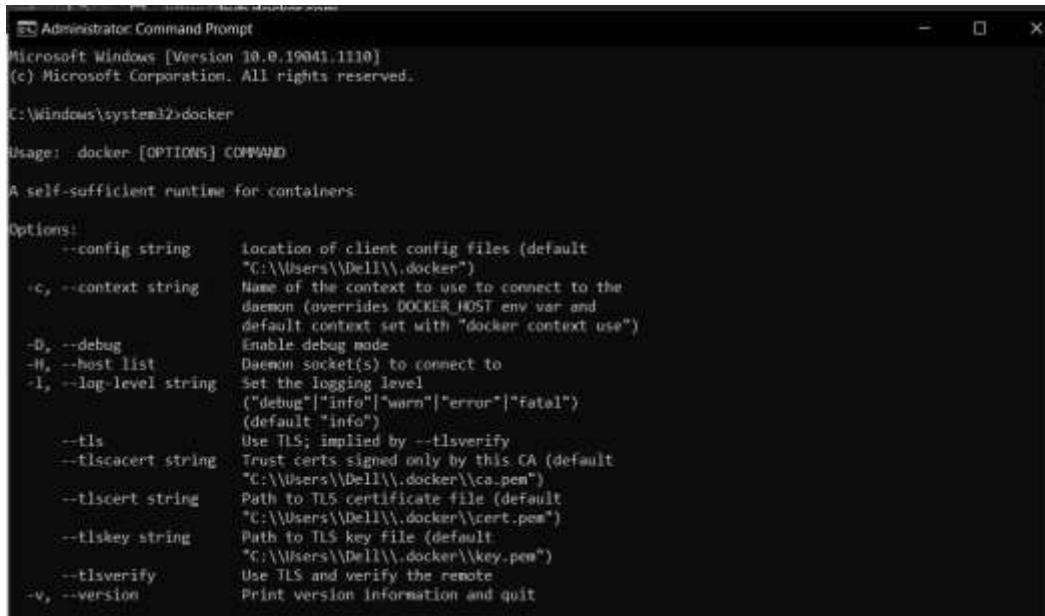


➤ **Run Docker desktop installer**



➤ **Open cmd as run as administrator**

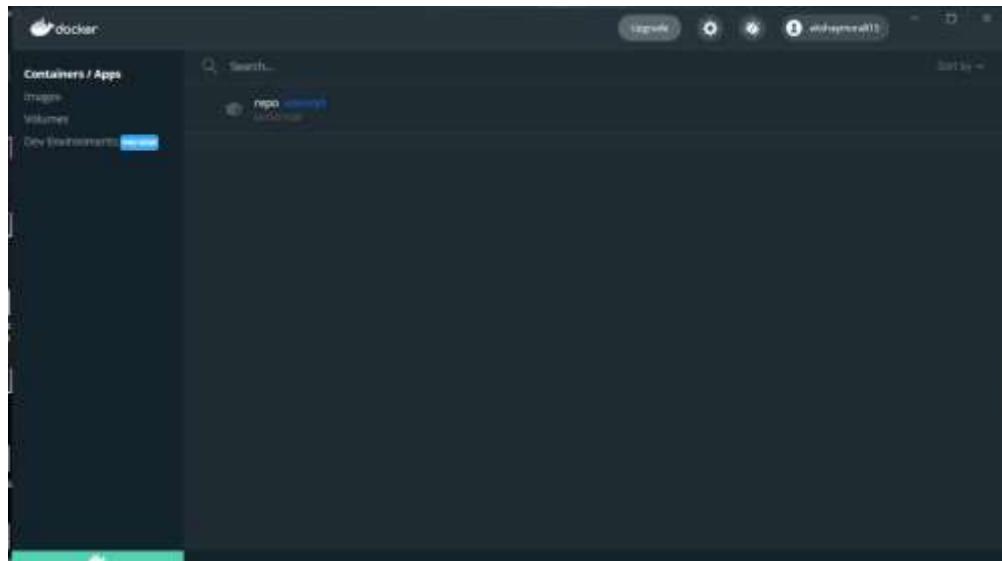
To check docker work properly



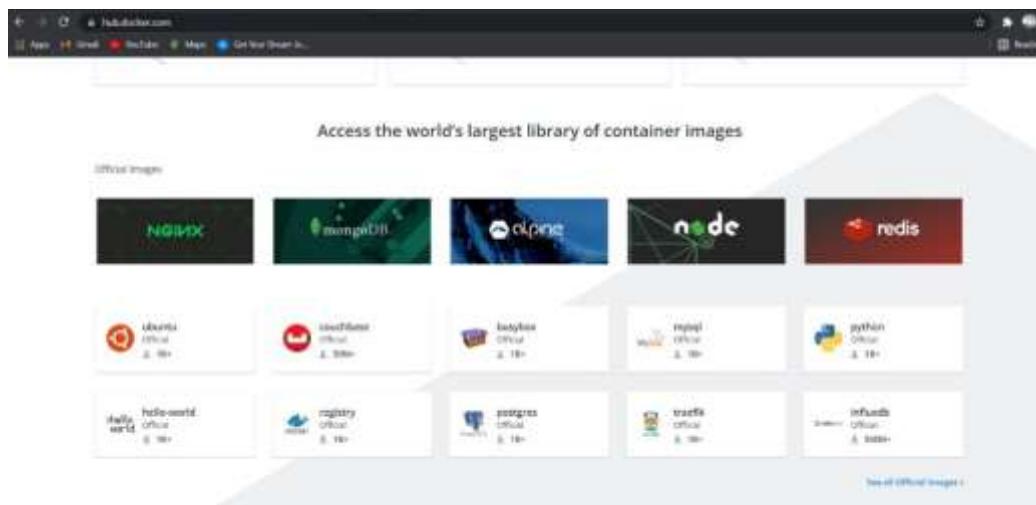
```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19041.1110]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>docker
Usage: docker [OPTIONS] COMMAND
      A self-sufficient runtime for containers

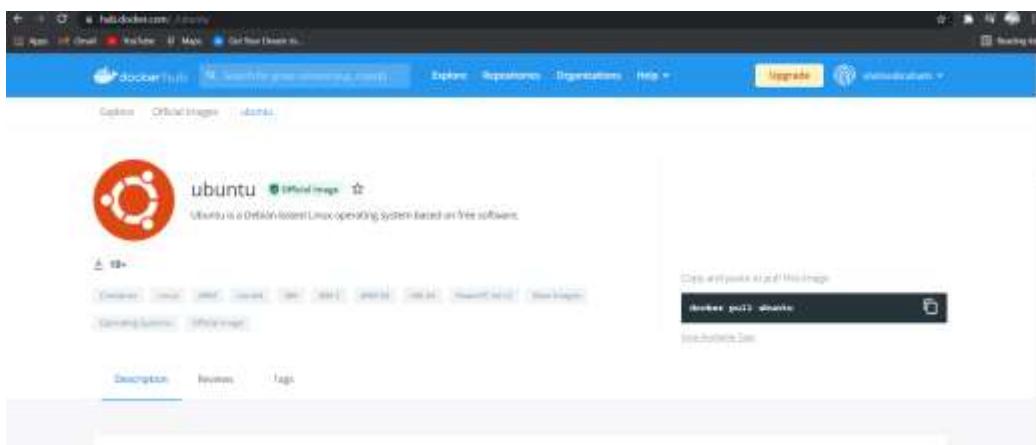
Options:
  --config string          location of client config files (default
                           "C:\Users\DeLL\.docker")
  -c, --context string     Name of the context to use to connect to the
                           daemon (overrides DOCKER_HOST env var and
                           default context set with "docker context use")
  -D, --debug              Enable debug mode
  -H, --host list           Daemon socket(s) to connect to
  -l, --log-level string   Set the logging level
                           ("debug"|"info"|"warn"|"error"|"fatal")
                           (default "info")
  --tls                   Use TLS; implied by --tlsv1.3
  --tlscacert string       Trust certs signed only by this CA (default
                           "C:\Users\DeLL\.docker\ca.pem")
  --tlscert string         Path to TLS certificate file (default
                           "C:\Users\DeLL\.docker\cert.pem")
  --tlskey string          Path to TLS key file (default
                           "C:\Users\DeLL\.docker\key.pem")
  --tlsv1.3                Use TLS and verify the remote
  -v, --version             Print version information and quit
```



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



- Copy the command



- And run that on cmd

```
Administrator: Command Prompt
rename      Rename a container
restart     Restart one or more containers
rm          Remove one or more containers
rmi         Remove one or more images
run          Run a command in a new container
save        Save one or more images to a tar archive (streamed to STDOUT by default)
search      Search the Docker Hub for images
start       Start one or more stopped containers
stats       Display a live stream of container(s) resource usage statistics
stop        Stop one or more running containers
tag         Create a tag TARGET_IMAGE that refers to SOURCE_IMAGE
top         Display the running processes of a container
unpause    Unpause all processes within one or more containers
update     Update configuration of one or more containers
version    Show the Docker version information
wait        Block until one or more containers stop, then print their exit codes

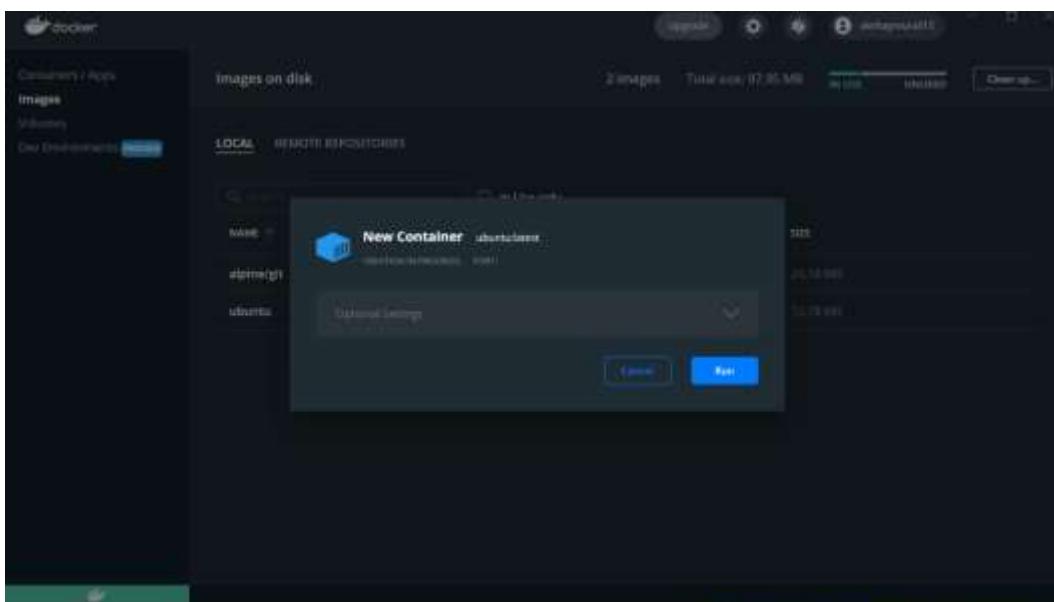
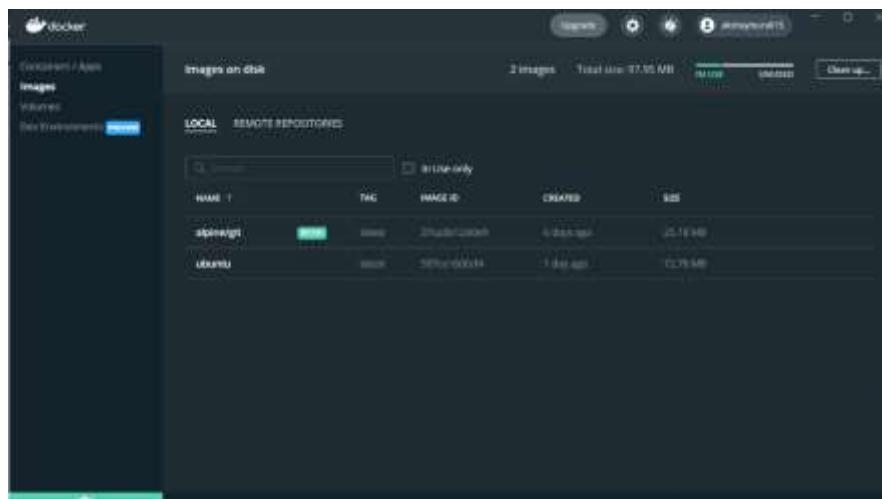
Run 'docker COMMAND --help' for more information on a command.

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

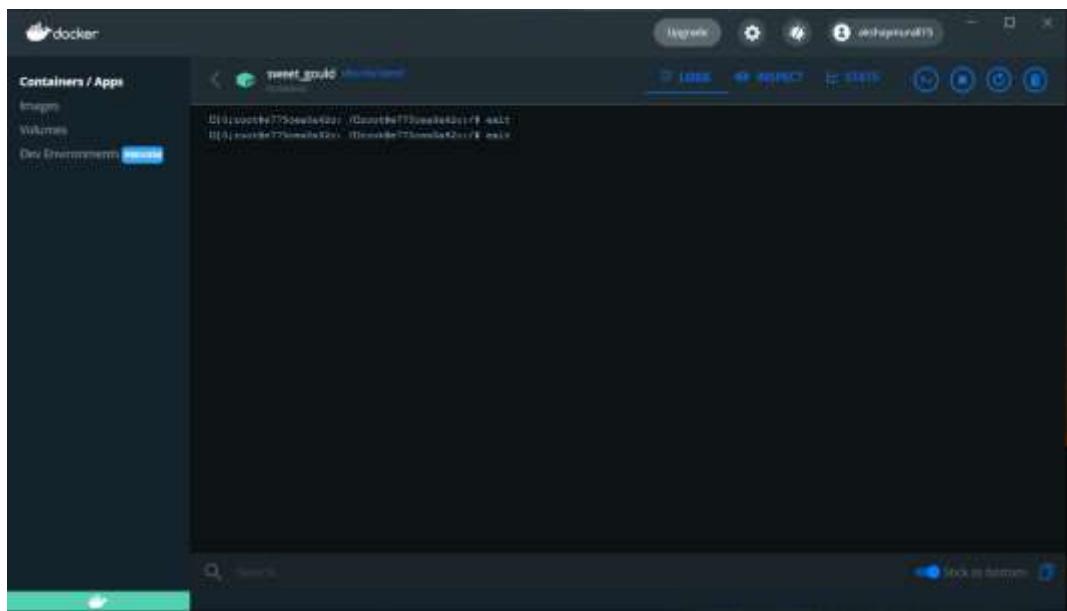
C:\windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:44ab2c2b26363823dc965498ab06abf74a1e6af20a732902250743df0d4172d
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\windows\system32>
```

➤ Run ubuntu from docker



- Another screen will open



20MCA136-NETWORKING &
ADMINISTRATION LAB

WIRESHARK INSTALLATION

SUBMITTED BY,

AKSHAY MURALI

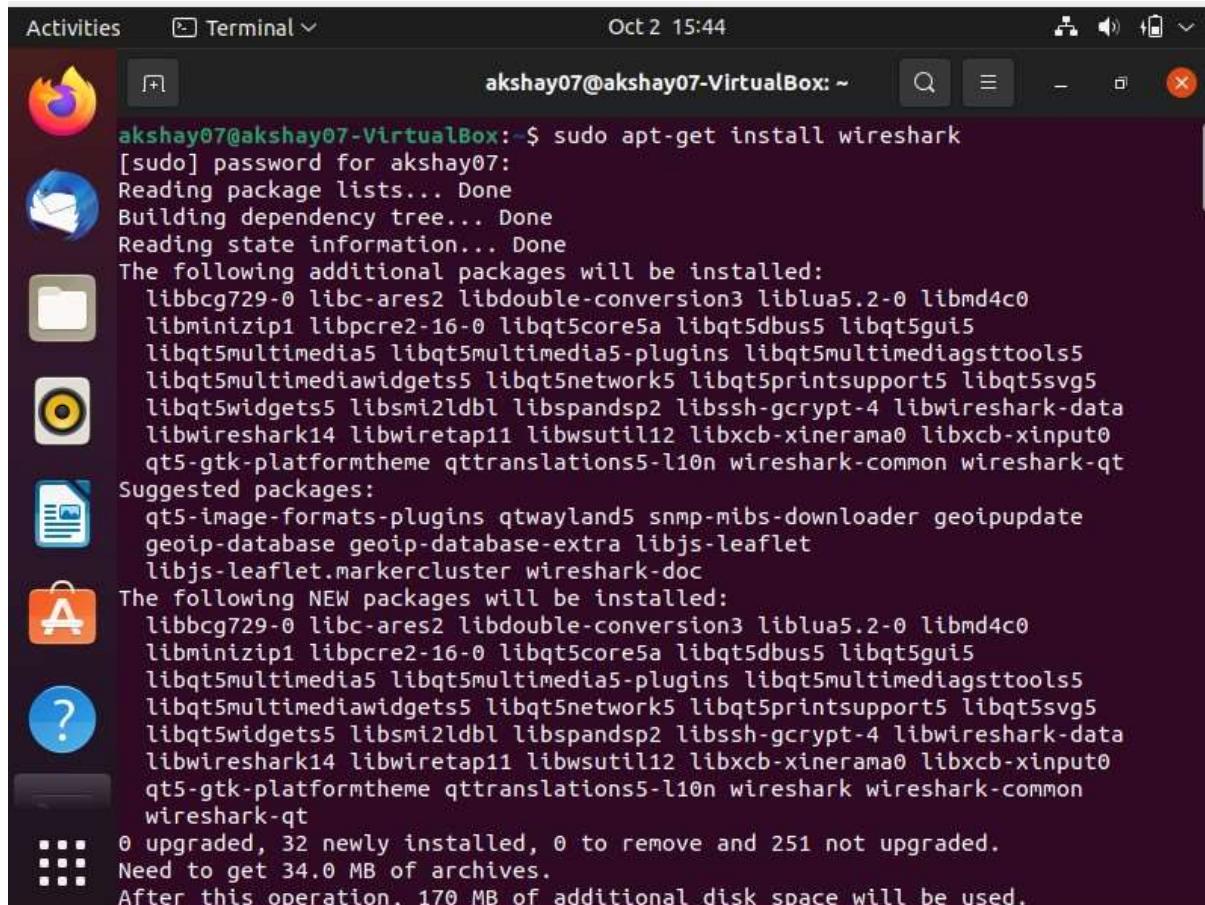
MCA A BATCH

ROLL NO-07

Wireshark Installation

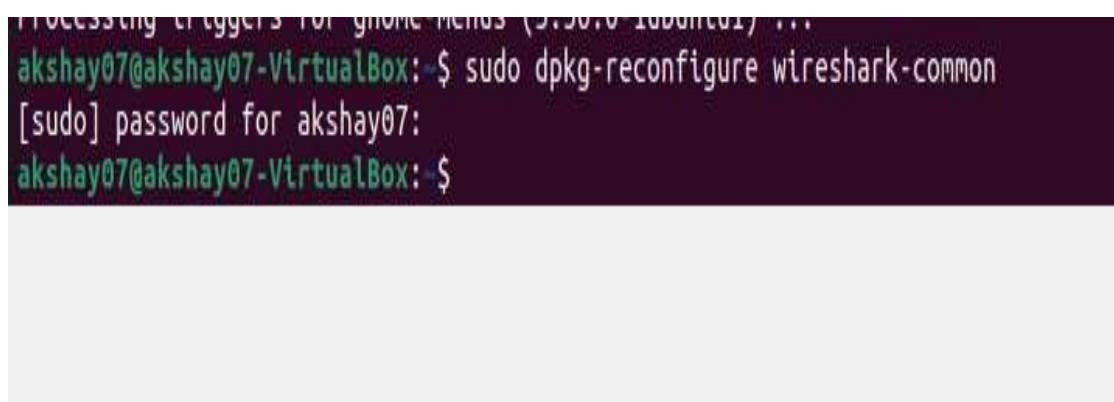
In terminal of ubuntu

sudo apt-get install wireshark

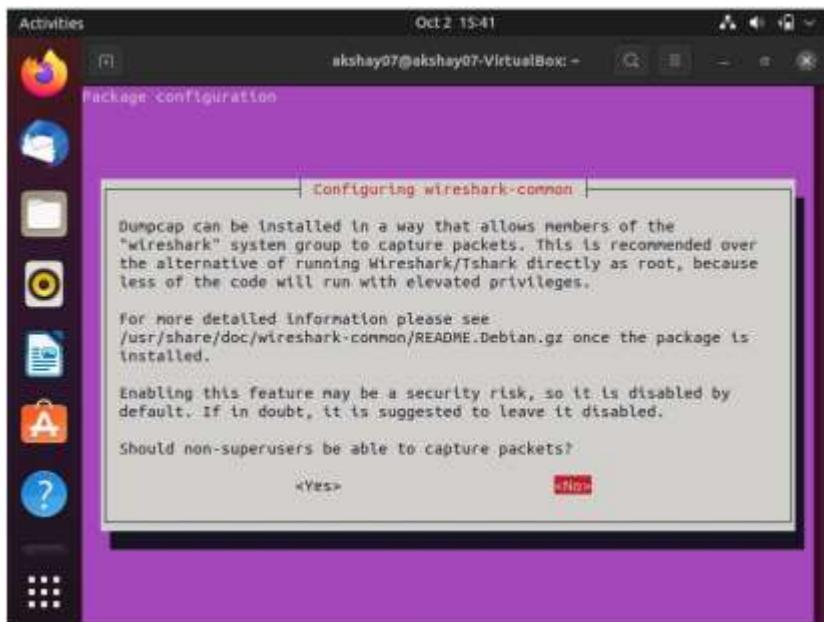


A screenshot of an Ubuntu desktop environment showing a terminal window. The terminal window title is "Terminal". The command entered is "sudo apt-get install wireshark". The output shows the package manager listing additional packages to be installed (including libb64, libdouble-conversion, liblua5.2, libmd4c0, libminizip1, libpcre2-16-0, libqt5core5a, libqt5dbus5, libqt5gui5, libqt5multimedia5, libqt5multimedia5-plugins, libqt5multimediasupports5, libqt5svg5, libqt5widgets5, libsmi2l5, libspandsp2, libssh-gcrypt-4, libwireshark-data, libwireshark14, libwiretap11, libwsutil12, libxcb-xinerama0, libxcb-xinput0, qt5-gtk-platformtheme, qttranslations5-l10n, wireshark-common, wireshark-qt) and suggested packages (qt5-image-formats-plugins, qtwayland5, snmp-mibs-downloader, geoipupdate, geoip-database, geoip-database-extra, libjs-leaflet, libjs-leaflet-markercluster, wireshark-doc). It also lists NEW packages to be installed (libb64, libdouble-conversion, liblua5.2, libmd4c0, libminizip1, libpcre2-16-0, libqt5core5a, libqt5dbus5, libqt5gui5, libqt5multimedia5, libqt5multimedia5-plugins, libqt5multimediasupports5, libqt5svg5, libqt5widgets5, libsmi2l5, libspandsp2, libssh-gcrypt-4, libwireshark-data, libwireshark14, libwiretap11, libwsutil12, libxcb-xinerama0, libxcb-xinput0, qt5-gtk-platformtheme, qttranslations5-l10n, wireshark-common, wireshark-qt). The log concludes with 0 upgraded, 32 newly installed, 0 to remove and 251 not upgraded, needing 34.0 MB of archives, and 170 MB of additional disk space will be used.

sudo dpkg-reconfigure wireshark-common



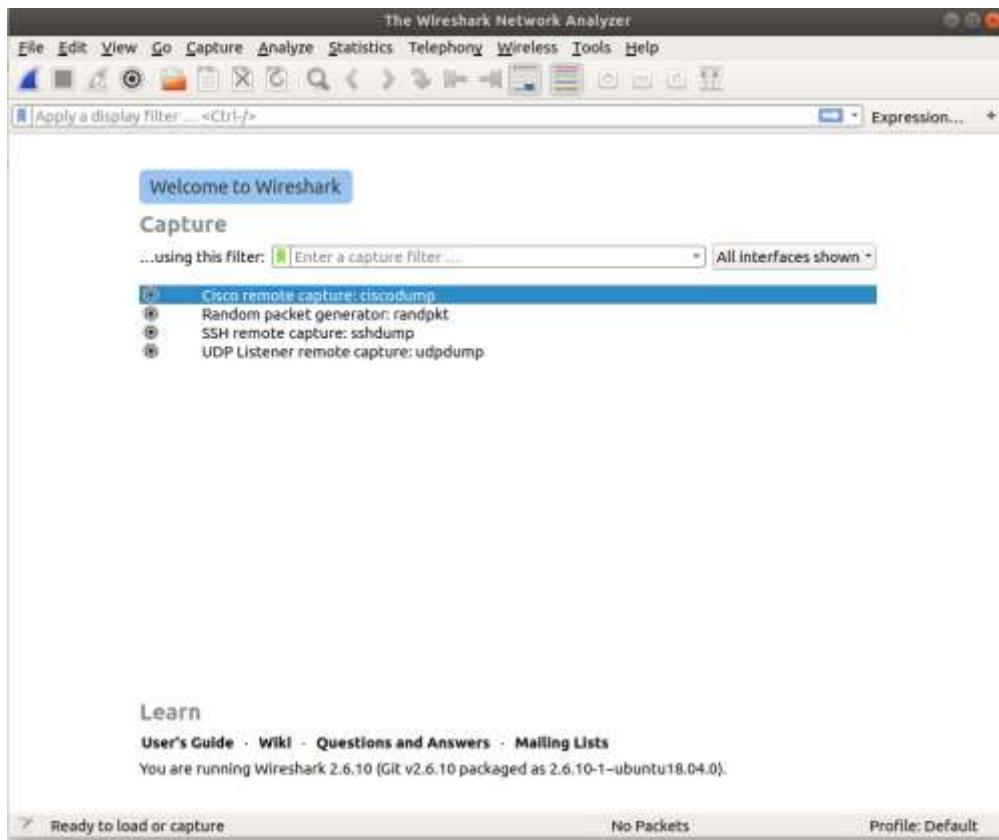
A screenshot of an Ubuntu desktop environment showing a terminal window. The terminal window title is "Terminal". The command entered is "sudo dpkg-reconfigure wireshark-common". The output shows the package manager prompting for a password ("[sudo] password for akshay07:"), and then the command prompt again ("akshay07@akshay07-VirtualBox: \$").



sudo adduser \$USER wireshark

```
[sudo] password for akshay07:  
akshay07@akshay07-VirtualBox:~$ sudo adduser $USER wireshark  
Adding user 'akshay07' to group `wireshark' ...  
Adding user akshay07 to group wireshark  
Done.  
akshay07@akshay07-VirtualBox:~$
```

Open Wireshark from Applications



Since showing

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

Use command

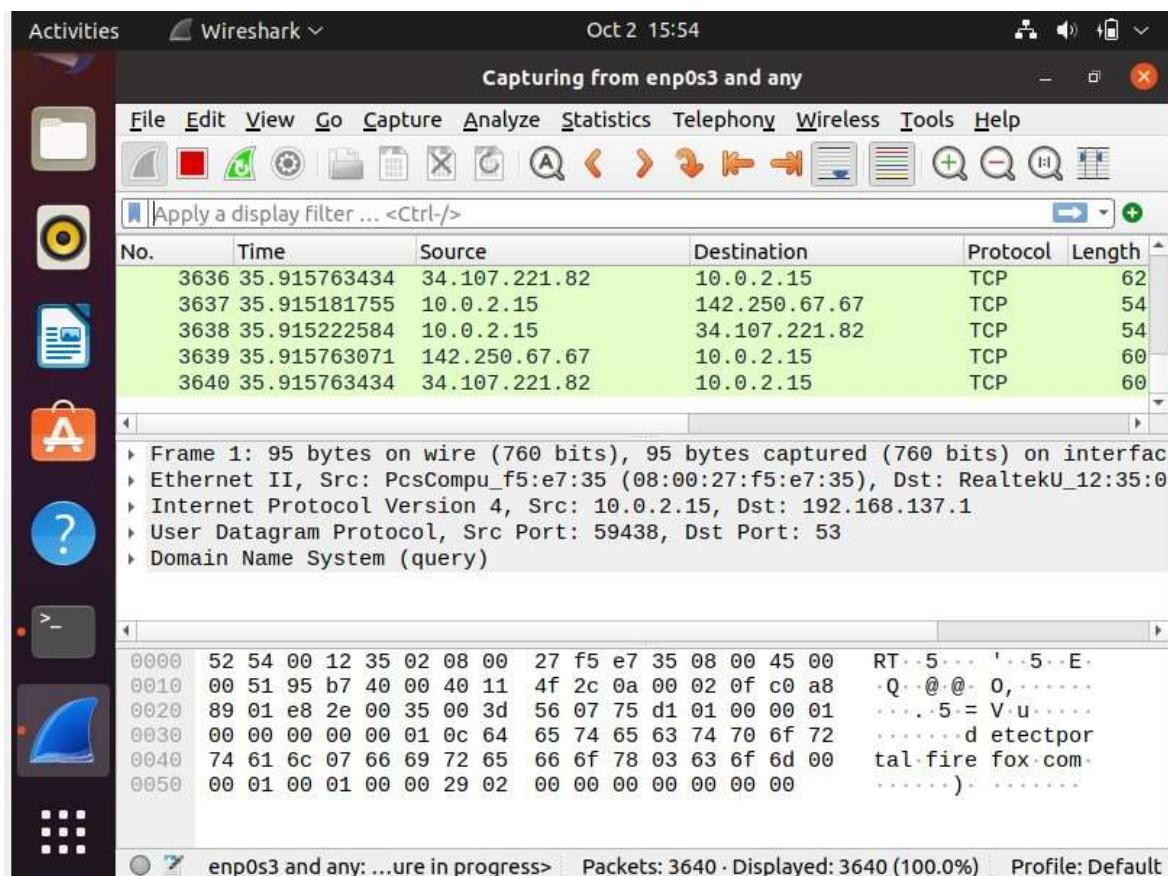
sudo chmod +x /usr/bin/dumpcap

```
Done.  
akshay07@akshay07-VirtualBox:~$ sudo chmod +x /usr/bin/dumpcap  
akshay07@akshay07-VirtualBox:~$ █
```

Capturing Data Packets on Wireshark

- When you open Wireshark, you see a screen that shows you a list of all of the network connections you can monitor. You also have a capture filter field, so you only capture the network traffic you want to see.

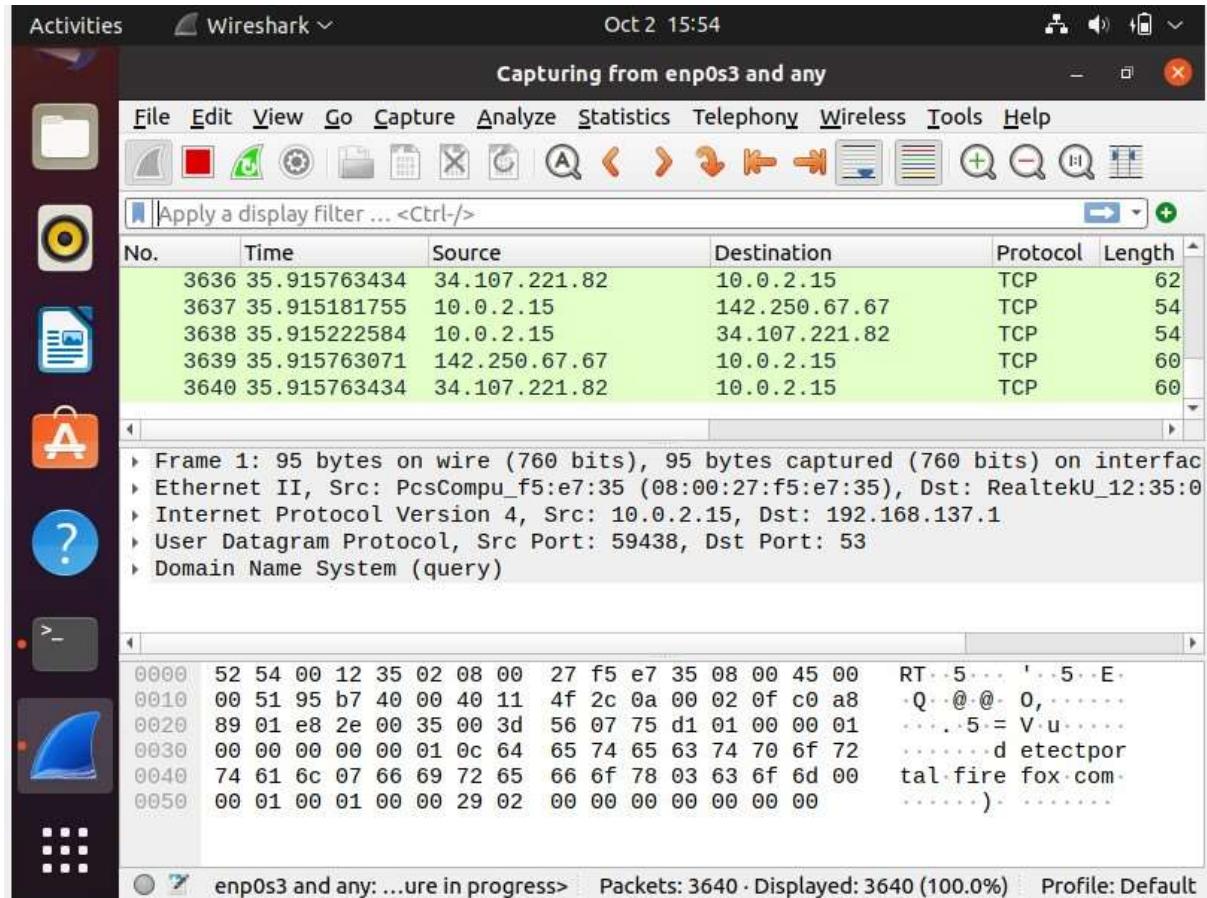
- You can select one or more of the network interfaces using “shift left-click.” Once you have the network interface selected, you can start the capture, and there are several ways to do that.
- Click the first button on the toolbar, titled “Start Capturing Packets.”



Analyzing Data Packets on Wireshark

- Wireshark shows you three different panes for inspecting packet data. The Packet List, the top pane, is a list of all the packets in the capture. When you click on a packet, the other two panes change to show you the details about the selected packet. You

can also tell if the packet is part of a conversation. Here are some details about each column in the top pane:



In panel

- **No.:** This is the number order of the packet that got captured. The bracket indicates that this packet is part of a conversation.
- **Time:** This column shows you how long after you started the capture that this packet got captured. You can change this value in the Settings menu if you need something different displayed.
- **Source:** This is the address of the system that sent the packet.
- **Destination:** This is the address of the destination of that packet.
- **Protocol:** This is the type of packet, for example, TCP, DNS, DHCPv6, or ARP.

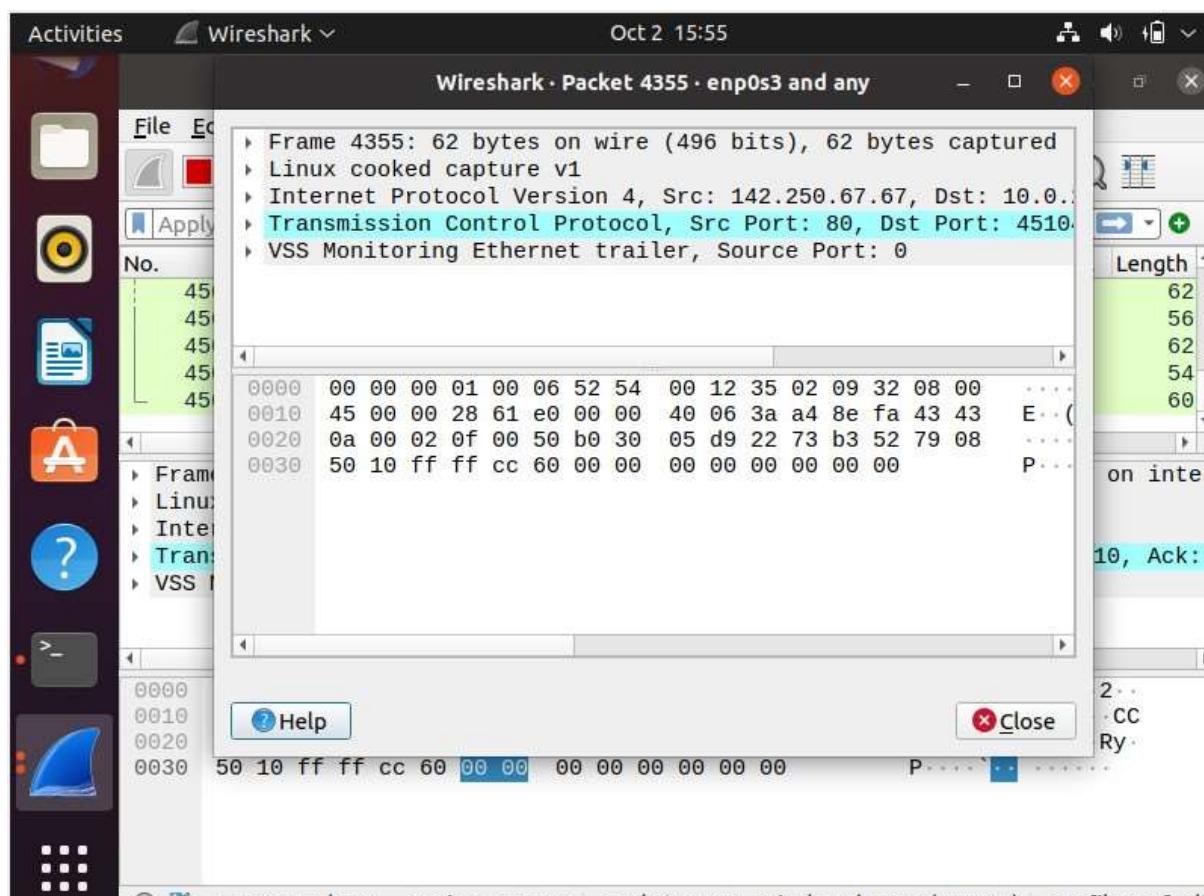
- **Length:** This column shows you the length of the packet in bytes.
- **Info:** This column shows you more information about the packet contents, and will vary depending on what kind of packet it is.

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

Details can take on the below panels or new window

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

Some fields



ADVANCED COMPUTER NETWORKS

LAB ASSIGNMENT

Topic: - Shell Programming

Submitted By:
Akshay Murali
Roll no: 07
S2 RMCA A

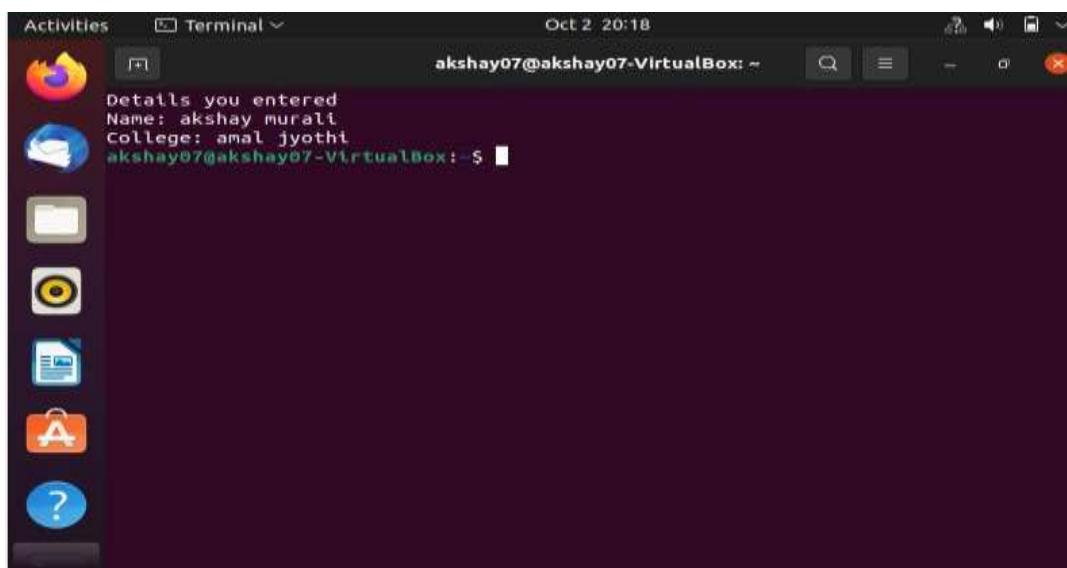
Submitted To:
Rini MISS

Submitted on:
02-10-2021

Shell Scripting Lab Assignments

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

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



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 "
echo "=====
```

```
a=10  
echo "$a"
```

```
akshay07@akshay07-VirtualBox:~$ vi a22.sh  
akshay07@akshay07-VirtualBox:~$ chmod +x a22.sh  
akshay07@akshay07-VirtualBox:~$ ./a22.sh  
Display value of a Variable  
10  
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash  
  
echo "ARITHMETIC OPERATIONS"  
echo "=====  
echo "Enter a number"  
read a  
echo "Enter another number"  
read b  
echo "Enter operation needed"  
echo "\n1.Addition\n2.Substration\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

```

```

Activities Terminal Oct 2 20:38
akshay07@akshay07-VirtualBox: ~
akshay07@akshay07-VirtualBox: $ gedit a333.sh
akshay07@akshay07-VirtualBox: $ bash a333.sh
ARITHMETIC OPERATIONS
Enter a number
23
Enter another number
10
Enter operation needed
\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division
1
a+b=33
akshay07@akshay07-VirtualBox: ~$ bash a333.sh
ARITHMETIC OPERATIONS
Enter a number
25
Enter another number
21
Enter operation needed
\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division
2
a-b=4
akshay07@akshay07-VirtualBox: ~$ 

```

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 "===="
echo "Enter a number"
read a
if [ $a == 10 ]; then
    echo "Number found ;)"
else
    echo "Number NOT found !"

```

```
fi

NUMBER NOT found !
akshay07@akshay07-VirtualBox:~$ bash a444.sh
Finding a number
Enter a number
5
a444.sh: line 5: [5: command not found
Number NOT found !
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Time and Calendar"
echo "===== "
echo "Today is $(date)"
echo ""
echo "Calendar :"
cal
akshay07@akshay07-VirtualBox:~$ bash a5555.sh
Time and Calendar
Today is Saturday 02 October 2021 08:51:12 PM IST

Calender :
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash
echo "EVEN OR ODD"
echo "===== "
echo "Enter a number"
read n
x=$((n%2))
if [ $x -eq 0 ]; then
    echo "Number is Even"
```

```
else
    echo "Number is odd"
fi
```

```
[~]
akshay07@akshay07-VirtualBox: ~ bash a6666.sh
EVEN OR ODD
Enter a number
77
Number is odd
akshay07@akshay07-VirtualBox: ~ bash a6666.sh
EVEN OR ODD
Enter a number
2
Number is Even
akshay07@akshay07-VirtualBox: ~
```

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

```
akshay07@akshay07-VirtualBox:~$ bash a7777.sh
Comparing numbers
Enter first number
66
Enter second number
77
a7777.sh: line 7: [: missing `]'
77 is greater
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Sum of Numbers "
echo "====="
s=0
for (( i=1;i<=10;i++ ))
do
s=`expr $s + $i`
done
echo "Sum of first 10 numbers = $s"
```

```
akshay07@akshay07-VirtualBox:~$ gedit a88888.sh
^C
akshay07@akshay07-VirtualBox:~$ bash a88888.sh
Sum of Numbers
Sum of first 10 numbers = 55
akshay07@akshay07-VirtualBox:~$
```

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 No."
echo "====="
echo "Please enter your first number: "
read a
```

```

echo "Second number: "
read b
echo "Third number: "
read c
echo "Fourth number: "
read d

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

echo "The sum of these numbers is: " $sum
echo "The average of these numbers is: " $avg
echo "The product of these numbers is: " $prod

```

```

akshay07@akshay07-VirtualBox:~$ bash a99999.sh
AVG, SUM & Product of 4 NO.
Please enter your first number:
5
Second number:
6
Third number:
7
Fourth number:
8
a99999.sh: command substitution: line 14: syntax error near unexpected token `)'
`echo $sum/4 | bc -l'
a99999.sh: command substitution: line 14: `echo $sum/4 | bc -l'
The sum of these numbers is: 26
The average of these numbers is:
The product of these numbers is: 1680

```

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

```

#!/bin/bash

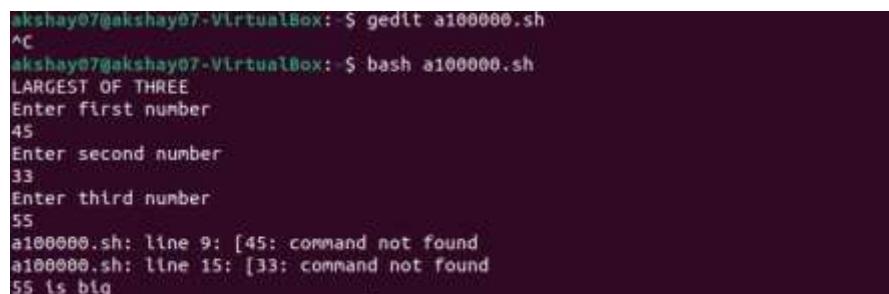
echo "LARGEST OF THREE"
echo "====="
echo "Enter first number"
read a
echo "Enter second number"
read b
echo "Enter third number"

```

```

read c
if [$a -gt $b]; then
if [$a -gt $c]; then
echo "$a is big"
else
echo "$c is big"
fi
elif [$b -gt $c];then
echo "$b is big"
else
echo "$c is big"
fi

```



```

akshay07@akshay07-VirtualBox: ~ gedit a100000.sh
^C
akshay07@akshay07-VirtualBox: ~ bash a100000.sh
LARGEST OF THREE
Enter first number
45
Enter second number
33
Enter third number
55
a100000.sh: line 9: [45: command not found
a100000.sh: line 15: [33: command not found
55 is big

```

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

```

#!/bin/bash
echo "Factorial"
echo "====="
echo "Enter a number"
read num
fact=1

for((i=2;i<=num;i++))
{
    fact=$((fact * i)) #fact = fact * i
}
echo "Factorial is $fact"

```

```
akshay07@akshay07-VirtualBox:~$ gedit a110000.sh
^C
akshay07@akshay07-VirtualBox:~$ bash a110000.sh
Factorial
Enter a number
8
Factorial is 40320
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Palindrome or Not"
echo "====="
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
```

```
akshay07@akshay07-VirtualBox:~$ gedit a120000.sh
^C
akshay07@akshay07-VirtualBox:~$ bash a120000.sh
Palindrome or Not
Enter number to check
56
Number is not Palindrome
akshay07@akshay07-VirtualBox:~$
```

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

```

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

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

```

```

akshay07@akshay07-VirtualBox:~$ gedit a130000.sh
^C
akshay07@akshay07-VirtualBox:~$ bash a130000.sh
Average of N numbers
Enter Size
3
Enter Numbers
23
44
55

```

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

```

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

```

```
akshay07@akshay07-VirtualBox:~$ gedit a140000.sh
^C
akshay07@akshay07-VirtualBox:~$ bash a140000.sh
Sum of aa digits
Enter a number:
56777
Sum of digits is 32
akshay07@akshay07-VirtualBox:~$
```

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

```
#!/bin/bash

echo "LEAP YEAR OR NOT"
echo "====="
echo "Enter the year"
read y

a=`expr $y % 4`
b=`expr $y % 100`
c=`expr $y % 400`

if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
then
    echo "$y is leap year"
else
    echo "$y is not leap year"
fi
```

```
sun 6/ 6 11:10:28 2016
akshay07@akshay07-VirtualBox: $ gedit a150000.sh
^C
akshay07@akshay07-VirtualBox: $ bash a150000.sh
LEAP YEAR OR NOT
Enter the year
2009
2009 is not leap year
akshay07@akshay07-VirtualBox: $
```