

NETWORK LAB RECORD



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RMCA B 34

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Linux Commands

1. `pwd` — When you first open the terminal, you are in the home directory of your user. To know which directory you are in, you can use the "**`pwd`**" command. It gives us the absolute path, which means the path that starts from the root. The root is the base of the Linux file system. It is denoted by a forward slash(/). The user directory is usually something like "/home/username".

2. `ls` — Use the "**`ls`**" command to know what files are in the directory you are in. You can see all the hidden files by using the command "**`ls -a`**".

3. `cd` — Use the "**`cd`**" command to go to a directory.

4. `mkdir & rmdir` — Use the **`mkdir`** command when you need to create a folder or a directory. Use **`rmdir`** to delete a directory. But **`rmdir`** can only be used to delete an empty directory. To delete a directory containing files, use **`rm`**.

5. `rm` - Use the **`rm`** command to delete files and directories

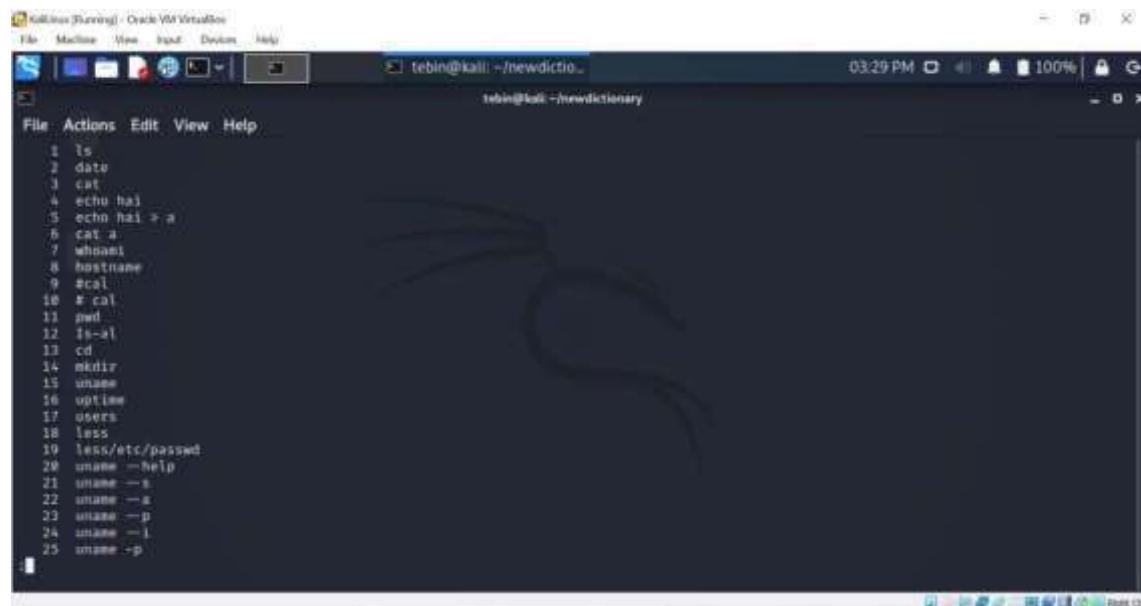
6. `touch` — The **`touch`** command is used to create a file. It can be anything, from an empty txt file to an empty zip file

7. Use the `cat` command to display the contents of a file. It is usually used to easily view programs.

Cat >> filename : append new content to existing content in a file.

Cat>filename: overwrite existing content in a file

8. man—To know more about a command and how to use it, use the **man** command. It shows the manual pages of the command. For example, “**man cd**” shows the manual pages of the **cd** command.



KaliLinux (Running) - Oracle VM VirtualBox

```
File Machine View Input Device Help
File Actions Edit View Help
1 ls
2 date
3 cat
4 echo had
5 echo had > a
6 cat a
7 whoami
8 hostname
9 #cal
10 # cat
11 pwd
12 ls -al
13 cd
14 mkdir
15 uname
16 uptime
17 users
18 less
19 less /etc/passwd
20 uname --help
21 uname -s
22 uname -a
23 uname -p
24 uname -i
25 uname -p
```

KaliLinux (Running) - Oracle VM VirtualBox

```
File Machine View Input Device Help
File Actions Edit View Help
26 uname -i
27 uname -a
28 pwd
29 --sys
30 exit
31 pwd
32 mkdir
33 mkdir newdictionary
34 cd newdictionary
35 pwd
36 touch newfile1
37 cat > newfile1
38 cat newfile1
39 cat >> newfile1
40 ls
41 ls -l
42 ls -d
43 ls -ld
44 history
45 man
46 man man
47 pwd
48 mkdir
49 mkdir newdictionary
50 cd newdictionary
```

```
File Actions Edit View Help
56 ls
57 ls -l
58 ls -d
59 ls -ld
60 history
61 man
62 man man
63 pwd
64 history
65 man
66 ls
67 cd
68 cd newdictionary
69 mkdir newdictionary
70 rmdir
71 rmdir newfile
72 rmdir newdictionary
73 rmdir newfile1
74 touch newfile1
75 rm
76 rm newfile1
77 cat > newfile1
78 cat newfile1
79 cat > newfile1
80 cat newfile1
```

BASIC LINUX COMMANDS

1. echo

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

2. head

The head command is used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking.

3. tail

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

4. read

The read the contents of a line into a variable. The read command can be used with and without arguments

5. more

The more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large. The more command also allows the user do scroll up and down through the page.

6. less

Less command is linux utility which can be used to read contents of text file one page(one screen) per time.

7. cut

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

8.paste

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

9.uname

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

10.cp

The cp command is used to copy files from the current directory to a different directory.

11.mv

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

12.locate

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

13.find

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

14.grep

Another basic Linux command that is undoubtedly helpful for everyday use is grep. It helps to search through all the text in a given file

15. df

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

16. du

The du (Disk Usage) command is used to check how much space a file or a directory takes. However, the disk usage summary will show disk block numbers instead of the usual size format. If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line.

- \$du -h

17. useradd

The useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd 123456789

18. userdel

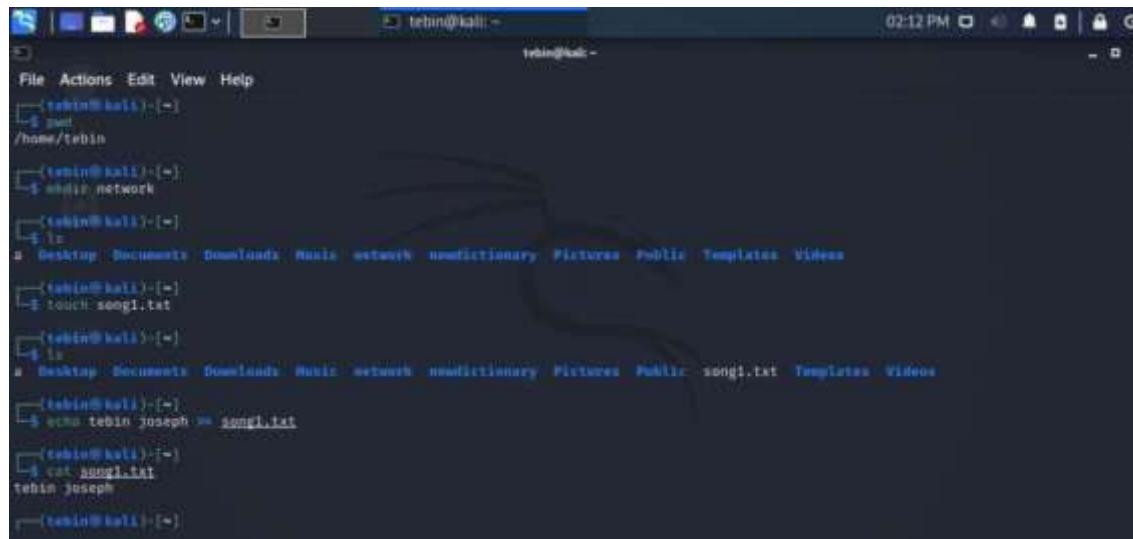
Remove a user is very similar to adding a new user. To delete the users account type, userdelUserName

19. sudo

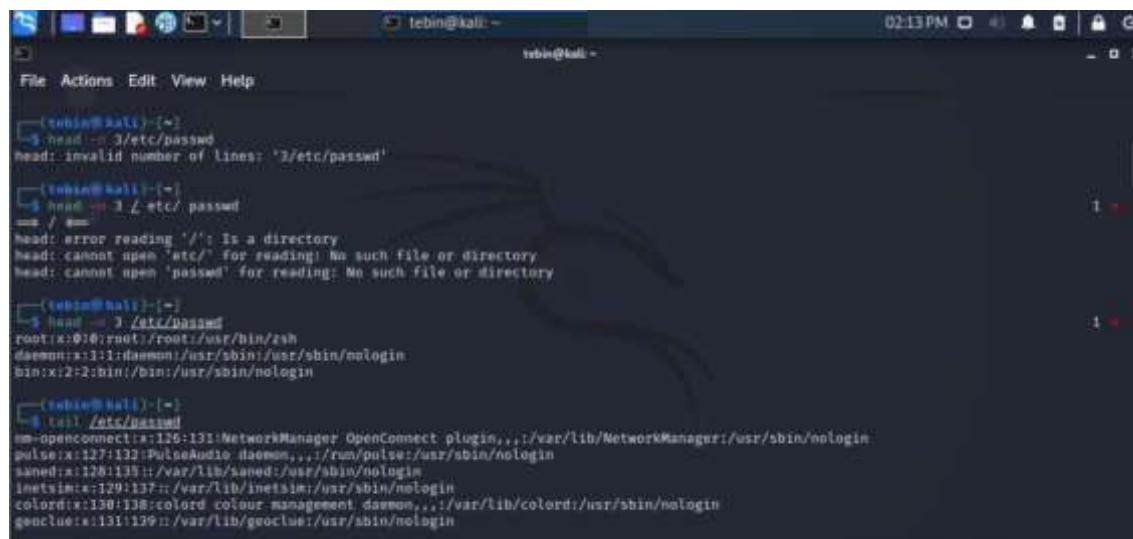
SuperUserDo(sudo) command enables you to perform tasks that require administrative or root permissions.

20. passwd

Changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account.



```
tebin@kali:~$ passwd
/home/tebin
(tebin㉿kali:~) ~
$ passwd network
(tebin㉿kali:~) ~
$ ls
Desktop Documents Downloads Music network worddictionary Pictures Public Templates Videos
(tebin㉿kali:~) ~
$ touch song1.txt
(tebin㉿kali:~) ~
$ ls
Desktop Documents Downloads Music network worddictionary Pictures Public song1.txt Templates Videos
(tebin㉿kali:~) ~
$ echo tebin joseph > song1.txt
(tebin㉿kali:~) ~
$ cat song1.txt
tebin joseph
(tebin㉿kali:~) ~
```



```
tebin@kali:~$ head -3 /etc/passwd
head: invalid number of lines: '3/etc/passwd'
(tebin㉿kali:~) ~
$ head -3 /etc/passwd
== / ==
head: error reading '/': Is a directory
head: cannot open '/etc/' for reading: No such file or directory
head: cannot open 'passwd' for reading: No such file or directory
(tebin㉿kali:~) ~
$ head -3 /etc/passwd
root:x:0:root:/root:/usr/bin/zsh
daemon:x:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:bin:/bin:/usr/sbin/nologin
(tebin㉿kali:~) ~
$ tail /etc/passwd
root:x:0:root:/root:/usr/bin/zsh
daemon:x:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:bin:/bin:/usr/sbin/nologin
NetworkManager:x:126:131:NetworkManager:OpenConnect plugin,,,:/var/lib/NetworkManager:/usr/sbin/nologin
pulseaudio:x:127:132: PulseAudio daemon,,,:/run/pulse:/usr/sbin/nologin
saned:x:128:135::/var/lib/saned:/usr/sbin/nologin
inetd:x:129:137::/var/lib/inetd:/usr/sbin/nologin
colord:x:130:138:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geooclue:x:131:139::/var/lib/geooclue:/usr/sbin/nologin
```

```
tebin@kali:~
```

File Actions Edit View Help

```
[tebin@kali:~]
$ read v1 v2 v3
amit jyothi college

[tebin@kali:~]
$ echo $v1 $v2 $v3
amit jyothi college

[tebin@kali:~]
$ man more

[tebin@kali:~]
$ more <> song1.txt
tebin joseph
cat

[tebin@kali:~]
$ echo cat >> song1.txt

[tebin@kali:~]
$ more <> song1.txt
tebin joseph
cat

[tebin@kali:~]
$ more </etc/passwd
```

```
tebin@kali:~
```

File Actions Edit View Help

```
[tebin@kali:~]
$ more </etc/passwd
root:x:0:0:root:/root:/usr/bin/zsh
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:56:games:/var/games:/usr/sbin/nologin
man:x:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:77:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:88:mail:/var/mail:/usr/sbin/nologin
news:x:99:news:/var/spool/news:/usr/sbin/nologin
uucp:x:101:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:131:proxy:/bin:/usr/sbin/nologin
www-data:x:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
_apt:x:100:65534::/nonexistent:/usr/sbin/nologin
systemd-timesync:x:101:101:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
systemd-network:x:102:103:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:103:104:systemd-Resolver,,,:/run/systemd:/usr/sbin/nologin
mysql:x:104:110:MySQL Server,,,:/nonexistent:/bin/false
tss:x:105:111:TPM Software Stack,,,:/var/lib/tss:/bin/false
```

```
tebin@kali:~
```

File Actions Edit View Help

```
[tebin@kali:~]
$ less </etc/passwd
[tebin@kali:~]
$ ls
a Desktop Documents Downloads Music network smdictionary Pictures Public song1.txt Templates Videos
[tebin@kali:~]
$ cat >> 1,2 song1.txt
te
cat

[tebin@kali:~]
$ cat > 1,2,3 song1.txt
teb
cat

[tebin@kali:~]
$ cat >> number.txt
1
2
3
^C

[tebin@kali:~]
$ paste number.txt song.txt
paste: song.txt: No such file or directory
```

```
File Actions Edit View Help
[zenin@kali:~]
$ paste number.txt song1.txt
1  tebin joseph
2  cat
3

[zenin@kali:~]
$ uname
Linux
[zenin@kali:~]
$ uname -r
5.10.8-kali1-amd64
[zenin@kali:~]
$ uname -v
#1 SMP Debian 5.10.28-kali1 (2021-04-12)
[zenin@kali:~]
$ uname -o
unknown
[zenin@kali:~]
$ touch v1.txt v2.txt
[zenin@kali:~]
```

```
File Actions Edit View Help
[zenin@kali:~]
$ cp v1.txt alice/
[zenin@kali:~]
$ ls alice
v1.txt
[zenin@kali:~]
$ cp v2.txt alice/
[zenin@kali:~]
$ mv v2.txt alice/
[zenin@kali:~]
$ ls alice
v1.txt v2.txt
[zenin@kali:~]
$ ls
a Desktop Downloads network number.txt Public Templates Videos
ajw Documents music newdictionary Pictures song1.txt v2.txt
[zenin@kali:~]
$ locate song1.txt
```

```
File Actions Edit View Help
[zenin@kali:~]
$ du -h
4.0K ./Music
4.0K ./Public
332K ./Pictures
8.0K ./Downloads
6.0K ./Desktop
12K ./cache/fontconfig
4.0K ./cache/mesa_shader_cache
8.0K ./cache/mozilla/firefox/5kgb49cc.default-esr/cache2/domed
5.2M ./cache/mozilla/firefox/5kgb49cc.default-esr/cache2/entries
5.2M ./cache/mozilla/firefox/5kgb49cc.default-esr/cache2
7.9M ./cache/mozilla/firefox/5kgb49cc.default-esr/safefrowsing/google4
9.9M ./cache/mozilla/firefox/5kgb49cc.default-esr/safefrowsing
12K ./cache/mozilla/firefox/5kgb49cc.default-esr/settings/main-ms-language-packs
16K ./cache/mozilla/firefox/5kgb49cc.default-esr/settings/main
20K ./cache/mozilla/firefox/5kgb49cc.default-esr/settings
268K ./cache/mozilla/firefox/5kgb49cc.default-esr/OfflineCache
15M ./cache/mozilla/firefox/5kgb49cc.default-esr/startupCache
24M ./cache/mozilla/firefox/5kgb49cc.default-esr-thumbnails
31M ./cache/mozilla/firefox/5kgb49cc.default-esr
4.0K ./cache/mozilla/firefox/nmvgcty4b.default
33M ./cache/mozilla/firefox
31M ./cache/mozilla
4.0K ./cache/nbead
436K ./cache/samba
8.0K ./cache/sessions/thumbs-kali:~
```

```
File Actions Edit View Help
404K ./local/share
408K ./local
508K

[tebim@kali:~]
$ useradd solomon
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.

[tebim@kali:~]
$ sudo useradd solomon
[sudo] password for tebim:
Sorry, try again.
[sudo] password for tebim:

[tebim@kali:~]
$ sudo passwd solomon
New password:
Retype new password:
passwd: password updated successfully

[tebim@kali:~]
$ sudo userdel solomon

[tebim@kali:~]
$
```

✓ **groupadd :**

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

```
user1:x:1007:1007 ::/home/user1:/bin/sh
root@kali:~# groupadd usrgrp
root@kali:~# groups
root
root@kali:~# cat /etc/groups
cat: /etc/groups: No such file or directory
root@kali:~# cat /etc/group
```

```
kaboxer:x:140:kali
systemd-coredump:x
beef-xss:x:141:
K_M_Abhijith:x:100
user2:x:1003:
usr1:x:1005:user3
user3:x:1006:
user1:x:1007:
usrgrp:x:1008:
```

✓ **groupdel:**

groupdel command is used to delete a existing group. It will delete all entry that refers to the group, modifies the system account files, and it is handled by superuser or root user.

```
root@kali:~# groupdel newusergrp
root@kali:~# cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:
tty:x:5:
disk:x:6:
```

✓ **usermod:**

usermod command is used to change the properties of a user in Linux through the commandline

- command-line utility that allows you to modify a user's login information
- #usermod --help
- #usermod -u 2000 Tom

✓ **groups:**

- print the groups a user is in
- #groups alice

```
root@kali:~# groups
root
```

✓ **groupmod:**

- The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database.
- # groupmod -n group1 group2

```
root@kali:~# groupmod -n newusergrp usrgrp
root@kali:~# cat /etc/group
root:x:0:
daemon:x:1:
user3:x:1006:
user1:x:1007:
user:x:1009:
newusergrp:x:1008:user
```

✓ **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
```

```
-rw-r--r-- 1 root root 10 Aug 12 13:01 myfile2.txt  
root@kali:~# chmod g+rw myfile2.txt  
-rw-rw-r-- 1 root root 10 Aug 12 13:01 myfile2.txt
```

✓ **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

```
root@kali:~# ps
  PID TTY      TIME CMD
 3714 pts/0    00:00:00 bash
 3716 pts/0    00:00:00 ps
root@kali:~# id
uid=0(root) gid=0(root) groups=0(root)
root@kali:~# █
```

✓ **chown:**

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

✓ **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 or any other user in the server. List out all the groups a user belongs to. Display security context of the current user

```
root@kali:~# id
uid=0(root) gid=0(root) groups=0(root)
root@kali:~# █
```

✓ top:

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

Usually, this command shows the summary information of the system and the list of processes or threads which are currently managed by the Linux Kernel.

PID	USER	PR	NI	VIRT	RES	SHR	S	PCPU	SWCPU	TIME	COMMAND
1	root	0	-20	0	0	0	R	0.0	0.0	0:00.25	swapper/0
2	root	20	0	333296	752800	65328	S	0.3	2.7	0:26.79	Xorg
3	root	29	0	3876888	3726212	99432	S	0.3	18.3	1:15.41	gnome-shell
4	root	29	0	1072322	248008	88364	S	0.3	3.5	0:25.42	terminal
5	root	20	0	164316	18672	7288	S	0.0	0.5	0:02.13	systemd
6	root	20	0	0	0	0	S	0.0	0.0	0:00.01	khrendd
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	ccu_g1
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	ccu_g2
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	ccu_g3
10	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g4
11	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g5
12	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g6
13	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g7
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g8
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g9
16	root	20	0	0	0	0	S	0.0	0.0	0:00.00	ccu_g10
17	root	21	0	0	0	0	S	0.0	0.0	0:00.00	migration/1
18	root	20	0	0	0	0	S	0.0	0.0	0:00.12	kaotizingd/1
19	root	10	-20	0	0	0	I	0.0	0.0	0:00.00	ccuworker/210H-events_highari
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kaotizingd/2
21	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kaotizingd/3
22	root	10	-20	0	0	0	I	0.0	0.0	0:00.00	kaotizingd/4
23	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kaotizingd/5
24	root	10	-20	0	0	0	I	0.0	0.0	0:00.00	netnm
25	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kauditd
26	root	20	0	0	0	0	S	0.0	0.0	0:00.01	khongtaskd
27	root	20	0	0	0	0	S	0.0	0.0	0:00.00	mem_reaper
28	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	writeback

- **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 6 8 54 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

```
root@kali:~# cat > myfile.txt
helloeveryone
hope u all are fine
hai hello,hello hi
hehe
root@kali:~# cat > myfile2.txt
hai hello
root@kali:~# wc myfile.txt
4 10 59 myfile.txt
root@kali:~# wc myfile2.txt
1 2 10 myfile2.txt
root@kali:~# wc -l myfile.txt
4 myfile.txt
root@kali:~# wc -w myfile.txt myfile2.txt
10 myfile.txt
2 myfile2.txt
12 total
root@kali:~# wc -c myfile.txt
59 myfile.txt
root@kali:~# wc -m myfile.txt
59 myfile.txt
```

● 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/meera/Documents/Meera_Linux/archive.tar
```

➤ **Compression Types**

```
gzip(z),bzip2(j), xz(J) #tar czf /abc.tar.gz /etc  
#tar cfj /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
```

● **Bzip2**

```
root@localhost:~# ls
Desktop          f3.txt.gz  myfile2.txt.gz
Documents        f3.txt.xz  myfile.txt.gz
Downloads        file1.gz   new.tar
embedded-browser-no-sandbox.json  file2.gz   Pictures
f1.txt          file3.gz   Public
f2.txt.gz        Music     Templates
f3.txt          myfile2.txt  Videos
root@localhost:~# bzip2 f1.txt
root@localhost:~# bzip2 -cc f3.txt > f3.txt.bz
root@localhost:~# ls
Desktop          f3.txt.gz  myfile.txt.gz
Documents        f3.txt.xz  new.tar
Downloads        file1.gz   Pictures
embedded-browser-no-sandbox.json  file2.gz   Public
f1.txt.bz        file3.gz   Templates
f2.txt.gz        Music     Videos
f3.txt          myfile2.txt  Videos
f3.txt.bz        myfile2.txt.xz
```

✿ Gzip

```
root@localhost:~# apt-get install gzip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gzip is already the newest version (1.18-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@localhost:~# ls
Desktop          f2.txt      new.tar
Documents        f3.txt      Pictures
Downloads        Music      Public
embedded-browser-no-sandbox.json  myfile2.txt  Templates
f1.txt.gz        myfile.txt.gz  Videos
root@localhost:~# gzip f2.txt
root@localhost:~# ls
Desktop          f2.txt.gz  new.tar
Documents        f3.txt      Pictures
Downloads        Music      Public
embedded-browser-no-sandbox.json  myfile2.txt  Templates
f1.txt.gz        myfile.txt.gz  Videos
root@localhost:~# touch file1 file2 file3
root@localhost:~# gzip file1.txt file2.txt file3.txt
gzip: file1.txt: No such file or directory
gzip: file2.txt: No such file or directory
gzip: file3.txt: No such file or directory
root@localhost:~# gzip file1 file2 file3
root@localhost:~# ls
Desktop          f3.txt      myfile.txt.gz
Documents        file1.gz   new.tar
Downloads        file2.gz   Pictures
embedded-browser-no-sandbox.json  file3.gz   Public
f1.txt.gz        Music      Templates
root@localhost:~# gzip -c f3.txt > f3.txt.gz
root@localhost:~# ls
Desktop          f3.txt.gz  new.tar
Documents        file1.gz   Pictures
Downloads        file2.gz   Public
embedded-browser-no-sandbox.json  file3.gz   Templates
f1.txt          Music     Videos
f2.txt.gz        myfile2.txt  Videos
f3.txt          myfile.txt.gz
root@localhost:~# gzip -d f1.txt.gz
root@localhost:~# ls
Desktop          f3.txt.gz  new.tar
Documents        file1.gz   Pictures
Downloads        file2.gz   Public
embedded-browser-no-sandbox.json  file3.gz   Templates
f1.txt          Music     Videos
f2.txt.gz        myfile2.txt  Videos
f3.txt          myfile.txt.gz
root@localhost:~# gzip -c f2.txt > f2.txt.gz
gzip: f2.txt: No such file or directory
root@localhost:~# gzip -c f2.txt.gz > f2.txt.gz
root@localhost:~# ls
Desktop          f3.txt.gz  new.tar
Documents        file1.gz   Pictures
Downloads        file2.gz   Public
embedded-browser-no-sandbox.json  file3.gz   Templates
f1.txt          Music     Videos
f2.txt.gz        myfile2.txt  Videos
f3.txt          myfile.txt.gz
root@localhost:~#
```

● Xz

```
root@kali:~# apt-get install xz-utils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
xz-utils is already the newest version (5.2.5-1.0).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@kali:~# ls
Desktop          f3.txt.gz      new.tar
Documents         file1.gz      Pictures
Downloads         file2.gz      Public
embedded-browser-no-sandbox.json file3.gz      Templates
f1.txt           myfile2.txt
f2.txt.gz
f3.txt           myfile.txt.gz
root@kali:~# xz f1.txt
root@kali:~# xz -k f3.txt
root@kali:~# xz -c myfile2.txt > myfile2.txt.xz
root@kali:~# ls
Desktop          f3.txt.gz      myfile2.txt.xz
Documents         f3.txt.xz    myfile.txt.gz
Downloads         file1.gz      new.tar
embedded-browser-no-sandbox.json file2.gz      Pictures
f1.txt.xz
f2.txt.gz
f3.txt           myfile2.txt    Public
                         Templates
                         myfile.txt    Videos
```

● 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
```

```
root@kali:~# expr 12 + 10
22
root@kali:~# expr 12 \* 10
120
root@kali:~# expr 12 - 10
2
```

● 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
root@kali:~# cat /etc myfile.txt|head -5 | tail -3
cat: /etc: Is a directory
hope u all are fine
hai hello,helllo hi
hehe
root@kali:~#
```

- **ssh**

- *ss* 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

```
root@kali:~# ssh --help
unknown option -- -
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
           [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] destination [command]
```

- **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

```
root@kali:~# ssh root@kali
ssh: connect to host kali port 22: Connection refused
```

● 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
```

```
root@kali:~# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:5i7sd5154YckqJXUKTTLk0d4y6659FBkcQilN3epryM root@kali
The key's randomart image is:
+---[RSA 3072]---+
 .oo+.
 .B.o .
 *=oO.oO
 .Oo*o
 .o5B.
 . oo.+ o.o
 o.o* o *o
 . *= E -+.
 .. o .. -
 [SHA256]
```

● 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

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

```
(tebinnm㉿kali)-[~]
$ touch song1.mp3 song2.mp3 song4.mp3 song5.mp3 song6.mp3
```

b) Create six files with name of the form snapX.jpg

```
(tebinnm㉿kali)-[~]
$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg
```

c) Create six files with name of the form filmX.mp4

```
(tebinnm㉿kali)-[~]
$ 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

```
(tebinnm㉿kali)-[~]
$ mv *.mp3 ./Music/
(tebinnm㉿kali)-[~]
$ mv *.jpg ./Pictures/
(tebinnm㉿kali)-[~]
$ 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.

```
(tebinnm㉿kali)-[~]
$ mkdir -p {friends,family,work}
```

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

```
(tebinnm㉿kali)-[~]
$ cp /home/tebinnm/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/tebinnm/friends/
```

```
(tebinnm㉿kali)-[~]
└─$ cp /home/tebinnm/Pictures snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/tebinnm/family/
```

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

```
(tebinnm㉿kali)-[~]
└─$ rmdir {friends,family}
```

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

```
(tebinnm㉿kali)-[~]
└─$ 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.

```
(tebinnm㉿kali)-[~]
└─$ ls -a > allfiles.txt
```

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

```
(tebinnm㉿kali)-[~]
└─$ date
Tue 17 Aug 16:36:01 BST 2021
```

9. Add the user Juliet.

```
(tebinnm㉿kali)-[~]
└─$ sudo useradd Juliet

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

[sudo] password for tebinnm:
```

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

```
[tebinnm㉿kali)-[~] $ cat /etc/passwd
Juliet:x:1001:1001::/home/Juliet:/bin/sh
```

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

```
[tebinnm㉿kali)-[~] $ sudo passwd Juliet
New password:
Retype new password:
passwd: password updated successfully
```

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

```
[tebinnm㉿kali)-[~] $ sudo groupadd -g 30000 Shakesphere
```

13. Create a supplementary group called artists.

```
[tebinnm㉿kali)-[~] $ sudo groupadd artist
```

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

```
[tebinnm㉿kali)-[~] $ less /etc/group
Shakesphere:x:
artist:x:30001
```

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

```
[tebinnm㉿kali)-[~] $ sudo usermod -G Shakesphere Juliet
```

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

```
[tebinnm㉿kali)-[~] $ id Juliet
uid=1001(Juliet) gid=1001(Juliet) groups=1001(Juliet),30000(Shakesphere)
```

17. Add Romeo and Hamlet to the Shakesphere group.

```
(tebinnm㉿kali)-[~]
└─$ sudo useradd Romeo
(tebinnm㉿kali)-[~]
└─$ sudo useradd Hamlet
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G Shakesphere Romeo
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G Shakesphere Hamlet
```

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

```
(tebinnm㉿kali)-[~]
└─$ sudo useradd Reba
(tebinnm㉿kali)-[~]
└─$ sudo useradd Dolly
(tebinnm㉿kali)-[~]
└─$ sudo useradd Elvis
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G Artist Reba
usermod: group 'Artist' does not exist
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G artist Reba
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G artist Dolly
(tebinnm㉿kali)-[~]
└─$ sudo usermod -G artist Elvis
```

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

```
Juliet:x:1001:
Shakesphere:x:30000:Juliet,Romeo,Hamlet
artist:x:30001:Reba,Dolly,Elvis
Romeo:x:1002:
Hamlet:x:1003:
Reba:x:1004:
Dolly:x:1005:
Elvis:x:1006:
```

20. Attempt to remove user Dolly.

```
(tebinnm㉿kali)-[~]
└─$ sudo userdel Dolly
```

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 :

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19043.1202]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=45ms TTL=119
Reply from 142.250.196.78: bytes=32 time=45ms TTL=119
Reply from 142.250.196.78: bytes=32 time=47ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 20ms, Maximum = 47ms, Average = 39ms

C:\Windows\system32>ping -a google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=37ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=31ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 20ms, Maximum = 37ms, Average = 27ms
```

```
C:\Windows\system32>ping -t google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=34ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119
Reply from 142.250.196.78: bytes=32 time=23ms TTL=119
Reply from 142.250.196.78: bytes=32 time=24ms TTL=119
Reply from 142.250.196.78: bytes=32 time=29ms TTL=119
Reply from 142.250.196.78: bytes=32 time=33ms TTL=119
Reply from 142.250.196.78: bytes=32 time=41ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 7, Received = 7, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 21ms, Maximum = 41ms, Average = 29ms
```

```
C:\Windows\system32>ping -j google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Windows\system32>ping -4 google.com

Pinging google.com [142.250.196.78] with 32 bytes of data:
Reply from 142.250.196.78: bytes=32 time=25ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=20ms TTL=119
Reply from 142.250.196.78: bytes=32 time=21ms TTL=119

Ping statistics for 142.250.196.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 20ms, Maximum = 25ms, Average = 21ms
```

❖ Route :

```
Administrator: Command Prompt
Minimum = 20ms, Maximum = 25ms, Average = 21ms
C:\Windows\system32>route print
=====
Interface List
 2...00 00 27 00 00 02 ....VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ....Qualcomm QCA61x4A B02.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ....Bluetooth Device (Personal Area Network) #2
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
  0.0.0.0          0.0.0.0    192.168.1.1  192.168.1.2    40
 127.0.0.0         255.0.0.0    On-link        127.0.0.1    331
 127.0.0.1         255.255.255.255  On-link        127.0.0.1    331
127.255.255.255  255.255.255.255  On-link        127.0.0.1    331
 192.168.1.0       255.255.255.0    On-link      192.168.1.2    296
 192.168.1.2       255.255.255.255  On-link      192.168.1.2    296
 192.168.1.255    255.255.255.255  On-link      192.168.1.2    296
 192.168.56.0       255.255.255.0    On-link      192.168.56.1    281
 192.168.56.1       255.255.255.255  On-link      192.168.56.1    281
 192.168.56.255    255.255.255.255  On-link      192.168.56.1    281
 224.0.0.0          240.0.0.0    On-link        127.0.0.1    331
 224.0.0.0          240.0.0.0    On-link      192.168.56.1    281
 224.0.0.0          240.0.0.0    On-link      192.168.1.2    296
 255.255.255.255  255.255.255.255  On-link        127.0.0.1    331
 255.255.255.255  255.255.255.255  On-link      192.168.56.1    281
 255.255.255.255  255.255.255.255  On-link      192.168.1.2    296
=====
Persistent Routes:
  None
```

```
IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
 1    331 ::1/128          On-link
 2    281 fe80::/64        On-link
 23   296 fe80::/64        On-link
 23   296 fe80::3967:1de3:1924:1daf/128
                                On-link
 2    281 fe80::e866:65b:18f5:53de/128
                                On-link
 1    331 ff00::/8          On-link
 2    281 ff00::/8          On-link
 23   296 ff00::/8          On-link
=====
Persistent Routes:
  None
```

```
C:\Windows\system32>route print -4
=====
Interface List
 2...0a 00 27 00 00 02 ....VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ....Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ....Bluetooth Device (Personal Area Network) #2
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
  0.0.0.0          0.0.0.0    192.168.1.1  192.168.1.2      40
 127.0.0.0        255.0.0.0    On-link        127.0.0.1      331
 127.0.0.1        255.255.255  On-link        127.0.0.1      331
127.255.255.255  255.255.255.255  On-link        127.0.0.1      331
 192.168.1.0      255.255.255.0  On-link        192.168.1.2      296
 192.168.1.2      255.255.255.255  On-link        192.168.1.2      296
 192.168.1.255    255.255.255.255  On-link        192.168.1.2      296
 192.168.56.0      255.255.255.0  On-link        192.168.56.1      281
 192.168.56.1      255.255.255.255  On-link        192.168.56.1      281
192.168.56.255    255.255.255.255  On-link        192.168.56.1      281
 224.0.0.0          240.0.0.0    On-link        127.0.0.1      331
 224.0.0.0          240.0.0.0    On-link        192.168.56.1      281
 224.0.0.0          240.0.0.0    On-link        192.168.1.2      296
 255.255.255.255  255.255.255.255  On-link        127.0.0.1      331
 255.255.255.255  255.255.255.255  On-link        192.168.56.1      281
 255.255.255.255  255.255.255.255  On-link        192.168.1.2      296
=====
Persistent Routes:
  None
```

```
C:\Windows\system32>route print -6
=====
Interface List
 2...0a 00 27 00 00 02 ....VirtualBox Host-Only Ethernet Adapter
 25...1a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #5
 19...2a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #6
 23...18 47 3d e9 62 5d ....Qualcomm QCA61x4A 802.11ac Wireless Adapter
 10...18 47 3d e9 62 5e ....Bluetooth Device (Personal Area Network) #2
 1.....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128        On-link
  2    281 fe80::/64        On-link
 23    296 fe80::/64        On-link
 23    296 fe80::3967:1de3:1924:1daf/128
                                On-link
  2    281 fe80::e866:65b:18f5:53de/128
                                On-link
  1    331 ff00::/8        On-link
  2    281 ff00::/8        On-link
 23    296 ff00::/8        On-link
=====
Persistent Routes:
  None
```

```
C:\Windows\system32>route print *153
=====
Interface List
  2...0a 00 27 00 00 02 ....VirtualBox Host-Only Ethernet Adapter
  25...1a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #5
  19...2a 47 3d e9 62 5d ....Microsoft Wi-Fi Direct Virtual Adapter #6
  23...18 47 3d e9 62 5d ....Qualcomm QCA61x4A 802.11ac Wireless Adapter
  10...18 47 3d e9 62 5e ....Bluetooth Device (Personal Area Network) #2
  1.....Software Loopback Interface 1
=====

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

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

❖ Tracert ;

```
C:\Windows\system32>tracert 192.168.1.2

Tracing route to KAJ [192.168.1.2]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  KAJ [192.168.1.2]

Trace complete.

C:\Windows\system32>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

  1    8 ms     2 ms     2 ms  192.168.1.1

Trace complete.
```

```
C:\Windows\system32>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1  18 ms    2 ms    2 ms  192.168.1.1
 2  22 ms    6 ms    5 ms  100.76.0.1
 3  66 ms    79 ms   80 ms  125.23.238.89
 4  249 ms   258 ms  250 ms  116.119.52.163
 5  242 ms   232 ms  257 ms  10gigabitethernet1-2.core1.nyc6.he.net [198.32.160.61]
 6  234 ms   240 ms  254 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
 7  265 ms   255 ms  252 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
 8  223 ms   227 ms  238 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
 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:\Windows\system32>tracert google.com

Tracing route to google.com [142.250.193.142]
over a maximum of 30 hops:

 1  6 ms    2 ms    2 ms  192.168.1.1
 2  5 ms    6 ms    5 ms  100.76.0.1
 3  39 ms   21 ms   20 ms  10.1.3.10
 4  22 ms   31 ms   20 ms  72.14.205.178
 5  33 ms   25 ms   54 ms  216.239.54.75
 6  21 ms   37 ms   23 ms  142.251.55.227
 7  21 ms   21 ms   36 ms  maa05s25-in-f14.1e100.net [142.250.193.142]

Trace complete.
```

```
C:\Windows\system32>tracert -d www.linkedin.com
```

```
Tracing route to 1-0005.l-msedge.net [13.107.42.14]  
over a maximum of 30 hops:
```

1	4 ms	3 ms	3 ms	192.168.1.1
2	5 ms	6 ms	6 ms	100.76.0.1
3	21 ms	45 ms	21 ms	10.1.3.14
4	20 ms	22 ms	43 ms	104.44.6.123
5	28 ms	34 ms	21 ms	104.44.41.233
6	21 ms	30 ms	29 ms	104.44.22.123
7	45 ms	24 ms	56 ms	104.44.18.159
8	62 ms	29 ms	49 ms	104.44.23.248
9	21 ms	38 ms	22 ms	104.44.234.36
10	23 ms	20 ms	37 ms	13.104.182.49
11	*	*	*	Request timed out.
12	*	*	*	Request timed out.
13	*	*	*	Request timed out.
14	63 ms	30 ms	*	13.107.42.14
15	21 ms	51 ms	21 ms	13.107.42.14

```
Trace complete.
```

❖ NsLookup ;

```
C:\Windows\system32>nslookup
Default Server: UnKnown
Address: 103.140.17.242

> exit

C:\Windows\system32>nslookup google.com
Server: UnKnown
Address: 103.140.17.242

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4007:82b::200e
           142.250.196.78

C:\Windows\system32>nslookup -q=MX google.com
Server: UnKnown
Address: 103.140.17.242

Non-authoritative answer:
google.com      MX preference = 40, mail exchanger = alt3.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 = 10, mail exchanger = aspmx.l.google.com

C:\Windows\system32>nslookup -type=ns google.com
Server: UnKnown
Address: 103.140.17.242

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

❖ Ipconfig :

```
C:\Windows\system32>ipconfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::e866:65b:18f5:53de%2
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daef%23
  IPv4 Address. . . . . : 192.168.1.2
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection 2:

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

```
C:\Windows\system32>ipconfig /allcompartments

Windows IP Configuration

Network Information for Compartment 1 (ACTIVE)
-----
Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::e866:65b:18f5:53de%2
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

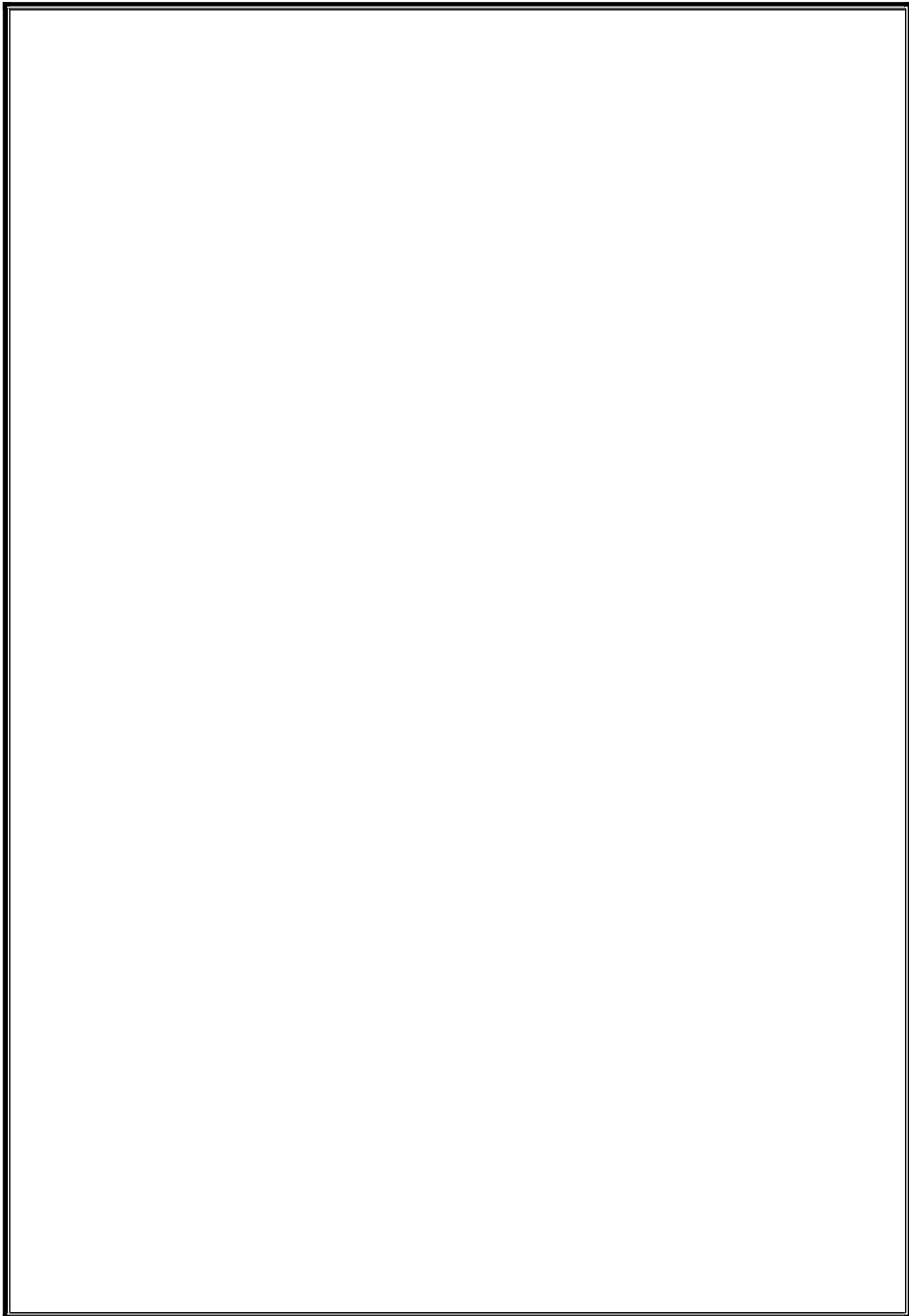
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daef%23
  IPv4 Address. . . . . : 192.168.1.2
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Bluetooth Network Connection 2:

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



```
C:\Windows\system32>ipconfig/displaydns

Windows IP Configuration

www.wondershare.com
-----
No records of type AAAA

www.wondershare.com
-----
Record Name . . . . . : www.wondershare.com
Record Type . . . . . : 1
Time To Live . . . . . : 483101
Data Length . . . . . : 4
Section . . . . . . . : Answer
A (Host) Record . . . . . : 127.0.0.1

cbs.wondershare.com
-----
No records of type AAAA

cbs.wondershare.com
-----
Record Name . . . . . : cbs.wondershare.com
Record Type . . . . . : 1
Time To Live . . . . . : 483101
Data Length . . . . . : 4
Section . . . . . . . : Answer
A (Host) Record . . . . . : 127.0.0.1

tracker.openbittorrent.com
-----
Record Name . . . . . : tracker.openbittorrent.com
Record Type . . . . . : 1
Time To Live . . . . . : 389
Data Length . . . . . : 4
Section . . . . . . . : Answer
A (Host) Record . . . . . : 45.154.253.5

Record Name . . . . . : tracker.openbittorrent.com
Record Type . . . . . : 1
Time To Live . . . . . : 389
Data Length . . . . . : 4
```

```
C:\Windows\system32>ipconfig/release

Windows IP Configuration

No operation can be performed on Local Area Connection* 13 while it has its media disconnected.
No operation can be performed on Local Area Connection* 14 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection 2 while it has its media disconnected.

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::e866:65b:18f5:53de%2
  IPv4 Address . . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 13:

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

Wireless LAN adapter Local Area Connection* 14:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::3967:1de3:1924:1daf%23
  Default Gateway . . . . . :

Ethernet adapter Bluetooth Network Connection 2:

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

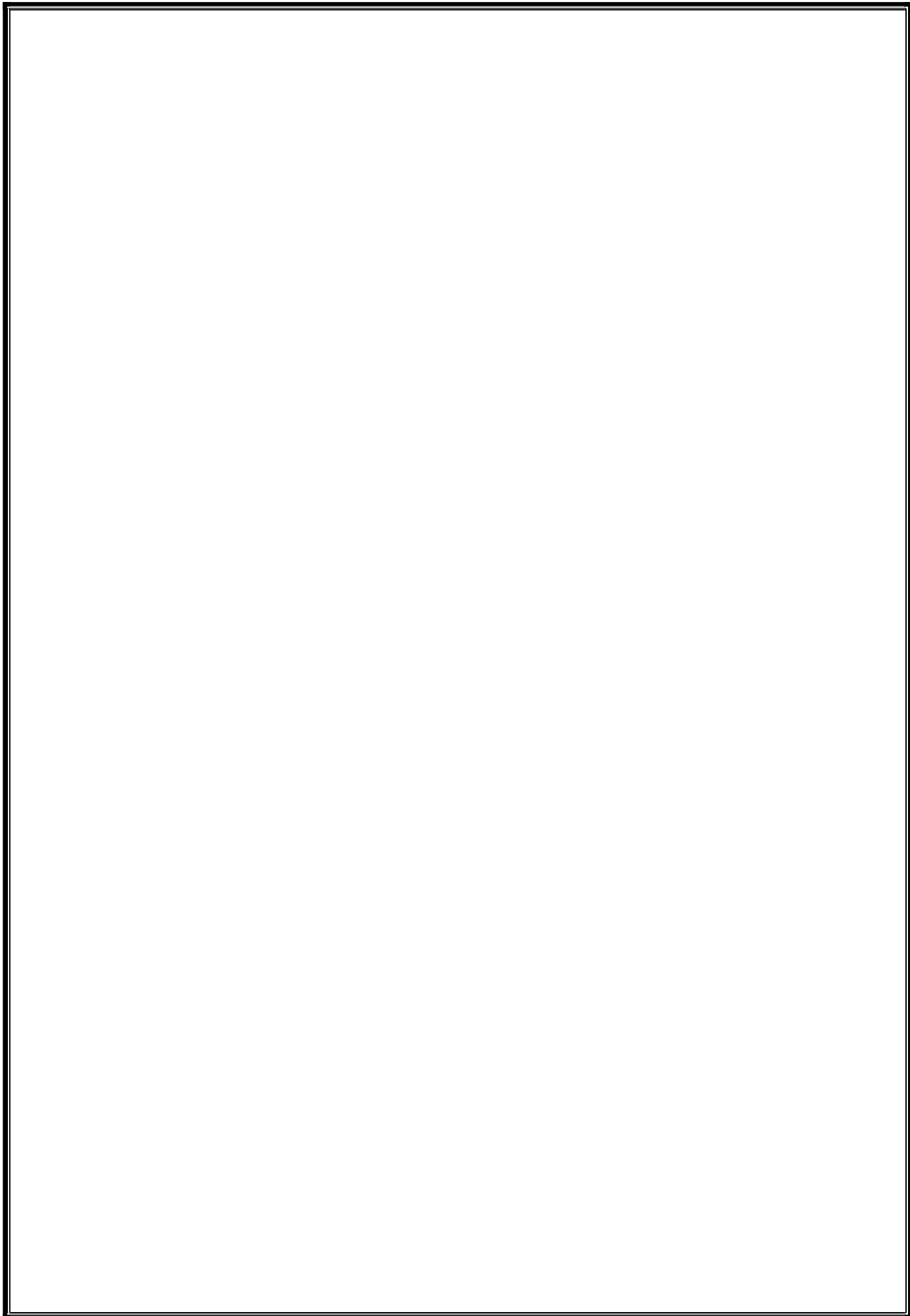
C:\Windows\system32>
```

❖ NetStat ;

```
C:\Windows\system32>netstat

Active Connections

  Proto  Local Address        Foreign Address      State
  TCP    127.0.0.1:19575    platform:50181        TIME_WAIT
  TCP    127.0.0.1:19575    platform:51946        TIME_WAIT
  TCP    127.0.0.1:19575    platform:53545        TIME_WAIT
  TCP    127.0.0.1:19575    platform:54604        TIME_WAIT
  TCP    127.0.0.1:19575    platform:55679        TIME_WAIT
  TCP    127.0.0.1:19575    platform:55970        TIME_WAIT
  TCP    127.0.0.1:19575    platform:57517        TIME_WAIT
  TCP    127.0.0.1:19575    platform:61464        TIME_WAIT
  TCP    127.0.0.1:19575    platform:61848        TIME_WAIT
  TCP    127.0.0.1:49376    platform:49377        ESTABLISHED
  TCP    127.0.0.1:49377    platform:49376        ESTABLISHED
  TCP    127.0.0.1:49678    platform:49671        ESTABLISHED
  TCP    127.0.0.1:49671    platform:49670        ESTABLISHED
  TCP    127.0.0.1:49672    platform:49673        ESTABLISHED
  TCP    127.0.0.1:49673    platform:49672        ESTABLISHED
  TCP    127.0.0.1:57118    platform:63736        ESTABLISHED
  TCP    127.0.0.1:58630    platform:58631        ESTABLISHED
  TCP    127.0.0.1:58631    platform:58630        ESTABLISHED
  TCP    127.0.0.1:62788    platform:62789        ESTABLISHED
  TCP    127.0.0.1:62789    platform:62788        ESTABLISHED
  TCP    127.0.0.1:62789    platform:62789        ESTABLISHED
```



```
C:\Windows\system32>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:19575	127.0.0.1:49321	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:54748	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:55939	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:60557	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:60878	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:63199	TIME_WAIT
TCP	127.0.0.1:49376	127.0.0.1:49377	ESTABLISHED
TCP	127.0.0.1:49377	127.0.0.1:49376	ESTABLISHED
TCP	127.0.0.1:49665	127.0.0.1:55846	ESTABLISHED
TCP	127.0.0.1:49670	127.0.0.1:49671	ESTABLISHED
TCP	127.0.0.1:49671	127.0.0.1:49670	ESTABLISHED
TCP	127.0.0.1:49672	127.0.0.1:49673	ESTABLISHED
TCP	127.0.0.1:49673	127.0.0.1:49672	ESTABLISHED
TCP	127.0.0.1:55846	127.0.0.1:49665	ESTABLISHED
TCP	127.0.0.1:57118	127.0.0.1:63736	ESTABLISHED
TCP	127.0.0.1:58630	127.0.0.1:58631	ESTABLISHED
TCP	127.0.0.1:58631	127.0.0.1:58630	ESTABLISHED
TCP	127.0.0.1:62788	127.0.0.1:62789	ESTABLISHED
TCP	127.0.0.1:62789	127.0.0.1:62788	ESTABLISHED
TCP	127.0.0.1:63736	127.0.0.1:57118	ESTABLISHED
TCP	127.0.0.1:63738	127.0.0.1:63739	ESTABLISHED
TCP	127.0.0.1:63739	127.0.0.1:63738	ESTABLISHED
TCP	127.0.0.1:63743	127.0.0.1:63755	ESTABLISHED
TCP	127.0.0.1:63755	127.0.0.1:63743	ESTABLISHED
TCP	127.0.0.1:64322	127.0.0.1:64323	ESTABLISHED

```
C:\Windows\system32>netstat -n 5
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:19575	127.0.0.1:50233	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:52594	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:54748	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:55939	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:58174	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:60557	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:60576	TIME_WAIT
TCP	127.0.0.1:19575	127.0.0.1:64364	TIME_WAIT
TCP	127.0.0.1:49376	127.0.0.1:49377	ESTABLISHED
TCP	127.0.0.1:49377	127.0.0.1:49376	ESTABLISHED
TCP	127.0.0.1:49665	127.0.0.1:55846	ESTABLISHED
TCP	127.0.0.1:49670	127.0.0.1:49671	ESTABLISHED
TCP	127.0.0.1:49671	127.0.0.1:49670	ESTABLISHED
TCP	127.0.0.1:49672	127.0.0.1:49673	ESTABLISHED
TCP	127.0.0.1:49673	127.0.0.1:49672	ESTABLISHED
TCP	127.0.0.1:55846	127.0.0.1:49665	ESTABLISHED
TCP	127.0.0.1:57118	127.0.0.1:63736	ESTABLISHED
TCP	127.0.0.1:58630	127.0.0.1:58631	ESTABLISHED
TCP	127.0.0.1:58631	127.0.0.1:58630	ESTABLISHED
TCP	127.0.0.1:62788	127.0.0.1:62789	ESTABLISHED
TCP	127.0.0.1:62789	127.0.0.1:62788	ESTABLISHED
TCP	127.0.0.1:63736	127.0.0.1:57118	ESTABLISHED
TCP	127.0.0.1:63738	127.0.0.1:63739	ESTABLISHED
TCP	127.0.0.1:63739	127.0.0.1:63738	ESTABLISHED
TCP	127.0.0.1:63743	127.0.0.1:63755	ESTABLISHED
TCP	127.0.0.1:63755	127.0.0.1:63743	ESTABLISHED
TCP	127.0.0.1:64322	127.0.0.1:64323	ESTABLISHED
TCP	127.0.0.1:64323	127.0.0.1:64322	ESTABLISHED
TCP	127.0.0.1:64324	127.0.0.1:64325	ESTABLISHED
TCP	127.0.0.1:64325	127.0.0.1:64324	ESTABLISHED
TCP	127.0.0.1:64326	127.0.0.1:64327	ESTABLISHED
TCP	127.0.0.1:64327	127.0.0.1:64326	ESTABLISHED
TCP	127.0.0.1:64335	127.0.0.1:64337	ESTABLISHED
TCP	127.0.0.1:64336	127.0.0.1:64338	ESTABLISHED
TCP	127.0.0.1:64337	127.0.0.1:64335	ESTABLISHED
TCP	127.0.0.1:64338	127.0.0.1:64336	ESTABLISHED
TCP	127.0.0.1:64339	127.0.0.1:64340	ESTABLISHED

```
C:\Windows\system32>netstat -a
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	KAJ:0	LISTENING
TCP	0.0.0.0:445	KAJ:0	LISTENING
TCP	0.0.0.0:3306	KAJ:0	LISTENING
TCP	0.0.0.0:5040	KAJ:0	LISTENING
TCP	0.0.0.0:5357	KAJ:0	LISTENING
TCP	0.0.0.0:5700	KAJ:0	LISTENING
TCP	0.0.0.0:6646	KAJ:0	LISTENING
TCP	0.0.0.0:6881	KAJ:0	LISTENING
TCP	0.0.0.0:7070	KAJ:0	LISTENING
TCP	0.0.0.0:19575	KAJ:0	LISTENING
TCP	0.0.0.0:19576	KAJ:0	LISTENING
TCP	0.0.0.0:19577	KAJ:0	LISTENING
TCP	0.0.0.0:33060	KAJ:0	LISTENING
TCP	0.0.0.0:49664	KAJ:0	LISTENING
TCP	0.0.0.0:49665	KAJ:0	LISTENING
TCP	0.0.0.0:49666	KAJ:0	LISTENING
TCP	0.0.0.0:49667	KAJ:0	LISTENING
TCP	0.0.0.0:49668	KAJ:0	LISTENING
TCP	0.0.0.0:49674	KAJ:0	LISTENING
TCP	127.0.0.1:1001	KAJ:0	LISTENING
TCP	127.0.0.1:8884	KAJ:0	LISTENING
TCP	127.0.0.1:9012	KAJ:0	LISTENING
TCP	127.0.0.1:19575	platform:50968	TIME_WAIT
TCP	127.0.0.1:19575	platform:51233	TIME_WAIT
TCP	127.0.0.1:19575	platform:51555	TIME_WAIT
TCP	127.0.0.1:19575	platform:54936	TIME_WAIT
TCP	127.0.0.1:19575	platform:57818	TIME_WAIT
TCP	127.0.0.1:19575	platform:64050	TIME_WAIT
TCP	127.0.0.1:27017	KAJ:0	LISTENING
TCP	127.0.0.1:49376	platform:49377	ESTABLISHED
TCP	127.0.0.1:49377	platform:49376	ESTABLISHED
TCP	127.0.0.1:49665	platform:64119	ESTABLISHED
TCP	127.0.0.1:49670	platform:49671	ESTABLISHED
TCP	127.0.0.1:49671	platform:49670	ESTABLISHED
TCP	127.0.0.1:49672	platform:49673	ESTABLISHED
TCP	127.0.0.1:49673	platform:49672	ESTABLISHED
TCP	127.0.0.1:49710	KAJ:0	LISTENING
TCP	127.0.0.1:53659	KAJ:0	LISTENING
TCP	127.0.0.1:57118	platform:63736	ESTABLISHED
TCP	127.0.0.1:58630	platform:58631	ESTABLISHED
TCP	127.0.0.1:58631	platform:58630	ESTABLISHED
TCP	127.0.0.1:62788	platform:62789	ESTABLISHED

Linux :

❖ Ping :

```
(tebinme㉿kali)-[~]
└─$ ./a.sh
ping
PING google.com (142.250.193.142) 56(84) bytes of data.
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=118 time=21.8 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=118 time=51.2 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=118 time=25.6 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=118 time=25.0 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=118 time=23.1 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 21.782/29.326/51.178/11.008 ms
```

❖ Route :

```
route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2      0.0.0.0         UG    100    0        0 eth0
10.0.2.0        0.0.0.0       255.255.255.0   U     100    0        0 eth0
```

❖ Traceroute :

```
traceroute
traceroute to google.com (142.250.193.142), 30 hops max, 60 byte packets
 1  10.0.2.2 (10.0.2.2)  0.184 ms  0.127 ms  0.105 ms
 2  10.0.2.2 (10.0.2.2)  1.991 ms  4.667 ms  4.639 ms
```

❖ NSlookup ;

```
nslookup
Server:      192.168.18.1
Address:      192.168.18.1#53

Non-authoritative answer:
Name:  google.com
Address: 142.250.193.142
Name:  google.com
Address: 2404:6800:4007:82b::200e
```

❖ Ifconfig -a ;

```
ifconfig -a
eth0: 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::a00:27ff:feb4:aaf6  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:b4:aa:f6  txqueuelen 1000  (Ethernet)
          RX packets 146  bytes 13517 (13.2 KiB)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 167  bytes 13463 (13.1 KiB)
          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 14  bytes 634 (634.0 B)
          RX errors 0  dropped 0  overruns 0  frame 0
          TX packets 14  bytes 634 (634.0 B)
          TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

❖ Ifconfig -s ;

```
ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0       1500     146     0     0 0       167     0     0     0 BMRU
lo        65536     14     0     0 0       14     0     0     0 LRU
```

❖ Ifconfig ;

```
ifconfig
eth0: 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::a00:27ff:feb4:aaf6 prefixlen 64 scopeid 0x20<link>
            ether 08:00:27:b4:aa:f6 txqueuelen 1000 (Ethernet)
            RX packets 146 bytes 13517 (13.2 KiB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 167 bytes 13463 (13.1 KiB)
            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 14 bytes 634 (634.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 14 bytes 634 (634.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

❖ Netstat :

```
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      15405      /run/user/1000/systemd/notify
  unix    3      [ ]      DGRAM      12173      /run/systemd/notify
  unix    2      [ ]      DGRAM      12189      /run/systemd/journal/syslog
  unix   12      [ ]      DGRAM      12195      /run/systemd/journal/dev-log
  unix    6      [ ]      DGRAM      12197      /run/systemd/journal/socket
  unix    3      [ ]      STREAM     CONNECTED    17468
  unix    3      [ ]      STREAM     CONNECTED    17046
  unix    3      [ ]      STREAM     CONNECTED    16754
  unix    3      [ ]      STREAM     CONNECTED    15930      /run/user/1000/bus
  unix    3      [ ]      STREAM     CONNECTED    17467      /run/user/1000/bus
  unix    3      [ ]      STREAM     CONNECTED    17036      /run/dbus/system_bus_socket
  unix    3      [ ]      STREAM     CONNECTED    17834      @/tmp/dbus-Qqtca2BLFe
  unix    3      [ ]      STREAM     CONNECTED    15935
  unix    3      [ ]      DGRAM      15407
  unix    3      [ ]      STREAM     CONNECTED    17455      /run/systemd/journal/stdout
  unix    3      [ ]      STREAM     CONNECTED    17035
  unix    3      [ ]      STREAM     CONNECTED    17223      /run/user/1000/bus
  unix    3      [ ]      STREAM     CONNECTED    16771      /run/user/1000/bus
```

```
File Actions Edit View Help
└──(raman㉿kali)-[~]
$ sudo apt update
[sudo] password for raman:
Ign:1 http://repo.mongodb.org/apt/debian buster/mongodb-org/5.0 InRelease
Hit:2 http://repo.mongodb.org/apt/debian buster/mongodb-org/5.0 Release
Get:3 http://ftp.harukasan.org/kali kali-rolling InRelease [30.5 kB]
Get:5 http://ftp.harukasan.org/kali kali-rolling/main amd64 Packages [17.9 MB]
Get:6 http://ftp.harukasan.org/kali kali-rolling/contrib amd64 Packages [108 kB]
Get:7 http://ftp.harukasan.org/kali kali-rolling/non-free amd64 Packages [209 kB]
Fetched 18.3 MB in 1min 46s (173 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
1486 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

```
sudo apt install apache2
```

```
(raman㉿kali)-[~]
$ sudo apt install apache2
Reading package lists ... Done
Building dependency tree
Reading state information ... Done
apache2 is already the newest version (2.4.48-4).
apache2 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 1486 not upgraded.
```

```
sudo systemctl status apache2
```

```
(raman㉿kali)-[~]
$ sudo systemctl status apache2
apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; disabled; vendor>
   Active: active (running) since Wed 2021-09-29 09:43:05 IST; 4s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 1431 ExecStart=/usr/sbin/apachectl start (code=exited, status>
 Main PID: 1442 (apache2)
    Tasks: 6 (limit: 2309)
   Memory: 17.9M
      CPU: 0.000 CPU(s) since start
     CGroup: /system.slice/apache2.service
             ├─1442 /usr/sbin/apache2 -k start
             ├─1444 /usr/sbin/apache2 -k start
             ├─1445 /usr/sbin/apache2 -k start
             ├─1446 /usr/sbin/apache2 -k start
             ├─1447 /usr/sbin/apache2 -k start
             └─1448 /usr/sbin/apache2 -k start

Sep 29 09:43:04 kali systemd[1]: Starting The Apache HTTP Server...
Sep 29 09:43:05 kali systemd[1]: Started The Apache HTTP Server.
[lines 1-18/18 (END)]
```

```
sudo apt install apache2
```

```
[~] (raman㉿kali)-[~]
└─$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.48-4).
apache2 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 1486 not upgraded.
```

```
[~] (raman㉿kali)-[~]
└─$ sudo apt install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required
:
  libreadline5
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  default-mysql-server galera-4 mariadb-client-10.5
  mariadb-client-core-10.5 mariadb-common mariadb-server-10.5
  mariadb-server-core-10.5
Suggested packages:
  mailx mariadb-test netcat-openbsd
The following packages will be REMOVED:
  galera-3 mariadb-client-10.3 mariadb-client-core-10.3
  mariadb-server-10.3 mariadb-server-core-10.3
The following NEW packages will be installed:
  galera-4 mariadb-client mariadb-client-10.5 mariadb-client-core-10.5
  mariadb-server mariadb-server-10.5 mariadb-server-core-10.5
The following packages will be upgraded:
  default-mysql-server mariadb-common
2 upgraded, 7 newly installed, 5 to remove and 1483 not upgraded.
Need to get 14.0 MB of archives.
After this operation, 11.7 MB disk space will be freed.
Do you want to continue? [Y/n] y
Get:1 http://ftp.harukasan.org/kali kali-rolling/main amd64 mariadb-common
  all 1:10.5.12-1 [36.3 kB]
Get:2 http://ftp.harukasan.org/kali kali-rolling/main amd64 default-mysql-s
  erver all 1:0.7 [3,712 B]
```

```
→(raman㉿kali)-[~]
$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; disabled; vendor>
  Active: active (running) since Wed 2021-09-29 09:43:05 IST; 4s ago
    Docs: https://httpd.apache.org/docs/2.4/
  Process: 1431 ExecStart=/usr/sbin/apachectl start (code=exited, status>
  Main PID: 1442 (apache2)
    Tasks: 6 (limit: 2309)
   Memory: 17.9M
      CGroup: /system.slice/apache2.service
              ├─1442 /usr/sbin/apache2 -k start
              ├─1444 /usr/sbin/apache2 -k start
              ├─1445 /usr/sbin/apache2 -k start
              ├─1446 /usr/sbin/apache2 -k start
              ├─1447 /usr/sbin/apache2 -k start
              └─1448 /usr/sbin/apache2 -k start

Sep 29 09:43:04 kali systemd[1]: Starting The Apache HTTP Server ...
Sep 29 09:43:05 kali systemd[1]: Started The Apache HTTP Server.
[snip 1-18/18 (END)]
```

```
└$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
  Loaded: loaded (/lib/systemd/system/mariadb.service; disabled; vendor preset: disabled)
  Active: inactive (dead)
    Docs: man:mariadb(8)
          https://mariadb.com/kb/en/library/systemd/
```

```
└$ sudo apt install mariadb-server mariadb-client
  130 ✘
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required
:
  libreadline5
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  default-mysql-server galera-4 mariadb-client-10.5
  mariadb-client-core-10.5 mariadb-common mariadb-server-10.5
  mariadb-server-core-10.5
Suggested packages:
  mailx mariadb-test netcat-openbsd
The following packages will be REMOVED:
  galera-3 mariadb-client-10.3 mariadb-client-core-10.3
  mariadb-server-10.3 mariadb-server-core-10.3
The following NEW packages will be installed:
  galera-4 mariadb-client mariadb-client-10.5 mariadb-client-core-10.5
  mariadb-server mariadb-server-10.5 mariadb-server-core-10.5
The following packages will be upgraded:
  default-mysql-server mariadb-common
```

Q. Explain the steps for the installation of ansible with your own screenshots.

Install ansible sudo apt install ansible ansible --version

```
root@LAPTOP-4D3BA01Q:~# sudo apt install ansible
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  cowsay sshpass
The following NEW packages will be installed:
  ansible
0 upgraded, 1 newly installed, 0 to remove and 55 not upgraded.
Need to get 5794 kB of archives.
After this operation, 58.0 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/universe amd64 ansible all 2.9.6+dfsg-1 [5794 kB]
Fetched 5794 kB in 14s (404 kB/s)
Selecting previously unselected package ansible.
(Reading database ... 36333 files and directories currently installed.)
Preparing to unpack .../ansible_2.9.6+dfsg-1_all.deb ...
Unpacking ansible (2.9.6+dfsg-1) ...
Setting up ansible (2.9.6+dfsg-1) ...
Processing triggers for man-db (2.9.1-1) ...
```

```
root@LAPTOP-4D3BA01Q:~# ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['~/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /use/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Jun  2 2021, 10:49:15) [GCC 9.4.0]
root@LAPTOP-4D3BA01Q:~#
```

Q. Execute tcpdump and its options on your own system, and submit the output screenshot as a document.

Install tcpdump sudo apt update && sudo apt

install tcpdump

```
root@LAPTOP-4DJB01Q:~# sudo apt update && sudo apt install tcpdump
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1256 kB]
Fetched 1584 kB in 7s (217 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
55 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-4).
0 upgraded, 0 newly installed, 0 to remove and 55 not upgraded.
```

Execute tcpdump

```
root@LAPTOP-4DJB01Q:~# sudo tcpdump
tcpdump: verbose output suppressed; use -v or -vv for full protocol decode
Listening on eth0, link-type LINUX_MII (Ethernet), capture size 262144 bytes
14:58:22.482573 IP LAPTOP-4DJB01Q.eshome.net.51134 > 239.255.255.256.1980: UDP, length 173
14:58:22.497244 IP 172.19.139.10.59879 > LAPTOP-4DJB01Q.eshome.net.domain: 43809+ PTR(0x0) 250.255.255.239.in-addr.arpa. (46)
14:58:22.506451 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:22.501129 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:22.745922 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:22.742783 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:23.489645 IP LAPTOP-4DJB01Q.eshome.net.51134 > 239.255.255.256.1980: UDP, length 173
14:58:23.489883 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:23.496280 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:23.747216 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:23.748862 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 250.255.255.239.in-addr.arpa.local. (52)
14:58:23.969478 IP LAPTOP-4DJB01Q.eshome.net.domain > 172.19.139.16.59879: 43809 0x0main 0/1/0 (383)
14:58:23.969784 IP 172.19.139.16.46953 > LAPTOP-4DJB01Q.eshome.net.domain: 1782+ PTR(1.128.19.172.in-addr.arpa. (43)
14:58:23.978715 IP LAPTOP-4DJB01Q.eshome.net.domain > 172.19.139.16.46953: 1782- 1/W PTR(LAPTOP-4DJB01Q.eshome.net. (100)
14:58:23.979016 IP 172.19.139.16.44462 > LAPTOP-4DJB01Q.eshome.net.domain: 16045+ PTR(16.139.19.172.in-addr.arpa. (44)
14:58:23.973173 IP LAPTOP-4DJB01Q.eshome.net.domain > 172.19.139.16.59879: 43809 0x0main 0/1/0 (383)
14:58:23.973892 IP 172.19.139.10 > LAPTOP-4DJB01Q.eshome.net: ICMP 172.19.139.16 udp port 59879 unreachable, length 139
14:58:23.973665 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:23.973161 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:24.497182 IP LAPTOP-4DJB01Q.eshome.net.51134 > 239.255.255.256.1980: UDP, length 173
14:58:24.708288 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:24.709731 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:24.966995 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:24.967399 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:25.498845 IP LAPTOP-4DJB01Q.eshome.net.51134 > 239.255.255.256.1980: UDP, length 173
14:58:25.795079 IP LAPTOP-4DJB01Q.eshome.net.adns > 224.0.0.251.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:25.795716 IP6 LAPTOP-4DJB01Q.adns > FF02::1b.adns: 0 PTR(0x0) 16.139.19.172.in-addr.arpa.local. (50)
14:58:26.224918 IP LAPTOP-4DJB01Q.eshome.net.domain > 172.19.139.16.44462: 16045 0x0main 0/1/0 (321)
```

```
tcpdump -D
```

```
root@LAPTOP-4DJBA01Q:~# tcpdump -D
1.eth0 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
7(dummy0 [none]
8.tun10 [none]
9.sit0 [none]
10.bond0 [none]
root@LAPTOP-4DJBA01Q:~#
```

```
root@LAPTOP-4DJBA01Q:~# tcpdump -i enp2s0
tcpdump: enp2s0: No such device exists
(SIOCGIFHWADDR: No such device)
```

```
tcpdump -c 5
```

```
root@LAPTOP-4DJBA01Q:~# tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:55:20.500051 IP LAPTOP-4DJBA01Q.mshome.net.64256 > 239.255.255.250.1900: UDP, length 373
14:55:20.500051 IP LAPTOP-4DJBA01Q.mshome.net.64256 > 239.255.255.239.in-addr.arpa. (46)
14:55:20.503343 IP LAPTOP-4DJBA01Q.mshome.net.mdns > 224.0.0.251.mdns: 0 PTR (Q)? 250.255.255.239.in-addr.arpa.local. (52)
14:55:20.504224 IP6 LAPTOP-4DJBA01Q.mshome.net.mdns > ff02::fb.mdns: 0 PTR (Q)? 250.255.255.239.in-addr.arpa.local. (52)
14:55:20.727772 IP LAPTOP-4DJBA01Q.mshome.net.mdns > 224.0.0.251.mdns: 0 PTR (Q)? 250.255.255.239.in-addr.arpa.local. (52)
5 packets captured
74 packets received by filter
39 packets dropped by kernel
```

1.vi

Activities Terminal Oct 2 23:42

[+]

user@user-VirtualBox: ~/Desktop

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

```
user@user-VirtualBox:~/Desktop$ ls
biold.sh data name.sh raman.sh roshan.sh sonu.sh tebin tebin.sh
user@user-VirtualBox:~/Desktop$ gedit name.sh
user@user-VirtualBox:~/Desktop$ chmod +x name.sh
user@user-VirtualBox:~/Desktop$ bash name.sh
enter details
enter yoyr name
tebin
enter your college name
amal jyothi college
name:tebin
college:amal jyothi college
user@user-VirtualBox:~/Desktop$
```

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

Activities Terminal Oct 2 06:45 en1

```
ubuntu@ubuntu:~$ vi variables
ubuntu@ubuntu:~$ vi variables
ubuntu@ubuntu:~$ cat variables.sh
cat: variables.sh: No such file or directory
ubuntu@ubuntu:~$ cat variables
#!/bin/bash
NEWVARIABLE=value1234
echo $NEVARIABLE value1234
$NEVARIABLE=value1234
NEVARIABLE:command not found
echo NEVARIABLE
NEVARIABLE
ubuntu@ubuntu:~$ ls -l variables
-rw-rw-r-- 1 ubuntu ubuntu 144 Oct  2 06:42 variables
ubuntu@ubuntu:~$ chmod +x variables
ubuntu@ubuntu:~$ ls -l variables
-rwxrwxr-x 1 ubuntu ubuntu 144 Oct  2 06:42 variables
ubuntu@ubuntu:~$ ./variables
./variables: line 1: #!/bin/bash: No such file or directory
value1234 value1234
./variables: line 4: value1234=value1234: command not found
./variables: line 5: NEVARIABLE:command: command not found
NEVARIABLE
./variables: line 7: NEVARIABLE: command not found
ubuntu@ubuntu:~$
```

```
Activities Terminal Oct 2 06:48 en1
[+]
ubuntu@ubuntu: ~
i#!bin/bash
NEWVARIABLE=value1234
echo $NEWWVARIABLE value1234
$NEWWVARIABLE=value1234
NEWWVARIABLE:command not found
echo NEWVARIABLE
NEWWVARIABLE
~
~
```

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

Activities Terminal Oct 2 09:26 en1

```
i#!bin/bash
a=100
b=20

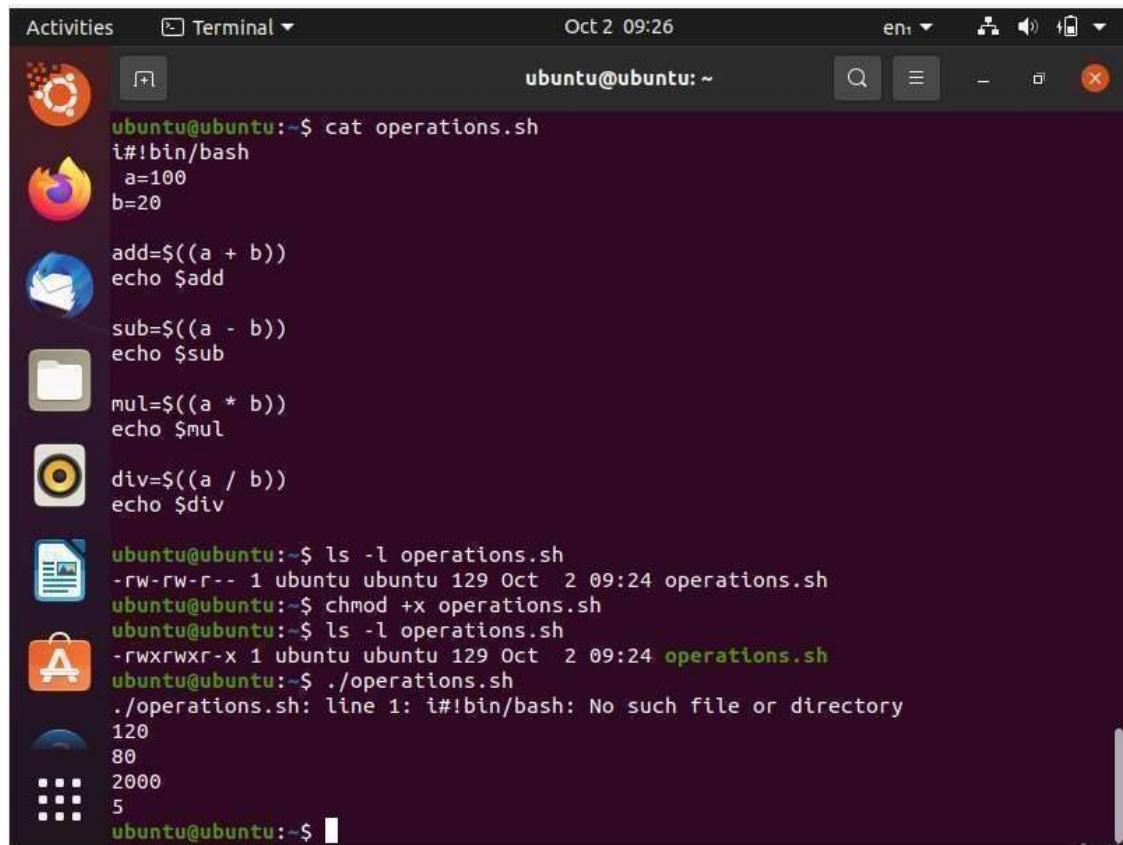
add=$((a + b))
echo $add

sub=$((a - b))
echo $sub

mul=$((a * b))
echo $mul

div=$((a / b))
echo $div

"operations.sh" 16 lines, 129 characters
```



A screenshot of an Ubuntu desktop environment. The terminal window shows the following content:

```
Activities Terminal Oct 2 09:26
ubuntu@ubuntu:~$ cat operations.sh
#!/bin/bash
a=100
b=20

add=$((a + b))
echo $add

sub=$((a - b))
echo $sub

mul=$((a * b))
echo $mul

div=$((a / b))
echo $div

ubuntu@ubuntu:~$ ls -l operations.sh
-rw-rw-r-- 1 ubuntu ubuntu 129 Oct  2 09:24 operations.sh
ubuntu@ubuntu:~$ chmod +x operations.sh
ubuntu@ubuntu:~$ ls -l operations.sh
-rwxrwxr-x 1 ubuntu ubuntu 129 Oct  2 09:24 operations.sh
ubuntu@ubuntu:~$ ./operations.sh
./operations.sh: line 1: i#!/bin/bash: No such file or directory
120
80
2000
5
ubuntu@ubuntu:~$
```

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

Activities Terminal Oct 2 10:00 en: ubunto@ubuntu: ~

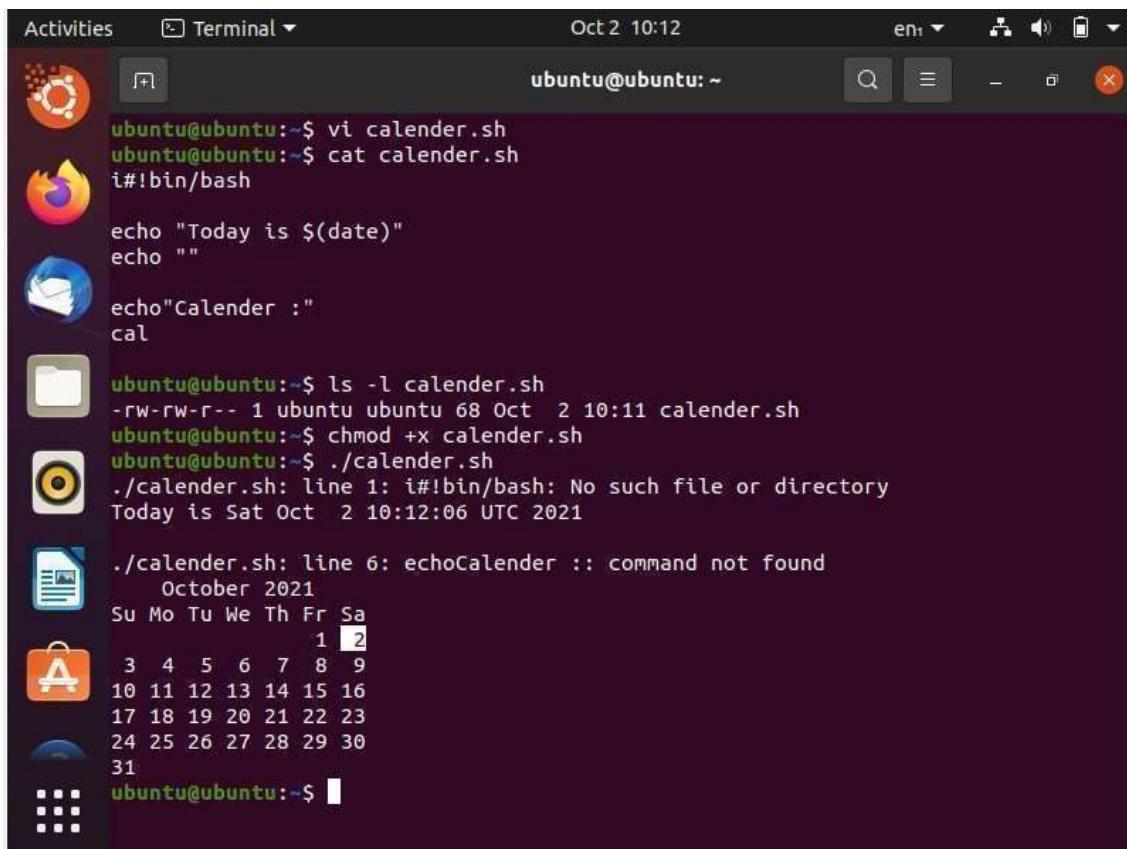
```
i#!/bin/bash
echo "Enter a number"
read num
i=1
ans=0
while [ $i -le $((num / 2)) ]
do
if [[ $((num%i)) -eq 0 ]]
then
ans=$((ans + i))
fi
done
if [ $num -eq $ans ]
then
echo "$num is perfect"
else
echo "$num is NOT perfect"
fi
~
```

"numbers.sh" 18 lines, 229 characters

Activities Terminal Oct 2 10:05 en: ubunto@ubuntu: ~

```
echo "Enter a number"
read no
i=1
ans=0
while [ $i -le $((no / 2)) ]
do
if [[ $((no%i)) -eq 0 ]]
then ans=$((ans + i))
fi
i=$((i + 1))
done
if [ $no -eq $ans ]
then
echo "$no is perfect"
else
echo "no is not perfect"
fi
ubuntu@ubuntu:~$ ls -l number.sh
-rwxrwxr-x 1 ubuntu ubuntu 233 Oct 2 09:42 number.sh
ubuntu@ubuntu:~$ chmod +x number.sh
ubuntu@ubuntu:~$ ls -l number.sh
-rwxrwxr-x 1 ubuntu ubuntu 233 Oct 2 09:42 number.sh
ubuntu@ubuntu:~$ ./number.sh
./number.sh: line 1: i#!/bin/bash: No such file or directory
Enter a number
7
./number.sh: line 6: [: missing `]'
no is not perfect
ubuntu@ubuntu:~$
```

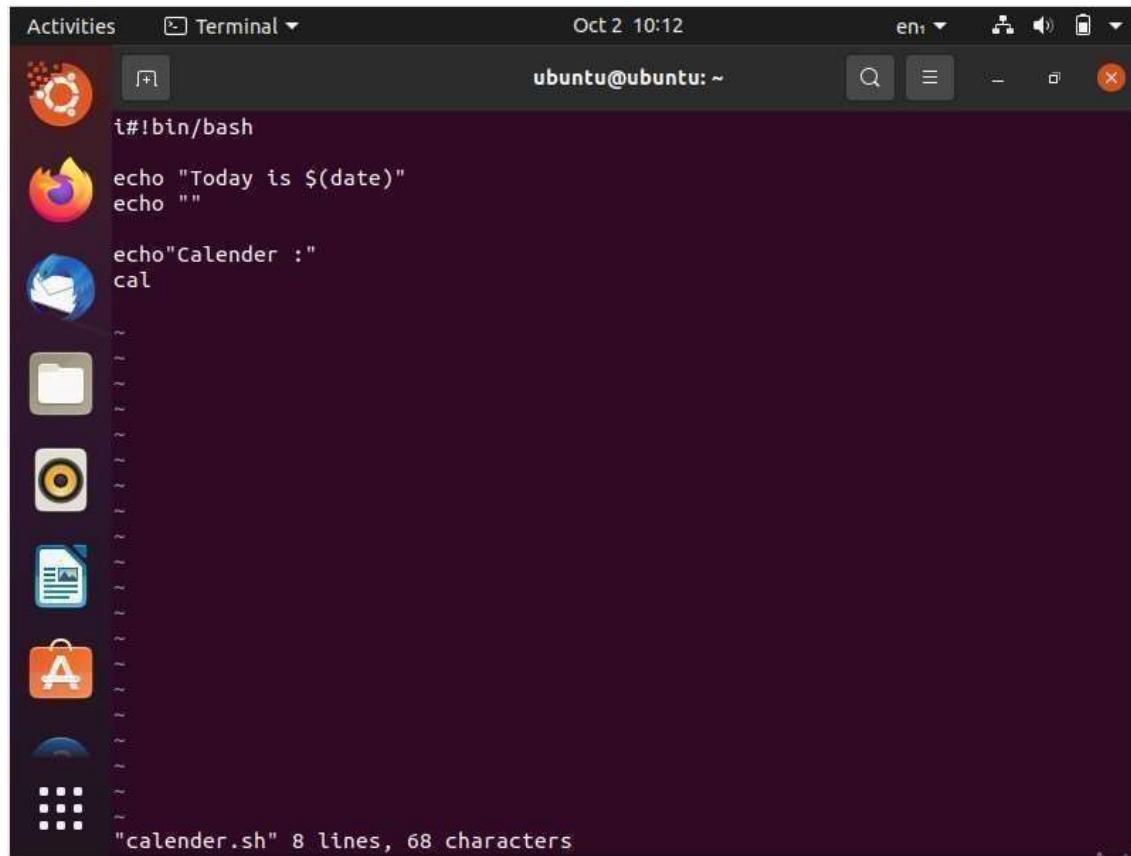
4. Write a shell script to display current date, calendar.



The image shows a screenshot of an Ubuntu desktop environment. A terminal window is open in the top right corner, titled 'Terminal'. The window shows the following command-line session:

```
Activities Terminal Oct 2 10:12
ubuntu@ubuntu:~$ vi calender.sh
ubuntu@ubuntu:~$ cat calender.sh
#!/bin/bash
echo "Today is $(date)"
echo ""
echo "Calender :"
cal
ubuntu@ubuntu:~$ ls -l calender.sh
-rw-rw-r-- 1 ubuntu ubuntu 68 Oct  2 10:11 calender.sh
ubuntu@ubuntu:~$ chmod +x calender.sh
ubuntu@ubuntu:~$ ./calender.sh
./calender.sh: line 1: i#!bin/bash: No such file or directory
Today is Sat Oct  2 10:12:06 UTC 2021
./calender.sh: line 6: echoCalender :: command not found
          October 2021
Su Mo Tu We Th Fr Sa
      1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
ubuntu@ubuntu:~$
```

The terminal window has a dark background with light-colored text. The window title bar includes the word 'Activities' and the date 'Oct 2 10:12'. The window title is 'Terminal'. The window has standard Linux window controls (minimize, maximize, close) in the top right corner. The terminal content shows the creation of a shell script 'calender.sh', its execution, and the resulting calendar output for October 2021.

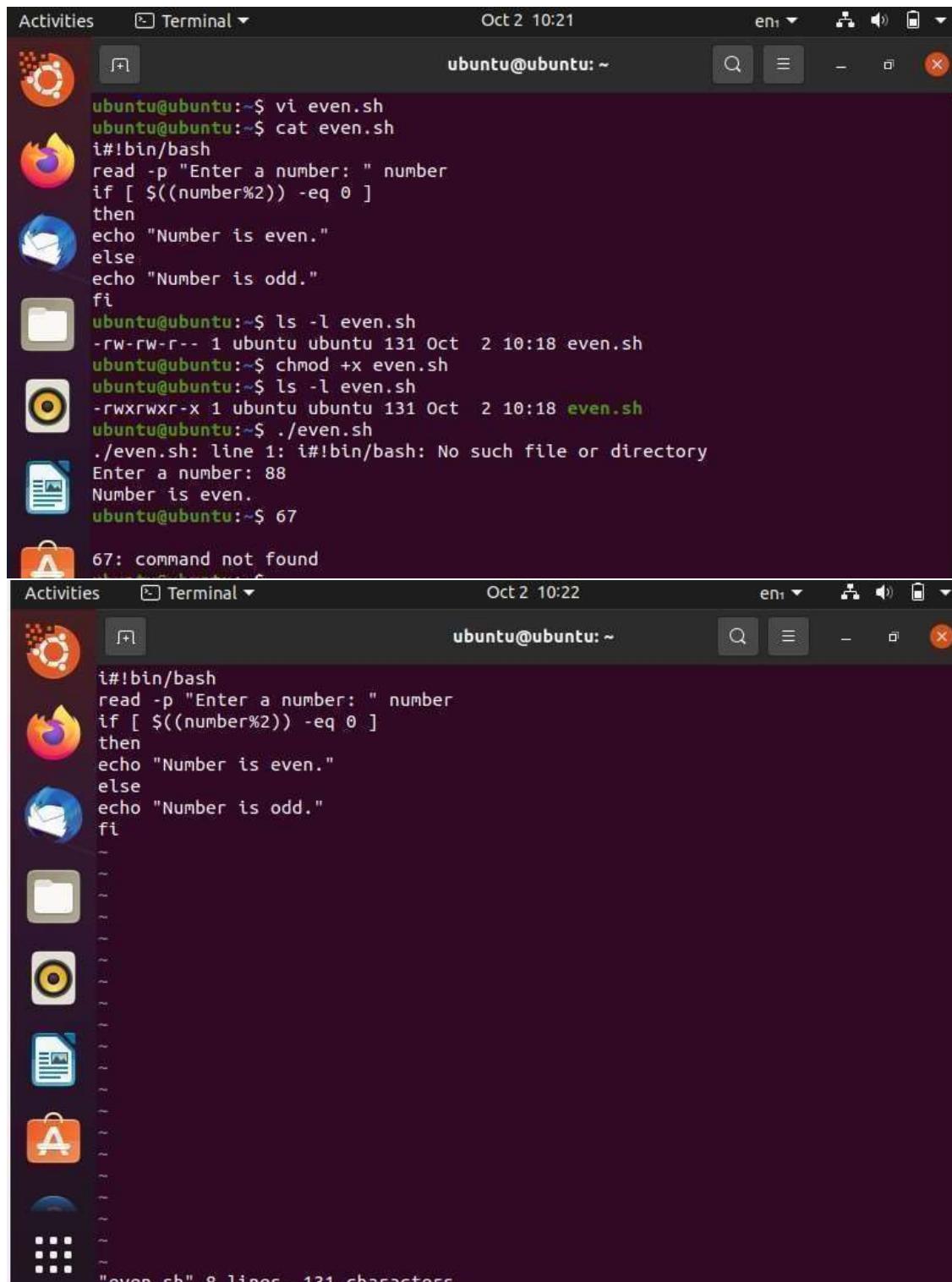


A screenshot of an Ubuntu desktop environment. The terminal window is open, showing a shell script named "calender.sh". The script contains the following code:

```
i#!bin/bash
echo "Today is $(date)"
echo ""
echo"Calender :"
cal
```

The terminal window also displays the message: "calender.sh" 8 lines, 68 characters.

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



The image shows a screenshot of a Ubuntu desktop environment. In the top-left corner, there is a dock with icons for the Dash, Home, Applications, and Dash to Dock. The main window is a terminal window titled "Terminal" with the command line "ubuntu@ubuntu: ~". The terminal shows the following session:

```
ubuntu@ubuntu:~$ vi even.sh
ubuntu@ubuntu:~$ cat even.sh
#!/bin/bash
read -p "Enter a number: " number
if [ $((number%2)) -eq 0 ]
then
echo "Number is even."
else
echo "Number is odd."
fi
ubuntu@ubuntu:~$ ls -l even.sh
-rw-rw-r-- 1 ubuntu ubuntu 131 Oct  2 10:18 even.sh
ubuntu@ubuntu:~$ chmod +x even.sh
ubuntu@ubuntu:~$ ls -l even.sh
-rwxrwxr-x 1 ubuntu ubuntu 131 Oct  2 10:18 even.sh
ubuntu@ubuntu:~$ ./even.sh
./even.sh: line 1: #!/bin/bash: No such file or directory
Enter a number: 88
Number is even.
ubuntu@ubuntu:~$ 67
```

Below this terminal window, there is another terminal window titled "67: command not found". The terminal shows the following session:

```
ubuntu@ubuntu:~$ vi even.sh
ubuntu@ubuntu:~$ cat even.sh
#!/bin/bash
read -p "Enter a number: " number
if [ $((number%2)) -eq 0 ]
then
echo "Number is even."
else
echo "Number is odd."
fi
ubuntu@ubuntu:~$ ls -l even.sh
-rw-rw-r-- 1 ubuntu ubuntu 131 Oct  2 10:18 even.sh
ubuntu@ubuntu:~$ chmod +x even.sh
ubuntu@ubuntu:~$ ls -l even.sh
-rwxrwxr-x 1 ubuntu ubuntu 131 Oct  2 10:18 even.sh
ubuntu@ubuntu:~$ ./even.sh
./even.sh: line 1: #!/bin/bash: No such file or directory
Enter a number: 88
Number is even.
ubuntu@ubuntu:~$ 67
```

At the bottom of the terminal window, the message "even.sh" 8 lines, 131 characters is displayed.

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

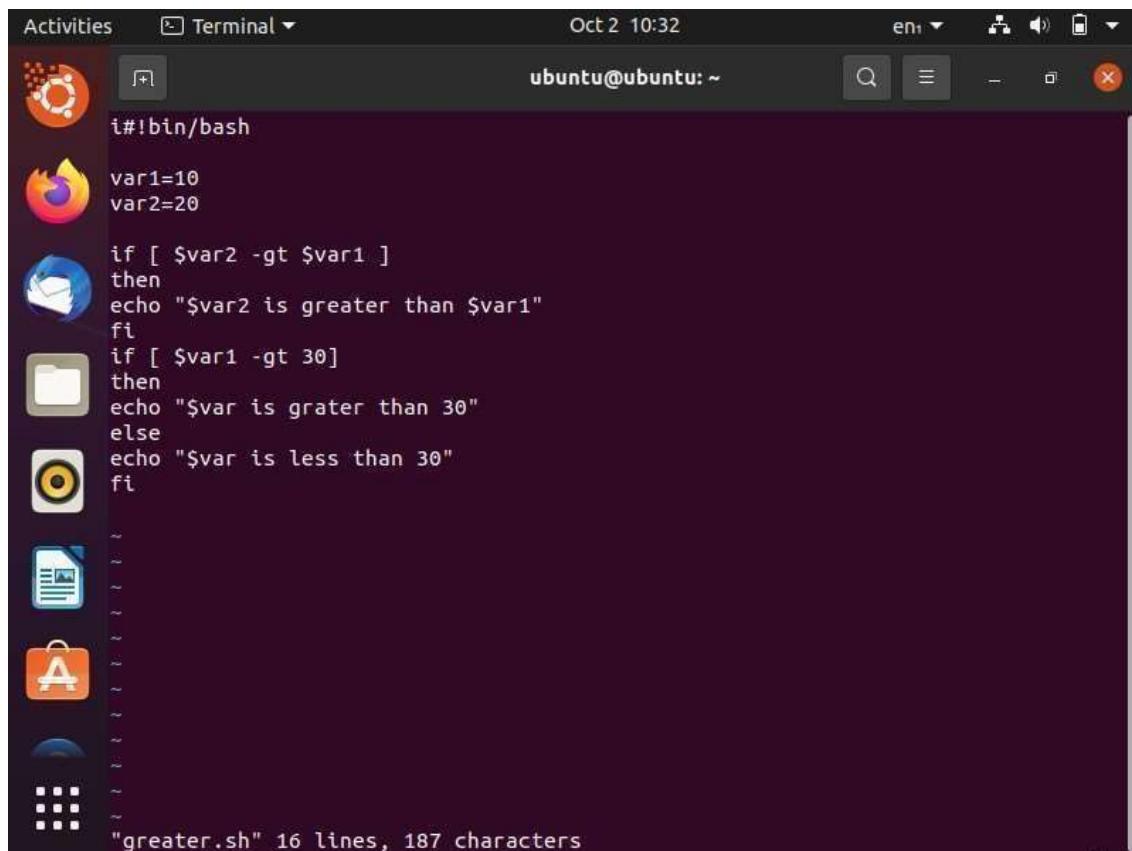
Activities Terminal Oct 2 10:31 en1

```
ubuntu@ubuntu:~$ vi greater.sh
ubuntu@ubuntu:~$ cat greater.sh
#!/bin/bash

var1=10
var2=20

if [ $var2 -gt $var1 ]
then
echo "$var2 is greater than $var1"
fi
if [ $var1 -gt 30 ]
then
echo "$var is grater than 30"
else
echo "$var is less than 30"
fi

ubuntu@ubuntu:~$ ls -l greater.sh
-rw-rw-r-- 1 ubuntu ubuntu 187 Oct  2 10:30 greater.sh
ubuntu@ubuntu:~$ chmod +x greater.sh
ubuntu@ubuntu:~$ ls -l greater.sh
-rwxrwxr-x 1 ubuntu ubuntu 187 Oct  2 10:30 greater.sh
ubuntu@ubuntu:~$ ./greater.sh
./greater.sh: line 1: i#!bin/bash: No such file or directory
20 is greater than 10
./greater.sh: line 10: [: missing ']'
is less than 30
ubuntu@ubuntu:~$
```



A screenshot of an Ubuntu desktop environment. In the foreground, a terminal window is open with the title 'Terminal'. The terminal shows a shell script named 'greater.sh' with the following content:

```
i#!bin/bash
var1=10
var2=20

if [ $var2 -gt $var1 ]
then
echo "$var2 is greater than $var1"
fi
if [ $var1 -gt 30]
then
echo "$var is grater than 30"
else
echo "$var is less than 30"
fi
```

The terminal also displays the status message: "greater.sh" 16 lines, 187 characters.

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

Activities Terminal ▾ Oct 2 10:42 en1 ▾



```
ubuntu@ubuntu:~$ vi first.sh
ubuntu@ubuntu:~$ cat first.sh
#!/bin/bash
echo "Enter Size(N)"
read N
i=1
sum=0
echo "Enter Numbers"
while [ $i -le $N ]
do
read num
sum=$((sum + num))
i=$((i + 1))
done
echo $sum

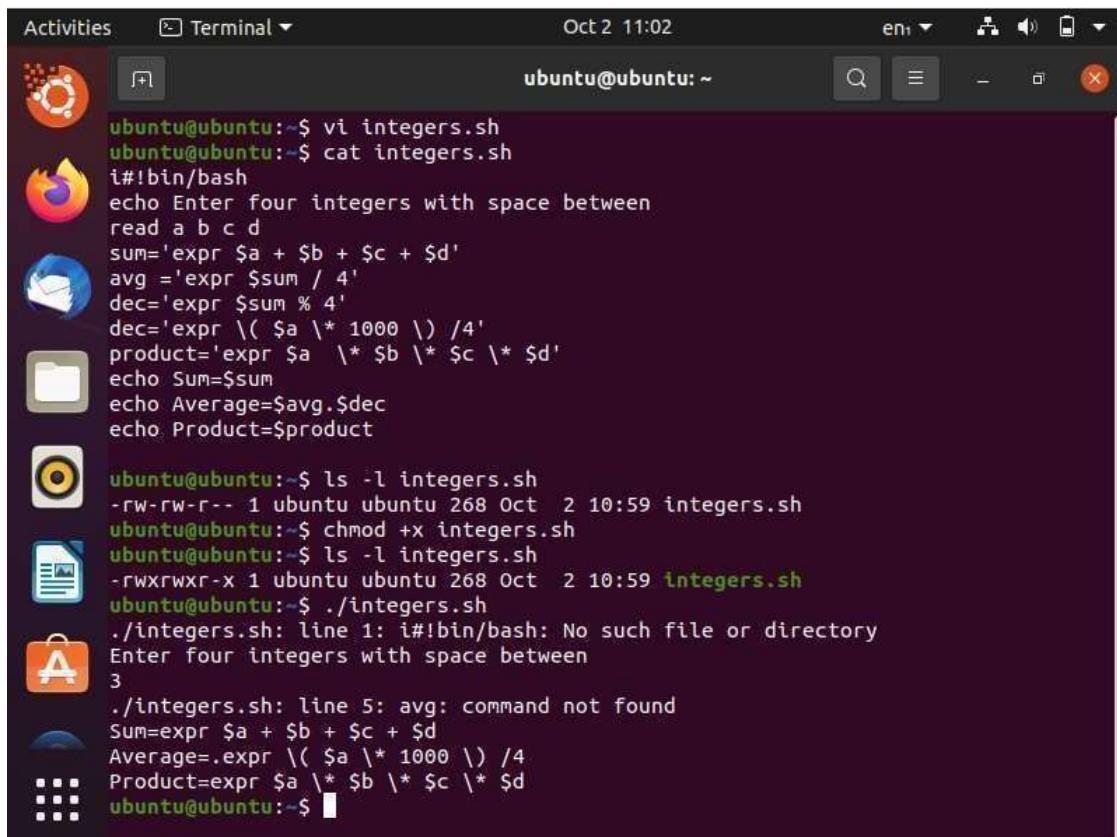
ubuntu@ubuntu:~$ ls -l first.sh
-rw-rw-r-- 1 ubuntu ubuntu 152 Oct  2 10:40 first.sh
ubuntu@ubuntu:~$ chmod +x first.sh
ubuntu@ubuntu:~$ ls -l first.sh
-rwxrwxr-x 1 ubuntu ubuntu 152 Oct  2 10:40 first.sh
ubuntu@ubuntu:~$ ./first.sh
./first.sh: line 1: i#!/bin/bash: No such file or directory
Enter Size(N)
10
Enter Numbers
1
2
3
```

Activities Terminal Oct 2 10:42 en1

```
ubuntu@ubuntu: ~
do
read num
sum=$((sum + num))
i=$((i + 1))
done
echo $sum

ubuntu@ubuntu:~$ ls -l first.sh
-rw-rw-r-- 1 ubuntu ubuntu 152 Oct  2 10:40 first.sh
ubuntu@ubuntu:~$ chmod +x first.sh
ubuntu@ubuntu:~$ ls -l first.sh
-rwxrwxr-x 1 ubuntu ubuntu 152 Oct  2 10:40 first.sh
ubuntu@ubuntu:~$ ./first.sh
./first.sh: line 1: i#!/bin/bash: No such file or directory
Enter Size(N)
10
Enter Numbers
1
2
3
4
5
6
7
8
9
10
55
ubuntu@ubuntu:~$
```

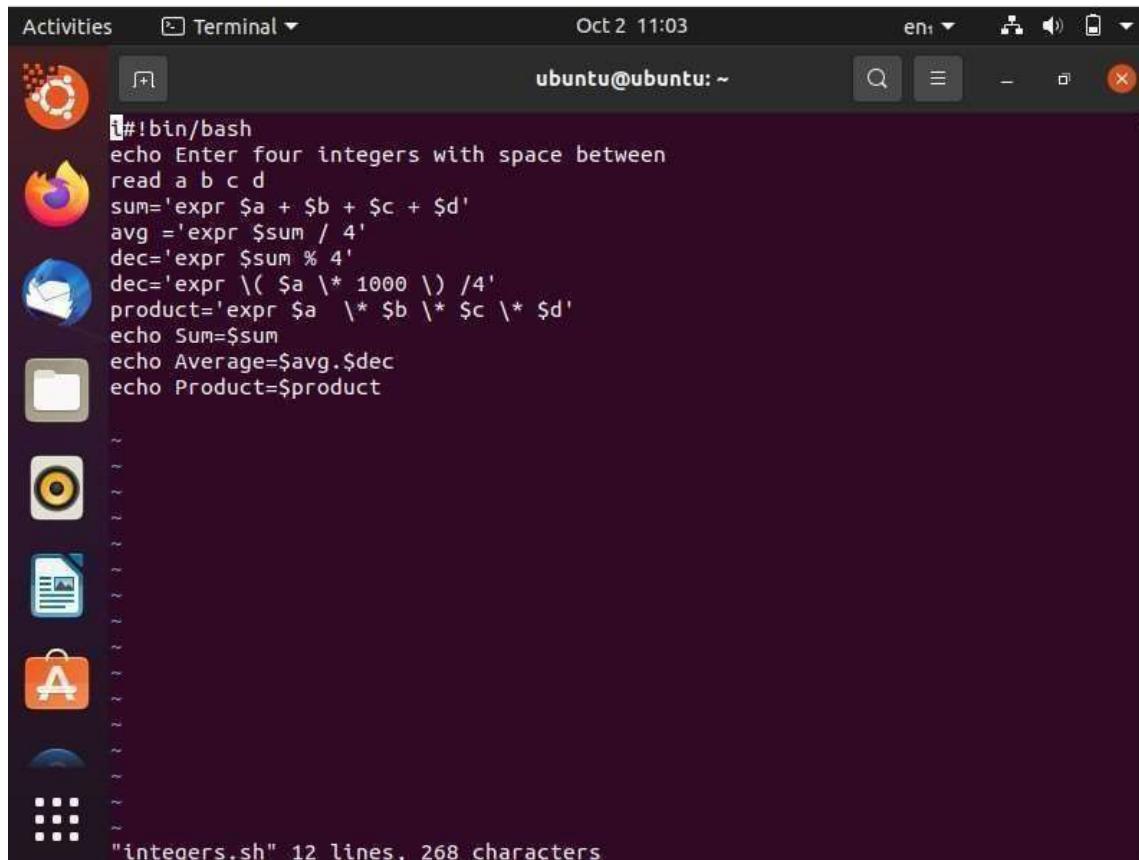
8. Write a shell script to find the sum, average and the product of the four integers entered.



Activities Terminal Oct 2 11:02 en1

```
ubuntu@ubuntu:~$ vi integers.sh
ubuntu@ubuntu:~$ cat integers.sh
#!/bin/bash
echo Enter four integers with space between
read a b c d
sum='expr $a + $b + $c + $d'
avg ='expr $sum / 4'
dec='expr $sum % 4'
dec='expr \($a \* 1000 \) /4'
product='expr $a \* $b \* $c \* $d'
echo Sum=$sum
echo Average=$avg.$dec
echo Product=$product

ubuntu@ubuntu:~$ ls -l integers.sh
-rw-rw-r-- 1 ubuntu ubuntu 268 Oct  2 10:59 integers.sh
ubuntu@ubuntu:~$ chmod +x integers.sh
ubuntu@ubuntu:~$ ls -l integers.sh
-rwxrwxr-x 1 ubuntu ubuntu 268 Oct  2 10:59 integers.sh
ubuntu@ubuntu:~$ ./integers.sh
./integers.sh: line 1: i#!/bin/bash: No such file or directory
Enter four integers with space between
3
./integers.sh: line 5: avg: command not found
Sum=expr $a + $b + $c + $d
Average=.expr \($a \* 1000 \) /4
Product=expr $a \* $b \* $c \* $d
ubuntu@ubuntu:~$
```



A screenshot of an Ubuntu desktop environment. The terminal window is open, showing a shell script named "integers.sh". The script reads four integers from the user, calculates their sum, average, and product, and then prints them out. The terminal window has a dark purple background and a dark purple header bar. The header bar includes the "Activities" button, a "Terminal" button, the date and time "Oct 2 11:03", and a language indicator "en". The terminal window title is "ubuntu@ubuntu: ~". The script content is as follows:

```
#!/bin/bash
echo Enter four integers with space between
read a b c d
sum='expr $a + $b + $c + $d'
avg ='expr $sum / 4'
dec='expr $sum % 4'
dec='expr \($a \* 1000 \) /4'
product='expr $a \* $b \* $c \* $d'
echo Sum=$sum
echo Average=$avg.$dec
echo Product=$product
```

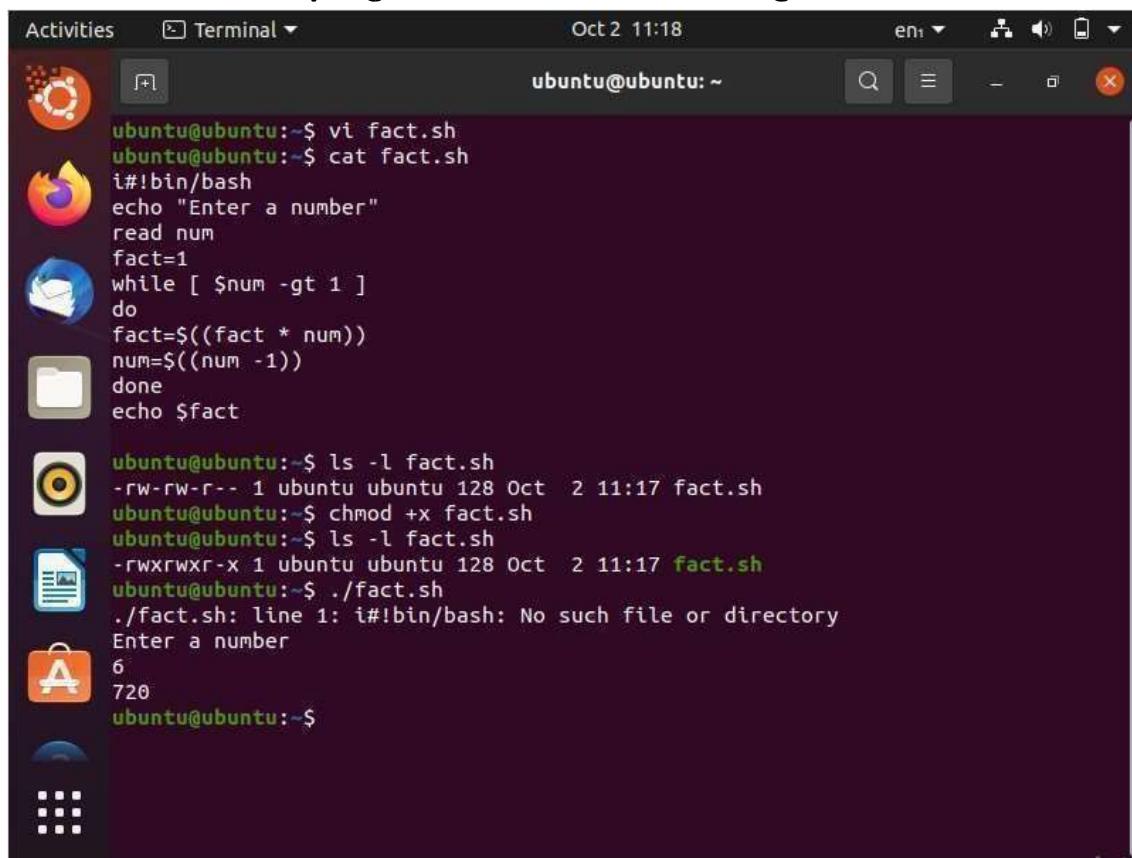
The terminal window also shows the file status at the bottom: "integers.sh" 12 lines, 268 characters.

9. Write a shell program to find the smallest of three numbers.

Activities Terminal Oct 2 11:12 en1

```
ubuntu@ubuntu:~$ vi small.sh
ubuntu@ubuntu:~$ cat small.sh
#!/bin/bash
echo Enter 3 numbers with spaces in between
read a b c
s=$a
if [ $b -lt $s ]
then
s=$b
fi
if [ $c -lt $s ]
then
s=$c
fi
echo Smallest of $a $b $c is $s
ubuntu@ubuntu:~$ ls -l small.sh
-rw-rw-r-- 1 ubuntu ubuntu 164 Oct  2 11:10 small.sh
ubuntu@ubuntu:~$ chmod +x small.sh
ubuntu@ubuntu:~$ ls -l small.sh
-rwxrwxr-x 1 ubuntu ubuntu 164 Oct  2 11:10 small.sh
ubuntu@ubuntu:~$ ./small.sh
./small.sh: line 1: i#!bin/bash: No such file or directory
Enter 3 numbers with spaces in between
3
./small.sh: line 5: [: -lt: unary operator expected
./small.sh: line 9: [: -lt: unary operator expected
Smallest of 3 is 3
ubuntu@ubuntu:~$ ./small.sh
./small.sh: line 1: i#!bin/bash: No such file or directory
```

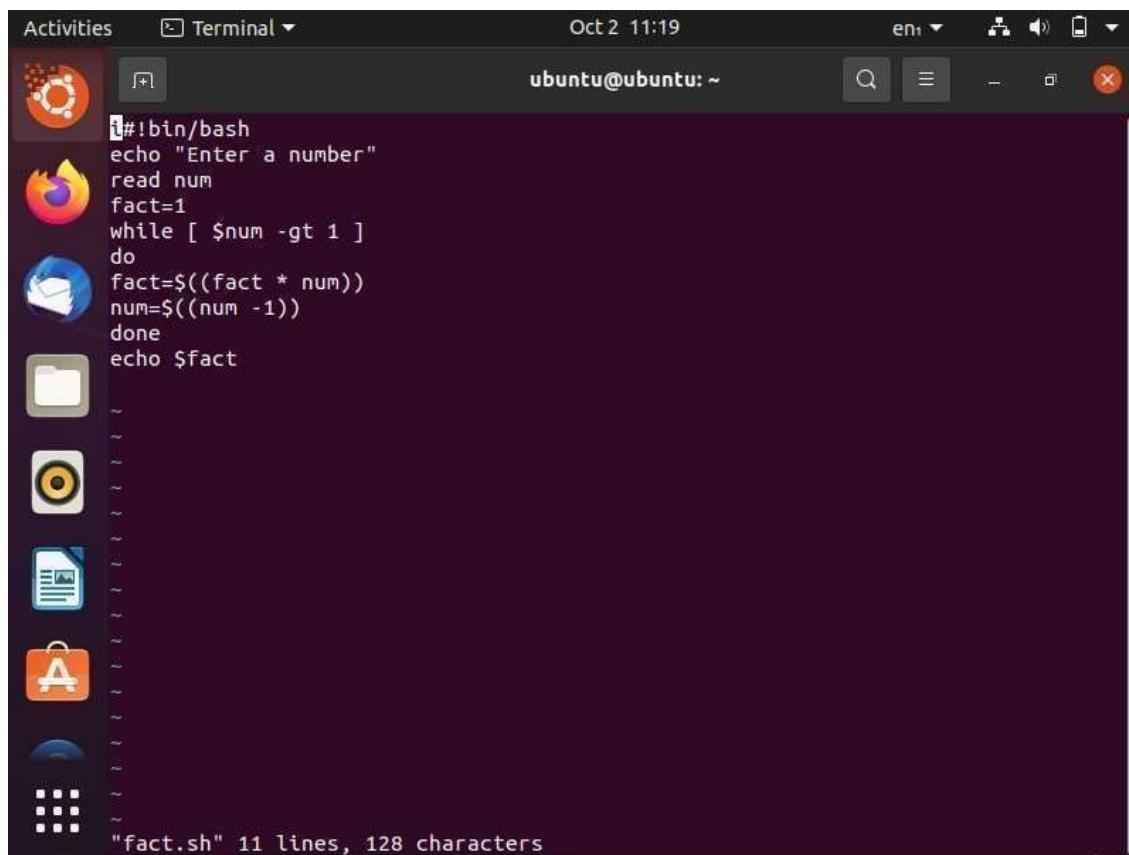
10. Write a shell program to find factorial of given number.



Activities Terminal Oct 2 11:18 en1

```
ubuntu@ubuntu:~$ vi fact.sh
ubuntu@ubuntu:~$ cat fact.sh
#!/bin/bash
echo "Enter a number"
read num
fact=1
while [ $num -gt 1 ]
do
fact=$((fact * num))
num=$((num -1))
done
echo $fact

ubuntu@ubuntu:~$ ls -l fact.sh
-rw-rw-r-- 1 ubuntu ubuntu 128 Oct  2 11:17 fact.sh
ubuntu@ubuntu:~$ chmod +x fact.sh
ubuntu@ubuntu:~$ ls -l fact.sh
-rwxrwxr-x 1 ubuntu ubuntu 128 Oct  2 11:17 fact.sh
ubuntu@ubuntu:~$ ./fact.sh
./fact.sh: line 1: i#!bin/bash: No such file or directory
Enter a number
6
720
ubuntu@ubuntu:~$
```



A screenshot of an Ubuntu desktop environment. The terminal window is open, showing a script named 'fact.sh' with the following content:

```
#!/bin/bash
echo "Enter a number"
read num
fact=1
while [ $num -gt 1 ]
do
fact=$((fact * num))
num=$((num -1))
done
echo $fact
```

The terminal window also shows the file statistics: "fact.sh" 11 lines, 128 characters. The desktop interface includes a dock with icons for the Dash, Home, Applications, and Help, and a vertical dock on the left with icons for the Dash, Home, Applications, and Help, along with several desktop environment icons.

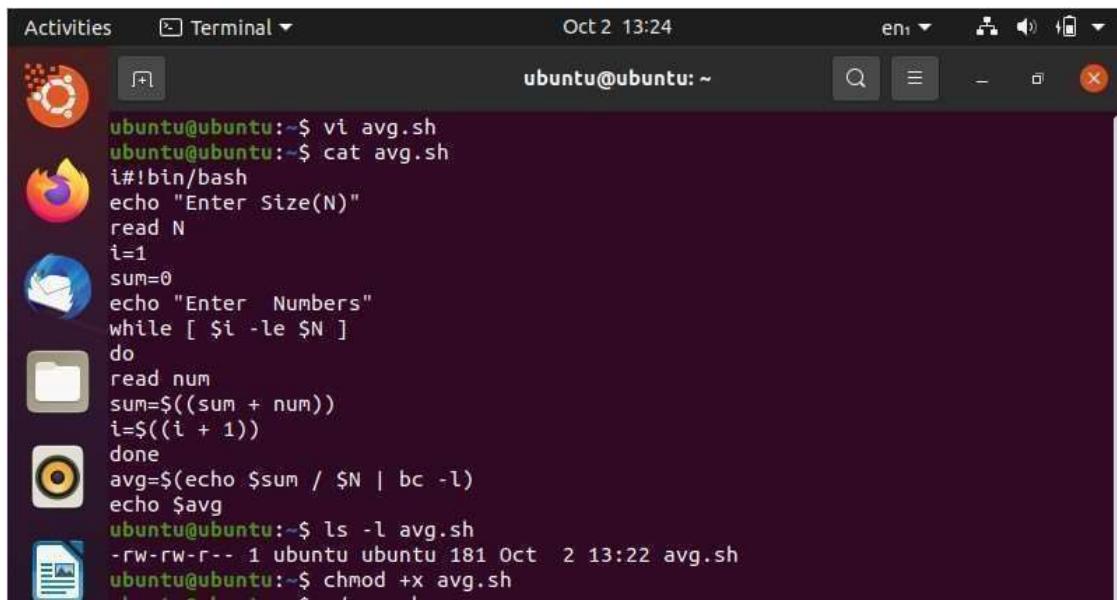
11. Write a shell program to check a number is palindrome or not.

```
Activities Terminal Oct 2 13:10 en: ubunto@ubuntu:~ [+] Search [≡] Close

ubuntu@ubuntu:~$ vi pal.sh
ubuntu@ubuntu:~$ cat pal.sh
#!/bin/bash
num=565
s=0
rev=""
temp=$num
while [ $num -gt 0 ]
do
s=$(( $num % 10 ))
num=$(( $num / 10 ))
rev=$( echo ${rev}${s} )
done
if [ $temp -eq $rev ];
then
echo "Number is palindrome"
else
echo "Number is NOT palindrome"
fi

ubuntu@ubuntu:~$ ls -l pal.sh
-rw-rw-r-- 1 ubuntu ubuntu 232 Oct  2 13:09 pal.sh
ubuntu@ubuntu:~$ chmod +x pal.sh
ubuntu@ubuntu:~$ ls -l pal.sh
-rwxrwxr-x 1 ubuntu ubuntu 232 Oct  2 13:09 pal.sh
ubuntu@ubuntu:~$ ./pal.sh
./pal.sh: line 1: #!/bin/bash: No such file or directory
Number is palindrome
ubuntu@ubuntu:~$
```

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



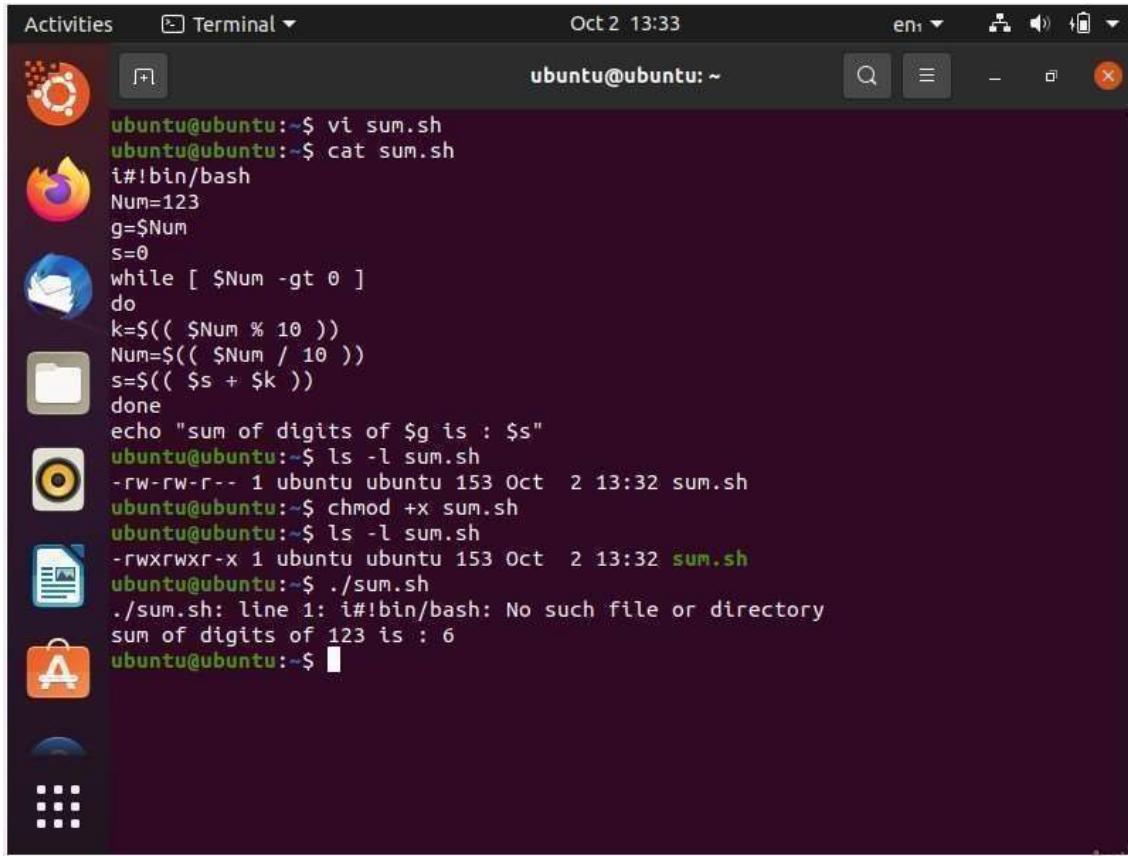
The image shows a screenshot of an Ubuntu desktop environment. In the top left, there's a dock with icons for the Dash, Home, and several application windows. The central part of the screen is a terminal window titled 'Terminal'. The terminal shows the following session:

```
Activities Terminal Oct 2 13:24
ubuntu@ubuntu:~$ vi avg.sh
ubuntu@ubuntu:~$ cat avg.sh
#!/bin/bash
echo "Enter Size(N)"
read N
i=1
sum=0
echo "Enter Numbers"
while [ $i -le $N ]
do
read num
sum=$((sum + num))
i=$((i + 1))
done
avg=$(echo $sum / $N | bc -l)
echo $avg
ubuntu@ubuntu:~$ ls -l avg.sh
-rw-rw-r-- 1 ubuntu ubuntu 181 Oct  2 13:22 avg.sh
ubuntu@ubuntu:~$ chmod +x avg.sh
```

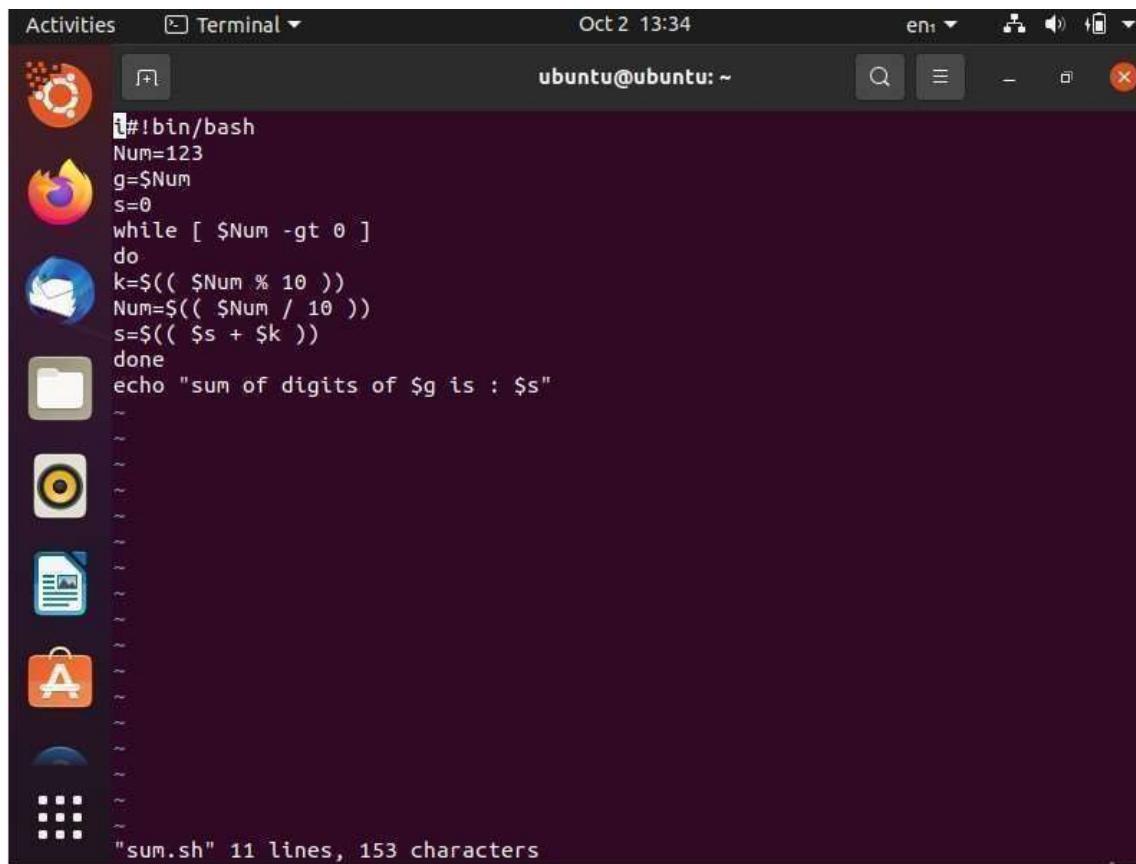
```
ubuntu@ubuntu:~$ ./avg.sh
./avg.sh: line 1: #!/bin/bash: No such file or directory
Enter Size(N)
3
Enter  Numbers
2
4
5
3.6666666666666666666666666666
ubuntu@ubuntu:~$
```

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

Activities Terminal ▾ Oct 2 13:33 en: ▾



```
ubuntu@ubuntu:~$ vi sum.sh
ubuntu@ubuntu:~$ cat sum.sh
#!/bin/bash
Num=123
g=$Num
s=0
while [ $Num -gt 0 ]
do
k=$(( $Num % 10 ))
Num=$(( $Num / 10 ))
s=$(( $s + $k ))
done
echo "sum of digits of $g is : $s"
ubuntu@ubuntu:~$ ls -l sum.sh
-rw-rw-r-- 1 ubuntu ubuntu 153 Oct  2 13:32 sum.sh
ubuntu@ubuntu:~$ chmod +x sum.sh
ubuntu@ubuntu:~$ ls -l sum.sh
-rwxrwxr-x 1 ubuntu ubuntu 153 Oct  2 13:32 sum.sh
ubuntu@ubuntu:~$ ./sum.sh
./sum.sh: line 1: i#!/bin/bash: No such file or directory
sum of digits of 123 is : 6
ubuntu@ubuntu:~$
```

A screenshot of an Ubuntu desktop environment. On the left, the Unity Dash is visible with various application icons. In the center, a terminal window is open with the following content:

```
#!/bin/bash
Num=123
g=$Num
s=0
while [ $Num -gt 0 ]
do
k=$(( $Num % 10 ))
Num=$(( $Num / 10 ))
s=$(( $s + $k ))
done
echo "sum of digits of $g is : $s"
```

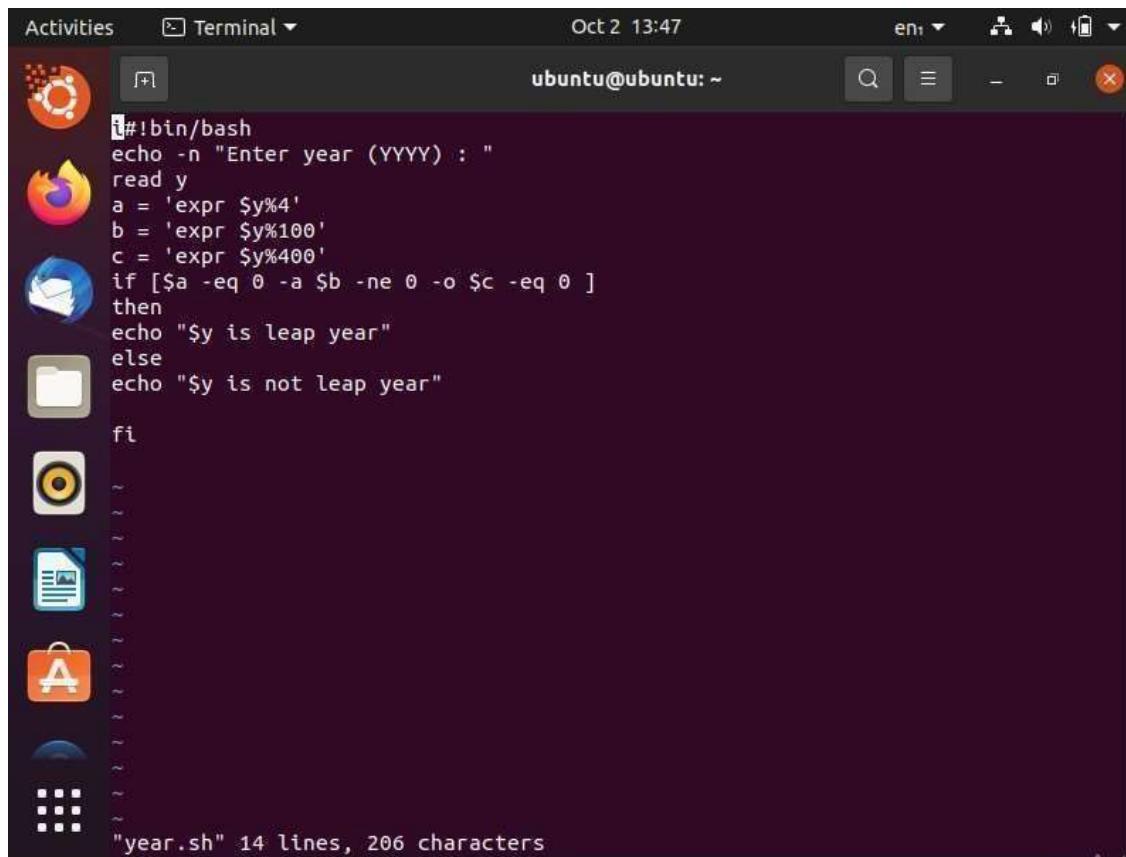
The terminal window shows the command "sum.sh" has 11 lines and 153 characters.

14. Write a shell program to check whether given year is leap year or not.

Activities Terminal Oct 2 13:46 en1

```
ubuntu@ubuntu:~$ vi year.sh
ubuntu@ubuntu:~$ cat year.sh
#!/bin/bash
echo -n "Enter year (YYYY) : "
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

ubuntu@ubuntu:~$ ls -l year.sh
-rw-rw-r-- 1 ubuntu ubuntu 206 Oct  2 13:45 year.sh
ubuntu@ubuntu:~$ chmod +x year.sh
ubuntu@ubuntu:~$ ls -l year.sh
-rwxrwxr-x 1 ubuntu ubuntu 206 Oct  2 13:45 year.sh
ubuntu@ubuntu:~$ ./year.sh
./year.sh: line 1: i#!/bin/bash: No such file or directory
Enter year (YYYY) : 2024
./year.sh: line 4: a: command not found
./year.sh: line 5: b: command not found
./year.sh: line 6: c: command not found
./year.sh: line 7: [: too many arguments
2024 is not leap year
```



Docker installation on Windows 10

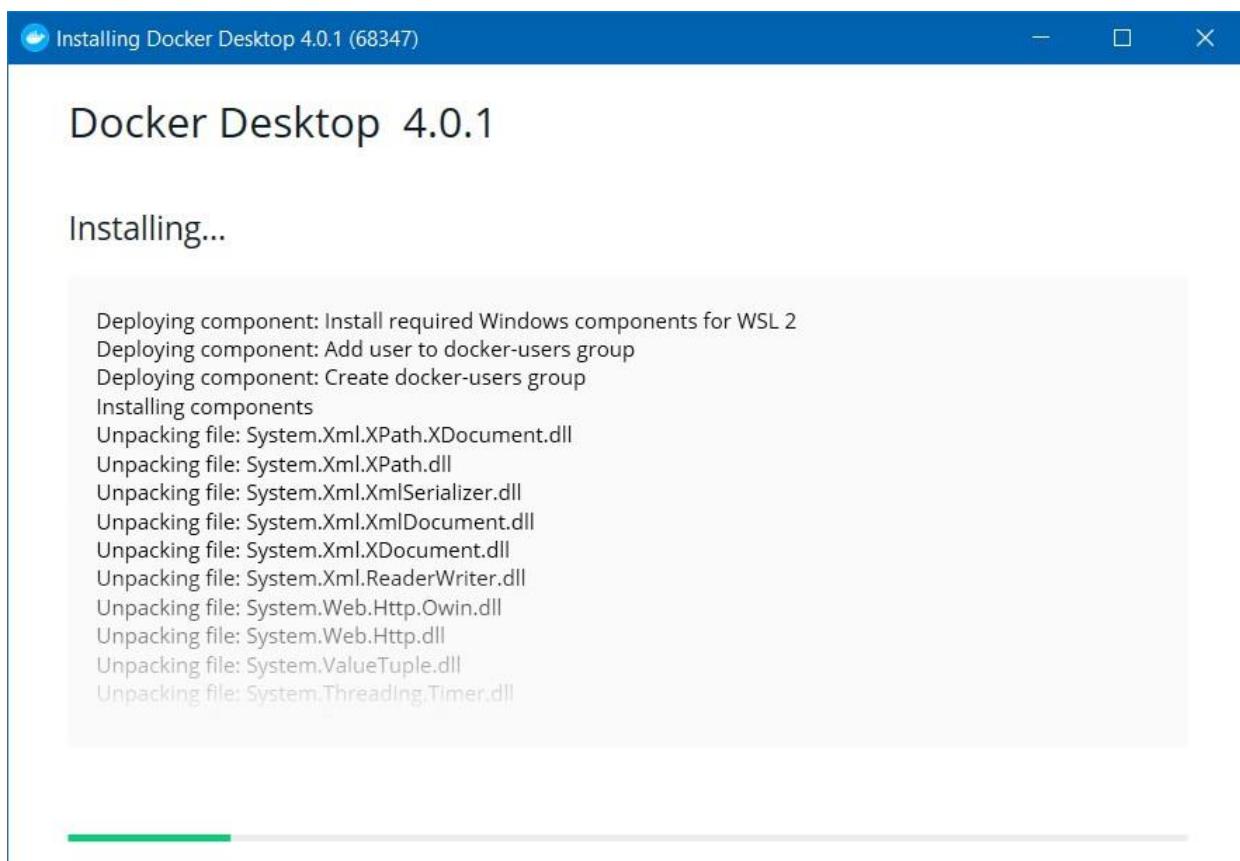
Step-I

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



Step-II

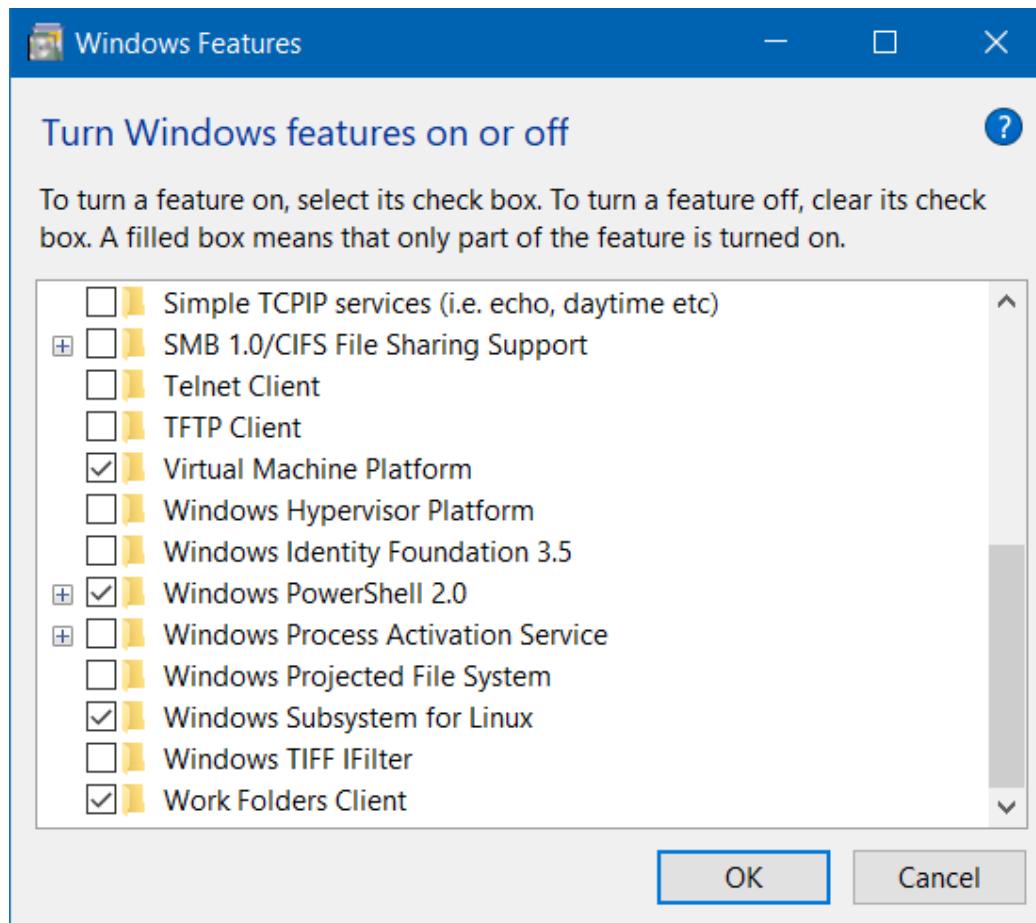
Open the .exe file and follow the steps after clicking install button.



Step-III

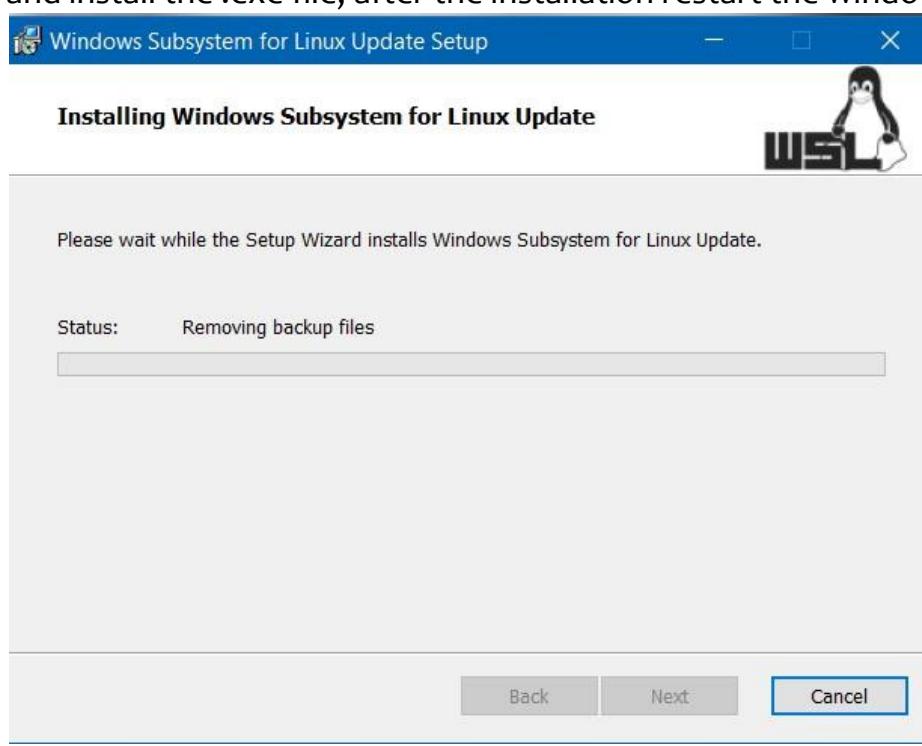
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



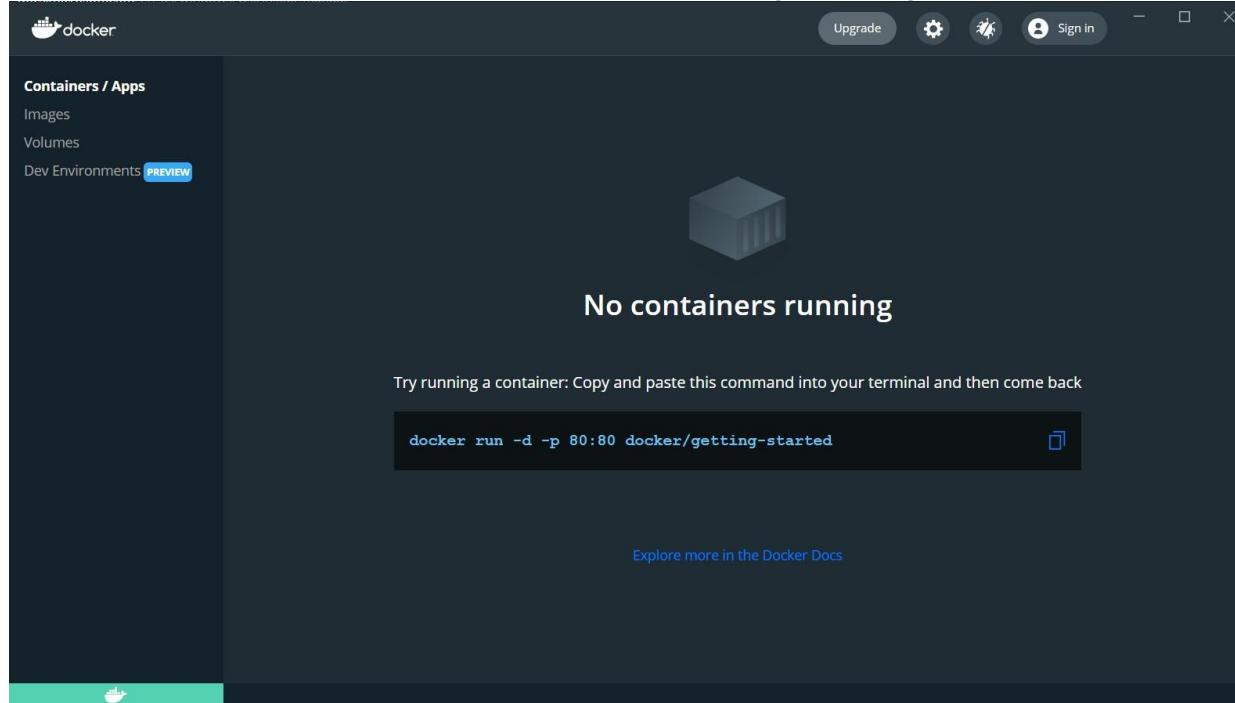
Step-IV

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



Step-V

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



Step-VI

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

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The window shows the following text output:

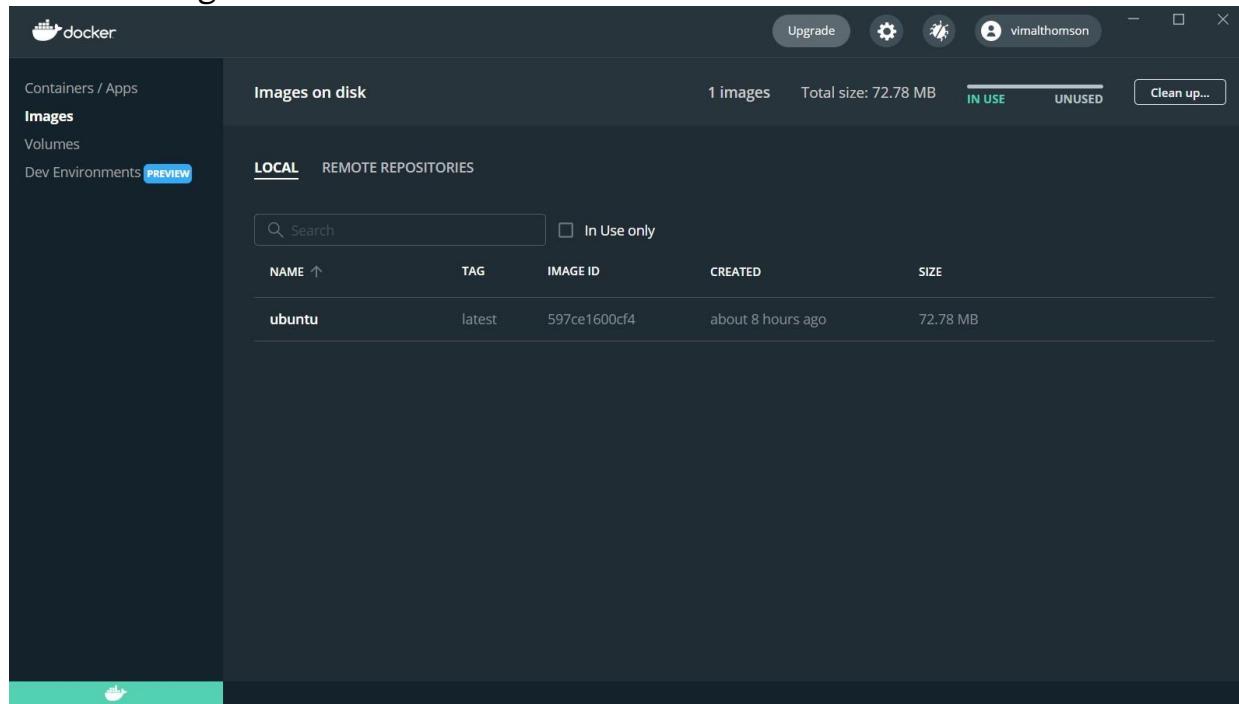
```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

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

C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4fff62e0d: Pull complete
Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Windows\system32>
```

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



The screenshot shows the Docker desktop application interface. The left sidebar has 'Containers / Apps' and 'Images' selected. The main area is titled 'Images on disk' and shows '1 images' with a total size of '72.78 MB'. A filter bar at the top right shows 'IN USE' is selected. Below is a table with columns: NAME, TAG, IMAGE ID, CREATED, and SIZE. One entry is listed: 'ubuntu' with 'latest' tag, IMAGE ID '597ce1600cf4', created 'about 8 hours ago', and size '72.78 MB'. A search bar and an 'In Use only' checkbox are also present.

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

Wireshark installation

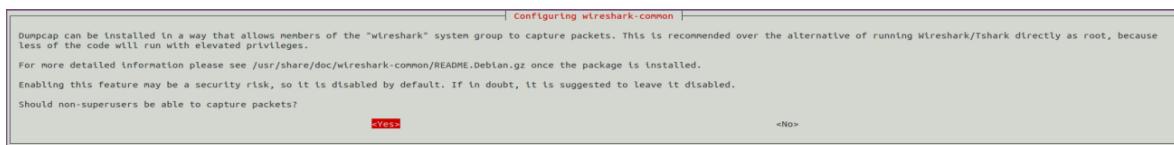
1. Command: sudo apt-get install wireshark

```
vimalthomson@vimal-thomson:~$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libgstreamer-plugins-bad1.0-0 libnvidia-cfg1-460 libnvidia-common-460 libnvidia-gl-460 libnvidia-ifr1-460 libva-wayland2 libxi1-xcb1:i386 libxnvctrl0 nvidia-compute-utils-460 nvidia-kernel-xserver-xorg-video-nvidia-460
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbuss libqt5guis libqt5multimedias libqt5multimedias5-plugins libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2ldbl libspandsp2 libwireshark-data libwireshark13 libwiretap10 libwireshark-common wireshark-qt
Suggested packages:
qt5-image-formats-plugins qtwaylands snmp-mibs-downloader geoipupdate geoip-database geoip-database-extra libjs-leaflet
The following NEW packages will be installed:
libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbuss libqt5guis libqt5multimedias libqt5multimedias5-plugins libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2ldbl libspandsp2 libwireshark-data libwireshark13 libwiretap10 libwireshark wireshark-common wireshark-qt
0 upgraded, 27 newly installed, 0 to remove and 342 not upgraded.
Need to get 32.6 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libdouble-conversion3 amd64 3.1.5-4ubuntu1 [37.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libpcre2-16-0 amd64 10.34-7 [181 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5core5a amd64 5.12.8+dfsg-0ubuntu1 [2,005 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5dbuss amd64 5.12.8+dfsg-0ubuntu1 [208 kB]
```

2. Command: sudo dpkg-reconfigure wireshark-common

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

3. Command: Select Yes and press enter



4. Open wireshark from the applist

