

NETWORKING AND SYSTEMADMINISTRATION

LAB

LAB RECORD

**SOJA SONY
RMCA B S2
Roll No:22**

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BASIC LINUX COMMANDS

1. pwd (Print Working Directory)

The pwd command is used to find out the path of the current working directory. The command will return an absolute (full) path, which is basically a path of all the directories that starts with a forward slash (/).

2. history

The history command is used to view the previously executed command.

3. man

The man command is used to display the user manual of any command that we can run on the terminal.

4. cd

The cd command, also known as chdir(change directory), is a command-line shell command used to change the current working directory in various operating systems.

5. ls

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

6. mkdir

The mkdir command is used to make a new directory.

7. rmdir

The rmdir command is used to delete a directory. However, rmdir only allows you to delete empty directories.

8. touch

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

9. rm

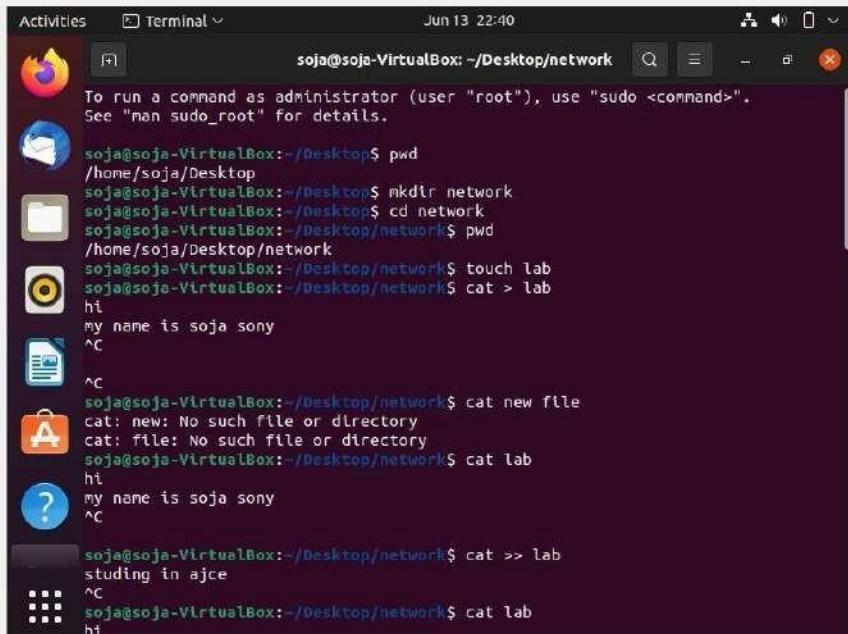
The rm command is used to delete directories and the contents within them. To remove a file use rm filename

10. cat

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

cat > filename creates a new file

cat >> myfile insert data to a file.



The screenshot shows a terminal window in a desktop environment. The terminal title is "soja@soja-VirtualBox: ~/Desktop/network". The terminal content is as follows:

```
Activities Terminal ~ Jun 13 22:40
soja@soja-VirtualBox:~/Desktop$ pwd
/home/soja/Desktop
soja@soja-VirtualBox:~/Desktop$ mkdir network
soja@soja-VirtualBox:~/Desktop$ cd network
soja@soja-VirtualBox:~/Desktop/network$ pwd
/home/soja/Desktop/network
soja@soja-VirtualBox:~/Desktop/network$ touch lab
soja@soja-VirtualBox:~/Desktop/network$ cat > lab
hi
my name is soja sony
^C
soja@soja-VirtualBox:~/Desktop/network$ cat new file
cat: new: No such file or directory
cat: file: No such file or directory
soja@soja-VirtualBox:~/Desktop/network$ cat lab
hi
my name is soja sony
^C
soja@soja-VirtualBox:~/Desktop/network$ cat >> lab
studing in ajce
^C
soja@soja-VirtualBox:~/Desktop/network$ cat lab
hi
```

Activities Terminal Jun 13 22:41

```
soja@soja-VirtualBox:~/Desktop/network$ cat lab
hi
my name is soja sony
^C
soja@soja-VirtualBox:~/Desktop/network$ cat >> lab
studng in ajce
^C
soja@soja-VirtualBox:~/Desktop/network$ cat lab
hi
my name is soja sony
^C
soja@soja-VirtualBox:~/Desktop/network$ ls
lab
soja@soja-VirtualBox:~/Desktop/network$ history
1  pwd
2  history
3  ls
4  man pwd
5  mkdir soja
6  mkdir ajce
7  ls
8  ls -r
9  rmdir ajce
10 ls
11 touch song1.txt
```

Activities Terminal Jun 13 22:41

```
soja@soja-VirtualBox:~/Desktop/network$ rm song2.txt
16 rm song2.txt
17 ls
18 cd..
19 cd ..
20 cd ..
21 ls
22 touch song2.txt
23 ls
24 pwd
25 ls
26 rm song2.txt
27 rm song1.txt
28 ls
29 touch song1
30 ls
31 pwd
32 mkdir network
33 cd network
34 pwd
35 touch newfile
36 cat newfile
37 cat > newfile
38 pwd
39 mkdir network
40 pwd
41 mkdir network
42 cd network
43 pwd
44 touch lab
```

Activities Terminal Jun 13 22:42

```
soja@soja-VirtualBox: ~/Desktop/network
32 mkdir network
33 cd network
34 pwd
35 touch newfile
36 cat newfile
37 cat > newfile
38 pwd
39 mkdir network
40 pwd
41 mkdir network
42 cd network
43 pwd
44 touch lab
45 cat > lab
46 cat new file
47 cat lab
48 cat >> lab
49 cat lab
50 ls
51 history
soja@soja-VirtualBox:~/Desktop/network$ man
What manual page do you want?
For example, try 'man man'.
soja@soja-VirtualBox:~/Desktop/network$ man pwd
soja@soja-VirtualBox:~/Desktop/network$ rm lab
soja@soja-VirtualBox:~/Desktop/network$ ls
soja@soja-VirtualBox:~/Desktop/network$ rmdir network
rmdir: failed to remove 'network': No such file or directory
soja@soja-VirtualBox:~/Desktop/network$
```

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 to scroll up and down through the page.

6. less

Less command is a 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

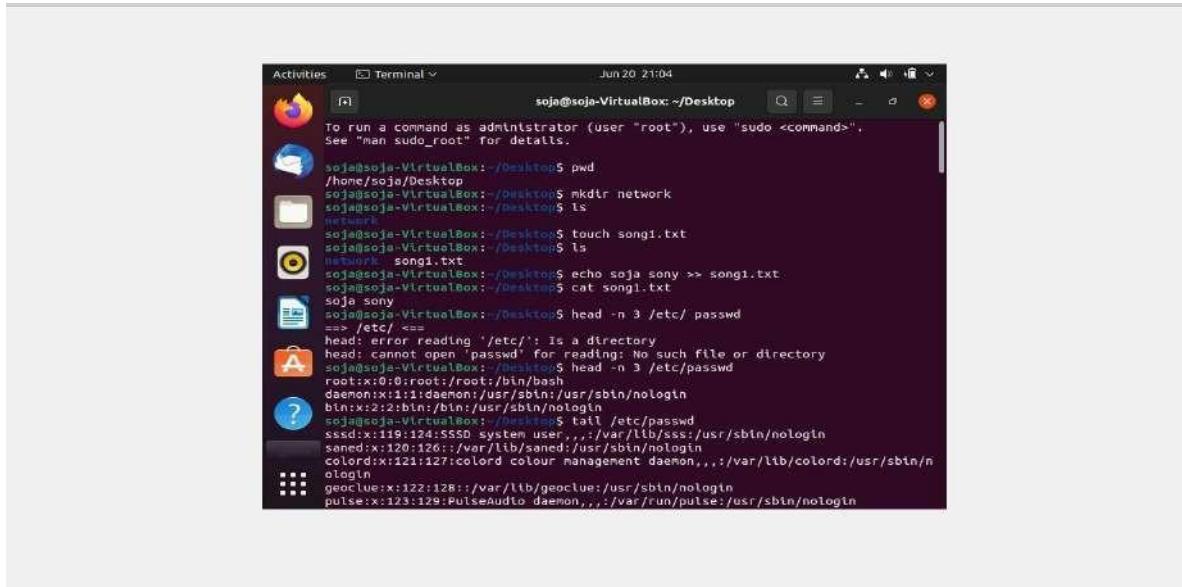
Remove a user is very similar to adding a new user. To delete the users account type, userdelUserName

19. sudo

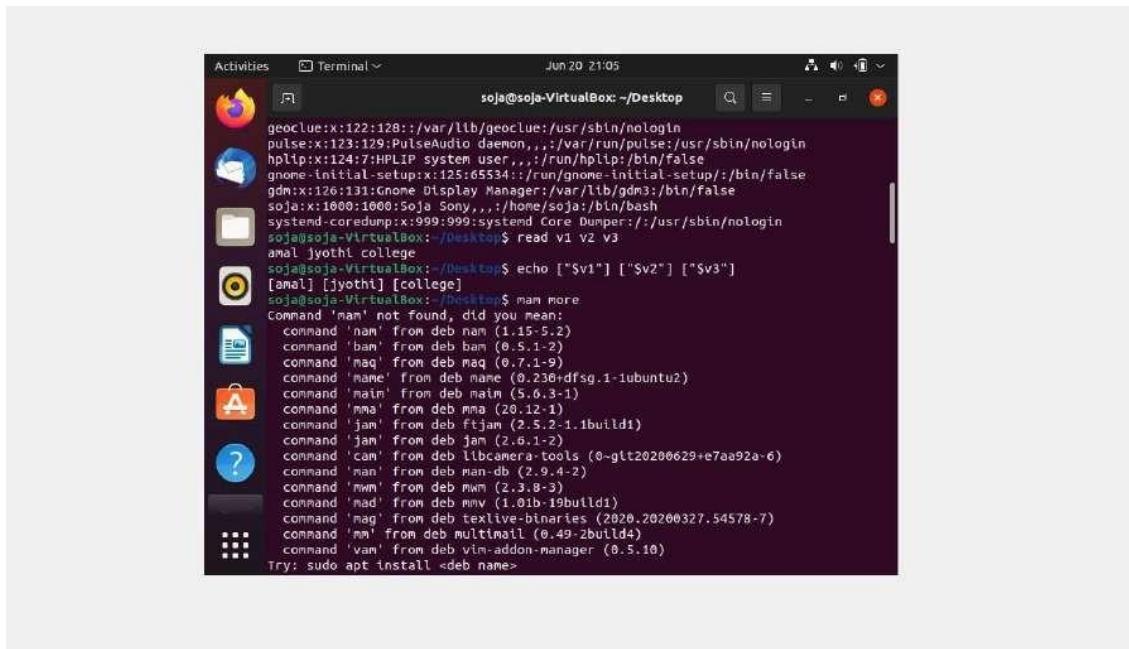
SuperUserDo(sudo) command enables you to perform tasks that require administrative or root permissions.

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.



```
Activities Terminal Jun 20 21:04
soja@soja-VirtualBox: ~/Desktop
soja@soja-VirtualBox: ~/Desktop$ pwd
/home/soja/Desktop
soja@soja-VirtualBox: ~/Desktop$ mkdir network
soja@soja-VirtualBox: ~/Desktop$ ls
network
soja@soja-VirtualBox: ~/Desktop$ touch song1.txt
soja@soja-VirtualBox: ~/Desktop$ ls
network song1.txt
soja@soja-VirtualBox: ~/Desktop$ echo soja sony >> song1.txt
soja@soja-VirtualBox: ~/Desktop$ cat song1.txt
soja sony
soja@soja-VirtualBox: ~/Desktop$ head -n 3 /etc/passwd
=> /etc/ <=
head: cannot read '/etc/': Is a directory
soja@soja-VirtualBox: ~/Desktop$ head -n 3 /etc/passwd
soja@soja-VirtualBox: ~/Desktop$ tail /etc/passwd
sssd:x:119:124:SSSD system user,,,:/var/lib/sssd:/usr/sbin/nologin
saned:x:120:126::/var/lib/saned:/usr/sbin/nologin
colorlxd:x:121:127:color daemon,,,:/var/lib/colorlxd:/usr/sbin/nologin
bogin:x:122:2:bin:/bin:/usr/sbin/nologin
soja@soja-VirtualBox: ~/Desktop$ tail /etc/passwd
sssd:x:119:124:SSSD system user,,,:/var/lib/sssd:/usr/sbin/nologin
saned:x:120:126::/var/lib/saned:/usr/sbin/nologin
colorlxd:x:121:127:color daemon,,,:/var/lib/colorlxd:/usr/sbin/nologin
bogin:x:122:2:bin:/bin:/usr/sbin/nologin
geoclue:x:122:128::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:129:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
hplip:x:124:HPLIP system user,,,:/run/hplip:/bin/false
gnome-initial-setup:x:125:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:126:131:gnome Display Manager:/var/lib/gdm3:/bin/false
soja:x:1000:1000:Soja SONY,,,:/home/soja:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
soja@soja-VirtualBox: ~/Desktop$ read v1 V2 V3
amal jyothi college
soja@soja-VirtualBox: ~/Desktop$ echo ["$v1"] ["$v2"] ["$v3"]
[amal] [jyothi] [college]
soja@soja-VirtualBox: ~/Desktop$ man more
Command 'mam' not found, did you mean:
  command 'nam' from deb nam (1:15-5.2)
  command 'bam' from deb bam (0.5.1-2)
  command 'mag' from deb mag (0.7.1-9)
  command 'name' from deb name (0.230+dfsg.1-1ubuntu2)
  command 'nain' from deb nain (5.6.3-1)
  command 'mma' from deb mma (20.12-1)
  command 'jam' from deb ftjam (2.5.2-1.1build1)
  command 'jam' from deb jam (2.6.1-2)
  command 'cam' from deb libcamera-tools (0-gitt20200629+e7aa92a~6)
  command 'nan' from deb man-db (2.9.4-2)
  command 'mm' from deb mm (2.3.8-3)
  command 'nad' from deb nnv (1.01b-19build1)
  command 'nag' from deb texlive-binaries (2020.20200327.54578-7)
  command 'nm' from deb multimed (0.49-2build4)
  command 'vam' from deb vim-addon-manager (0.5.10)
Try: sudo apt install <deb name>
```



```
Activities Terminal Jun 20 21:05
soja@soja-VirtualBox: ~/Desktop
soja@soja-VirtualBox: ~/Desktop$ geoclue:x:122:128::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:129:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
hplip:x:124:HPLIP system user,,,:/run/hplip:/bin/false
gnome-initial-setup:x:125:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:126:131:gnome Display Manager:/var/lib/gdm3:/bin/false
soja:x:1000:1000:Soja SONY,,,:/home/soja:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
soja@soja-VirtualBox: ~/Desktop$ read v1 V2 V3
amal jyothi college
soja@soja-VirtualBox: ~/Desktop$ echo ["$v1"] ["$v2"] ["$v3"]
[amal] [jyothi] [college]
soja@soja-VirtualBox: ~/Desktop$ man more
Command 'mam' not found, did you mean:
  command 'nam' from deb nam (1:15-5.2)
  command 'bam' from deb bam (0.5.1-2)
  command 'mag' from deb mag (0.7.1-9)
  command 'name' from deb name (0.230+dfsg.1-1ubuntu2)
  command 'nain' from deb nain (5.6.3-1)
  command 'mma' from deb mma (20.12-1)
  command 'jam' from deb ftjam (2.5.2-1.1build1)
  command 'jam' from deb jam (2.6.1-2)
  command 'cam' from deb libcamera-tools (0-gitt20200629+e7aa92a~6)
  command 'nan' from deb man-db (2.9.4-2)
  command 'mm' from deb mm (2.3.8-3)
  command 'nad' from deb nnv (1.01b-19build1)
  command 'nag' from deb texlive-binaries (2020.20200327.54578-7)
  command 'nm' from deb multimed (0.49-2build4)
  command 'vam' from deb vim-addon-manager (0.5.10)
Try: sudo apt install <deb name>
```

Activities Terminal Jun 20 21:06 soja@soja-VirtualBox: ~/Desktop

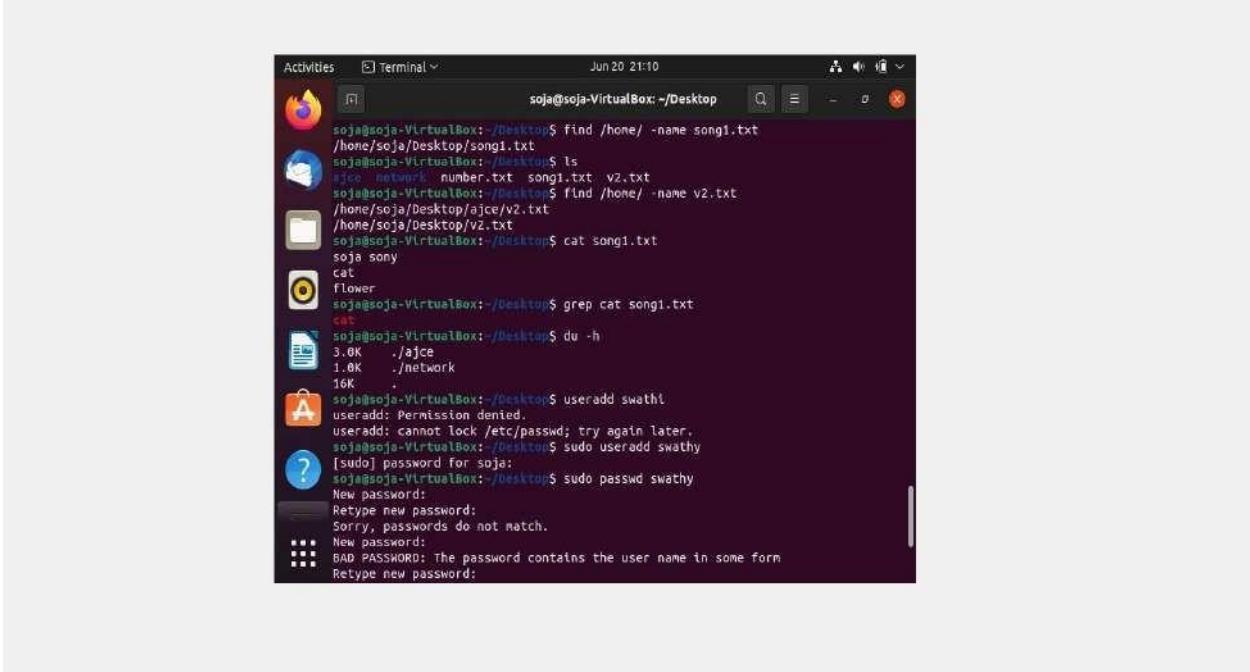
```
Try: sudo apt install <deb name>
soja@soja-VirtualBox:~/Desktop$ man more
soja@soja-VirtualBox:~/Desktop$ more -d song1.txt
soja sony
soja@soja-VirtualBox:~/Desktop$ echo cat >> song1.txt
soja@soja-VirtualBox:~/Desktop$ echo flower >> song1.txt
soja@soja-VirtualBox:~/Desktop$ more -d song1.txt
soja sony
cat
flower
soja@soja-VirtualBox:~/Desktop$ more /etc/passwd
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin/nologin
bin:x:2:2:bin:/bin/nologin
sys:x:3:3:sys:/dev/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:0:games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
```

Activities Terminal Jun 20 21:07 soja@soja-VirtualBox: ~/Desktop

```
systemd-resolve:x:101:103:systemd Resolver,,,;/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,;/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,;/var/lib/tpm:/bin/false
uidd:x:107:114::/run/uidd:/usr/sbin/nologin
soja@soja-VirtualBox:~/Desktop$ less /etc/passwd
soja@soja-VirtualBox:~/Desktop$ ls
network song1.txt
soja@soja-VirtualBox:~/Desktop$ cut -b 1,2 song1.txt
so
ca
fl
soja@soja-VirtualBox:~/Desktop$ cut -b 1,2,3 song1.txt
soj
cat
flo
soja@soja-VirtualBox:~/Desktop$ cat >> number.txt
1
2
3^C
soja@soja-VirtualBox:~/Desktop$ paste number.txt song1.txt
1      soja sony
2      cat
3      flower
soja@soja-VirtualBox:~/Desktop$ cat >> number.txt
3
```

```
Activities Terminal Jun 20 21:08
soja@soja-VirtualBox:~/Desktop$ cat >> number.txt
1
2
3
soja@soja-VirtualBox:~/Desktop$ paste number.txt song1.txt
1 soja sony
2 cat
3 flower
soja@soja-VirtualBox:~/Desktop$ cat >> number.txt
3
^C
soja@soja-VirtualBox:~/Desktop$ paste number.txt song1.txt
1 soja sony
2 cat
3 flower
soja@soja-VirtualBox:~/Desktop$ uname
Linux
soja@soja-VirtualBox:~/Desktop$ uname -r
5.11.0-18-generic
soja@soja-VirtualBox:~/Desktop$ uname -v
#19-Ubuntu SMP Fri May 7 14:22:03 UTC 2021
soja@soja-VirtualBox:~/Desktop$ uname -p
x86_64
soja@soja-VirtualBox:~/Desktop$ touch v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ ls
network number.txt song1.txt v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ mkdir ajce
soja@soja-VirtualBox:~/Desktop$ ls
```

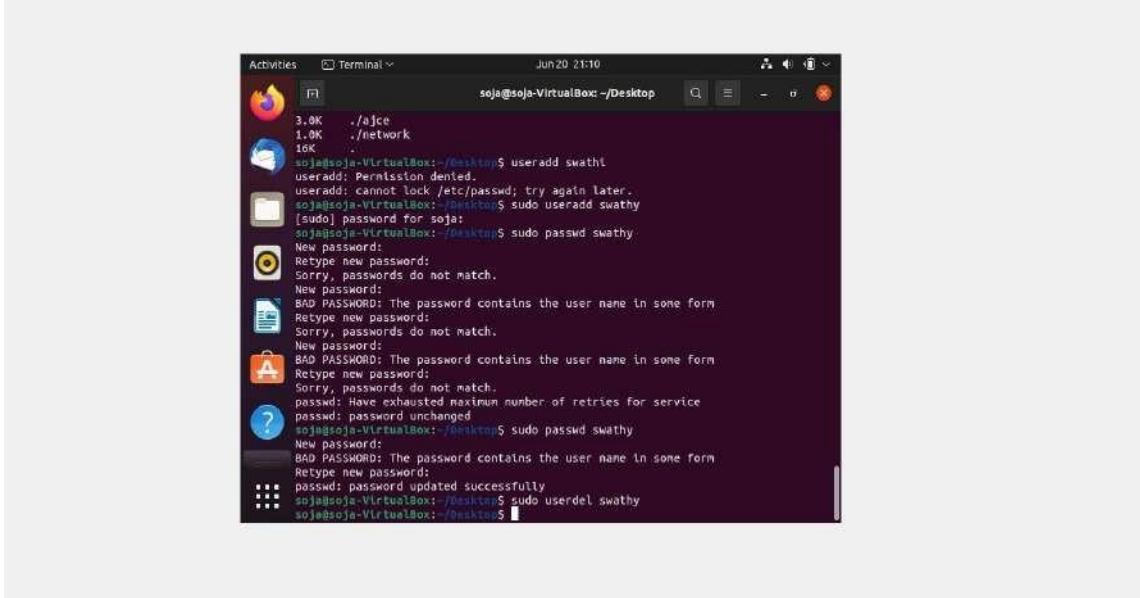
```
Activities Terminal Jun 20 21:09
soja@soja-VirtualBox:~/Desktop$ touch v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ ls
network number.txt song1.txt v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ mkdir ajce
soja@soja-VirtualBox:~/Desktop$ ls
ajce network number.txt song1.txt v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ cp v1.txt ajce/
soja@soja-VirtualBox:~/Desktop$ ls ajce
v1.txt
soja@soja-VirtualBox:~/Desktop$ cp v2.txt ajce/
soja@soja-VirtualBox:~/Desktop$ ls ajce
v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ ls
ajce network number.txt song1.txt v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ mv v1.txt ajce/
soja@soja-VirtualBox:~/Desktop$ ls ajce
v1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ ls
ajce network number.txt song1.txt v2.txt
soja@soja-VirtualBox:~/Desktop$ locate song1.txt
Command 'locate' not found, but can be installed with:
sudo apt install mlocate # version 0.26-5ubuntu1, or
sudo apt install plocate # version 1.1.7-1
soja@soja-VirtualBox:~/Desktop$ locate number*song
Command 'locate' not found, but can be installed with:
sudo apt install mlocate # version 0.26-5ubuntu1, or
sudo apt install plocate # version 1.1.7-1
soja@soja-VirtualBox:~/Desktop$ find /home/ -name song1.txt
/home/soja/Desktop/song1.txt
```



A screenshot of an Ubuntu desktop environment. In the top-left corner, there's a dock with icons for Dash, Home, Applications, and Help. The main window is a terminal titled "Terminal" with the command line "soja@soja-VirtualBox: ~/Desktop". The terminal shows the following session:

```
soja@soja-VirtualBox: ~/Desktop$ find /home/ -name song1.txt
/home/soja/Desktop/song1.txt
soja@soja-VirtualBox: ~/Desktop$ ls
v1ce network number.txt song1.txt v2.txt
soja@soja-VirtualBox: ~/Desktop$ find /home/ -name v2.txt
/home/soja/Desktop/ajce/v2.txt
/home/soja/Desktop/v2.txt
soja@soja-VirtualBox: ~/Desktop$ cat song1.txt
soja sony
cat
flower
soja@soja-VirtualBox: ~/Desktop$ grep cat song1.txt
cat
soja@soja-VirtualBox: ~/Desktop$ du -h
3.0K ./ajce
1.0K ./network
16K .
soja@soja-VirtualBox: ~/Desktop$ useradd swathy
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
soja@soja-VirtualBox: ~/Desktop$ sudo useradd swathy
[sudo] password for soja:
soja@soja-VirtualBox: ~/Desktop$ sudo passwd swathy
New password:
Retype new password:
Sorry, passwords do not match.
New password:
Retype new password:
Sorry, passwords do not match.
BAD PASSWORD: The password contains the user name in some form
Retype new password:

```



A screenshot of an Ubuntu desktop environment, similar to the one above. In the top-left corner, there's a dock with icons for Dash, Home, Applications, and Help. The main window is a terminal titled "Terminal" with the command line "soja@soja-VirtualBox: ~/Desktop". The terminal shows the following session:

```
soja@soja-VirtualBox: ~/Desktop$ ./ajce
1.0K ./network
16K .
soja@soja-VirtualBox: ~/Desktop$ useradd swathy
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
soja@soja-VirtualBox: ~/Desktop$ sudo useradd swathy
[sudo] password for soja:
soja@soja-VirtualBox: ~/Desktop$ sudo passwd swathy
New password:
Retype new password:
Sorry, passwords do not match.
New password:
Retype new password:
Sorry, passwords do not match.
BAD PASSWORD: The password contains the user name in some form
Retype new password:
Sorry, passwords do not match.
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
Sorry, passwords do not match.
passwd: Have exhausted maximum number of retries for service
passwd: password unchanged
soja@soja-VirtualBox: ~/Desktop$ sudo passwd swathy
New password:
BAD PASSWORD: The password contains the user name in some form
Retype new password:
passwd: password updated successfully
soja@soja-VirtualBox: ~/Desktop$ sudo userdel swathy
soja@soja-VirtualBox: ~/Desktop$
```

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

COMMANDS

1. usermod

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

```
soja@soja-VirtualBox:~/Desktop$ sudo usermod -u 2000 soja
soja@soja-VirtualBox:~/Desktop$ usermod -u 2000 soja
usermod: user soja is currently used by process 1353
soja@soja-VirtualBox:~/Desktop$ usermod --help
Usage: usermod [options] LOGIN

options:
  -b, --badnames          allow bad names
  -c, --comment COMMENT   new value of the GECOS field
  -d, --home HOME_DIR     new home directory for the user account
  -e, --expiredate EXPIRE_DATE set account expiration date to EXPIRE_DATE
  -f, --inactive INACTIVE  set password inactive after expiration
                           to INACTIVE
  -g, --gid GROUP          force use GROUP as new primary group
  -G, --groups GROUPS      new list of supplementary GROUPS
  -a, --append              append the user to the supplemental GROUPS
                           mentioned by the -G option without removing
                           the user from other groups
  -h, --help                display this help message and exit
  -l, --login NEW_LOGIN    new value of the login name
  -L, --lock                 lock the user account
  -m, --move-home           move contents of the home directory to the
                           new location (use only with -d)
```

2. groupadd

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

```
soja@soja-VirtualBox:~/Desktop$ sudo groupadd student
[sudo] password for soja:
sudo: a password is required
soja@soja-VirtualBox:~/Desktop$ sudo groupadd student
[sudo] password for soja:
soja@soja-VirtualBox:~/Desktop$ sudo groups soja
soja : soja adm cdrom sudo dip plugdev lpadmin lxd sambashare
```

3. groups

Groups command print the groups a user is in

```
soja@soja-VirtualBox:~/Desktop$ sudo groupadd student
groupadd: group 'student' already exists
soja@soja-VirtualBox:~/Desktop$ sudo groupadd -g 1010 mygroup1
soja@soja-VirtualBox:~/Desktop$ sudo groupadd mygroup1
groupadd: group 'mygroup1' already exists
soja@soja-VirtualBox:~/Desktop$ getent group mygroup1
mygroup1:x:1010:
soja@soja-VirtualBox:~/Desktop$ sudo groupadd soja12
soja@soja-VirtualBox:~/Desktop$ getent group soja12
```

4. groupdel

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

```
soja@soja-VirtualBox:~/Desktop$ groupdel soja12
groupdel: Permission denied.
groupdel: cannot lock /etc/group; try again later.
soja@soja-VirtualBox:~/Desktop$ getent group soja12
soja12:x:1011:
soja@soja-VirtualBox:~/Desktop$ sudo groupdel soja12
soja@soja-VirtualBox:~/Desktop$ getent group soja12
soja@soja-VirtualBox:~/Desktop$ sudo groupadd student2
soja@soja-VirtualBox:~/Desktop$ groupmod -n soja12 student2
```

5. groupmod

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

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

```
soja@soja-VirtualBox:~/Desktop$ getent group soja12
soja12:x:1011:
soja@soja-VirtualBox:~/Desktop$ sudo groupdel soja12
soja@soja-VirtualBox:~/Desktop$ getent group soja12
soja@soja-VirtualBox:~/Desktop$ sudo groupadd student2
soja@soja-VirtualBox:~/Desktop$ groupmod -n soja12 student2
groupmod: Permission denied.
groupmod: cannot lock /etc/group; try again later.
soja@soja-VirtualBox:~/Desktop$ sudo groupmod -n soja12 student2
soja@soja-VirtualBox:~/Desktop$ cd /mnt
```

6. chmod

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

```
#chmod who what which file/directory.
```

```
soja@soja-VirtualBox:~/Desktop$ cd ..
soja@soja-VirtualBox:~$ ls
Desktop  Downloads  Pictures  song1      Videos
Documents  Music      Public    Templates
soja@soja-VirtualBox:~$ cd downloads
bash: cd: downloads: No such file or directory
soja@soja-VirtualBox:~$ cd Downloads
soja@soja-VirtualBox:~/Downloads$ ls
a.txt
soja@soja-VirtualBox:~/Downloads$ chmod +rmw a.txt.txt
chmod: invalid mode: '+rmw'
Try 'chmod --help' for more information.
soja@soja-VirtualBox:~/Downloads$ chmod +rwx a.txt.txt
chmod: cannot access 'a.txt.txt': No such file or directory
soja@soja-VirtualBox:~/Downloads$ chmod +rwx a.txt
soja@soja-VirtualBox:~/Downloads$
```

7. chown

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

8. id

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

```
soja@soja-VirtualBox:~/Downloads$ chmod +rwx sojas.txt
soja@soja-VirtualBox:~/Downloads$ id
uid=1000(soja) gid=1000(soja) groups=1000(soja),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),121(lpadmin),132(lxd),133(sambashare)
soja@soja-VirtualBox:~/Downloads$ █
```

9. ps

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

```
soja@soja-VirtualBox:~/Downloads$ ps -a
 PID TTY          TIME CMD
 1422 tty2        00:00:00 gnome-session-b
 61282 pts/0      00:00:00 ps
soja@soja-VirtualBox:~/Downloads$ █
```

10. top

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

```
top - 22:32:58 up  1:24,  1 user,  load average: 0.00, 0.00, 0.04
Tasks: 304 total,   1 running, 303 sleeping,   0 stopped,   0 zombie
%CPU(s): 0.7 us, 0.0 sy, 0.0 nt, 99.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 972.2 total,   83.4 free, 664.8 used, 224.0 buff/cache
MiB Swap: 448.0 total,   71.0 free, 377.0 used. 166.2 avail Mem

 PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
 1614 soja      20   0 4029060 128112 30516 5  0.3 12.9  1:01.34 gnome-
 60898 soja      20   0 411056 34828 23244 5  0.3  3.5  0:03.05 gnome-
• 61322 soja      20   0 21576  3000  2192 R  0.3  0.3  0:01.03 top
```

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

```
soja@soja-VirtualBox:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3  
song6.mp3
```

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

```
soja@soja-VirtualBox:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg  
snap6.jpg
```

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

```
soja@soja-VirtualBox:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4  
film6.mp4
```

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

```
soja@soja-VirtualBox:~$ mv *.mp3 ./Music/  
soja@soja-VirtualBox:~$ mv *.jpg ./Pictures/  
soja@soja-VirtualBox:~$ mv *.mp4 ./Videos/
```

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

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

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

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

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

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

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

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

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

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

```
soja@soja-VirtualBox:~$ ls -a > allfiles.txt
soja@soja-VirtualBox:~$ date
Tuesday 17 August 2021 04:12:13 PM IST
```

8. Add the user Juliet.

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

```
soja@soja-VirtualBox:~$ sudo useradd Juliet
[sudo] password for soja:
soja@soja-VirtualBox:~$ cat /etc/passwd | grep Juliet
Juliet:x:1001:1012::/home/Juliet:/bin/sh
```

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

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

10. Create a supplementary group called Shakespeare with a group id of 30000.a) Create a supplementary group called artists.

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

c) Add the Juliet user to the Shakespeare group as a supplementary group.

d) Confirm that Juliet has been added using the id command.

```
soja@soja-VirtualBox:~$ sudo groupadd -g 30000 Shakespeare
soja@soja-VirtualBox:~$ sudo groupadd artist
soja@soja-VirtualBox:~$ less /etc/group
soja@soja-VirtualBox:~$ sudo usermod -G Shakespeare Juliet
soja@soja-VirtualBox:~$ id Juliet
uid=1001(Juliet) gid=1012(Juliet) groups=1012(Juliet),30000(Shakespeare)
```

```
mygroup:x:1010:  
soja12:x:1011:  
Juliet:x:1012:  
Shakespheare:x:30000:  
artist:x:30001:  
(END)
```

11. Add Romeo and Hamlet to the Shakespeare group.

```
soja@soja-VirtualBox:~$ sudo useradd Romeo  
[sudo] password for soja:  
soja@soja-VirtualBox:~$ sudo useradd Hamlet  
soja@soja-VirtualBox:~$ sudo usermod -G Shakespeare Romeo  
soja@soja-VirtualBox:~$ sudo usermod -G Shakespeare Hamlet  
soja@soja-VirtualBox:~$ id Romeo  
uid=1002(Romeo) gid=1002(Romeo) groups=1002(Romeo),30000(Shakespeare)  
soja@soja-VirtualBox:~$ id Hamlet  
uid=1003(Hamlet) gid=1003(Hamlet) groups=1003(Hamlet),30000(Shakespeare)  
soja@soja-VirtualBox:~$
```

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

```
soja@soja-VirtualBox:~$ sudo useradd Reba  
soja@soja-VirtualBox:~$ sudo useradd Dolly  
soja@soja-VirtualBox:~$ sudo useradd Elvis  
soja@soja-VirtualBox:~$ sudo usermod -G artist Reba  
soja@soja-VirtualBox:~$ sudo usermod -G artist Dolly  
soja@soja-VirtualBox:~$ sudo usermod -G artist Elvis  
soja@soja-VirtualBox:~$
```

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

```
soja@soja-VirtualBox:~$ less /etc/group  
Shakespheare:x:30000:Juliet,Romeo,Hamlet  
artist:x:30001:Reba,Dolly,Elvis
```

14. Attempt to remove user Dolly.

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

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

WINDOWS

Ping:

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

Pinging google.com [2404:6800:4007:829::200e] with 32 bytes of data:
Reply from 2404:6800:4007:829::200e: time=170ms
Reply from 2404:6800:4007:829::200e: time=176ms
Reply from 2404:6800:4007:829::200e: time=190ms
Reply from 2404:6800:4007:829::200e: time=95ms

Ping statistics for 2404:6800:4007:829::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 95ms, Maximum = 190ms, Average = 157ms

C:\Users\sojas>
```

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

Pinging google.com [2404:6800:4007:829::200e] with 32 bytes of data:
Reply from 2404:6800:4007:829::200e: time=102ms
Reply from 2404:6800:4007:829::200e: time=112ms
Reply from 2404:6800:4007:829::200e: time=116ms
Reply from 2404:6800:4007:829::200e: time=128ms

Ping statistics for 2404:6800:4007:829::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 102ms, Maximum = 128ms, Average = 114ms

C:\Users\sojas>
```

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

Pinging google.com [2404:6800:4007:829::200e] with 32 bytes of data:
Reply from 2404:6800:4007:829::200e: time=165ms
Reply from 2404:6800:4007:829::200e: time=482ms
Reply from 2404:6800:4007:829::200e: time=184ms
Reply from 2404:6800:4007:829::200e: time=199ms
Reply from 2404:6800:4007:829::200e: time=200ms
Reply from 2404:6800:4007:829::200e: time=315ms
Reply from 2404:6800:4007:829::200e: time=222ms
Reply from 2404:6800:4007:829::200e: time=120ms

Ping statistics for 2404:6800:4007:829::200e:
    Packets: Sent = 8, Received = 8, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 120ms, Maximum = 482ms, Average = 235ms
Control-C
```

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

Pinging google.com [142.250.196.14] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.196.14:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

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

Pinging google.com [142.250.196.14] with 32 bytes of data:
Reply from 142.250.196.14: bytes=32 time=189ms TTL=117
Reply from 142.250.196.14: bytes=32 time=197ms TTL=117
Reply from 142.250.196.14: bytes=32 time=198ms TTL=117
Reply from 142.250.196.14: bytes=32 time=202ms TTL=117

Ping statistics for 142.250.196.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 189ms, Maximum = 202ms, Average = 196ms
```

Route:

```
C:\Users\sojas>route print

Interface List
19...6c 02 e0 15 72 f8 ....Realtek PCIe GbE Family Controller
6...00 ff 55 31 bf cd ....ExpressVPN TAP Adapter
7...0a 00 27 00 00 07 ....VirtualBox Host-Only Ethernet Adapter
13...22 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter
21...a2 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter #2
9...20 4e f6 6f ba 8d ....Realtek RTL8822CE 802.11ac PCIe Adapter
11...20 4e f6 6f ba 8c ....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1

IPv4 Route Table
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
 0.0.0.0          0.0.0.0    192.168.23.105  192.168.23.26       55
 127.0.0.0        255.0.0.0        On-link        127.0.0.1       331
 127.0.0.1        255.255.255.255  On-link        127.0.0.1       331
127.255.255.255  255.255.255.255  On-link        127.0.0.1       331
 192.168.23.0     255.255.255.0        On-link     192.168.23.26       311
 192.168.23.26     255.255.255.255  On-link     192.168.23.26       311
 192.168.23.255   255.255.255.255  On-link     192.168.23.26       311
 192.168.56.0     255.255.255.0        On-link     192.168.56.1       330
 192.168.56.1     255.255.255.255  On-link     192.168.56.1       330
192.168.56.255   255.255.255.255  On-link     192.168.56.1       330
 224.0.0.0         240.0.0.0        On-link        127.0.0.1       331
 224.0.0.1         240.0.0.0        On-link     192.168.23.26       311
 224.0.0.9         240.0.0.0        On-link     192.168.56.1       330
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     192.168.23.26       311
255.255.255.255  255.255.255.255  On-link     192.168.56.1       330

Persistent Routes:
 None

TPv6 Route Table
Active Routes:
If Metric Network Destination      Gateway
 9   71 ::1/0          fe80::14b4:85ff:fea1:342b
 1   331 ::1/128        On-link
 9   71 2401:4900:22dc:5e21::/64  On-link
 9   311 2401:4900:22dc:5e21:5d3:3989:25bc:7ed4/128
          On-link
 9   311 2401:4900:22dc:5e21:ed69:1063:cb2e:1674/128
          On-link
 9   311 fe80::/64        On-link
 7   281 fe80::/64        On-link
 7   281 fe80::589a:c0ff:6066:cc5f/28
          On-link


```

```
C:\Users\sojas>route print -4

Interface List
19...6c 02 e0 15 72 f8 ....Realtek PCIe GbE Family Controller
6...00 ff 55 31 bf cd ....ExpressVPN TAP Adapter
7...0a 00 27 00 00 07 ....VirtualBox Host-Only Ethernet Adapter
13...22 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter
21...a2 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter #2
9...20 4e f6 6f ba 8d ....Realtek RTL8822CE 802.11ac PCIe Adapter
11...20 4e f6 6f ba 8c ....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1

IPv4 Route Table
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
 0.0.0.0          0.0.0.0    192.168.23.105  192.168.23.26       55
 127.0.0.0        255.0.0.0        On-link        127.0.0.1       331
 127.0.0.1        255.255.255.255  On-link        127.0.0.1       331
127.255.255.255  255.255.255.255  On-link        127.0.0.1       331
 192.168.23.0     255.255.255.0        On-link     192.168.23.26       311
 192.168.23.26     255.255.255.255  On-link     192.168.23.26       311
 192.168.23.255   255.255.255.255  On-link     192.168.23.26       311
 192.168.56.0     255.255.255.0        On-link     192.168.56.1       330
 192.168.56.1     255.255.255.255  On-link     192.168.56.1       330
192.168.56.255   255.255.255.255  On-link     192.168.56.1       330
 224.0.0.0         240.0.0.0        On-link        127.0.0.1       331
 224.0.0.1         240.0.0.0        On-link     192.168.23.26       311
 224.0.0.9         240.0.0.0        On-link     192.168.56.1       330
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     192.168.23.26       311
255.255.255.255  255.255.255.255  On-link     192.168.56.1       330

Persistent Routes:
 None
```

```
C:\Users\sojas>route print -6
=====
Interface List
19...6c 02 e0 15 72 f8 ....Realtek PCIe GbE Family Controller
6...00 ff 55 31 bf cd ....ExpressVPN TAP Adapter
7...0a 00 27 00 00 07 ....VirtualBox Host-Only Ethernet Adapter
13...22 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter
21...a2 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter #2
9...20 4e f6 6f ba 8d ....Realtek RTL8822CE 802.11ac PCIe Adapter
11...20 4e f6 6f ba 8c ....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
9     71 ::/0                         fe80::14b4:85ff:fc1a:342b
1     331 ::1/128                      On-link
9     71 2401:4900:22dc:5e2::/64    On-link
9     311 2401:4900:22dc:5e2:c5d3:3989:25bc:7ed4/128
9     311 2401:4900:22dc:5e2:ed69:1063:cb2e:1674/128
9     311 fc80::/64                  On-link
7     281 fe80::/64                  On-link
7     281 fe80::589a:c0ff:6066:cc5d/128
9     311 fe80::c5d3:3989:25bc:7ed4/128
1     331 ff00::/8                  On-link
9     311 ff00::/8                  On-link
7     281 ff00::/8                  On-link
=====
Persistent Routes:
None
```

```
C:\Users\sojas>route print *157
=====
Interface List
19...6c 02 e0 15 72 f8 ....Realtek PCIe GbE Family Controller
6...00 ff 55 31 bf cd ....ExpressVPN TAP Adapter
7...0a 00 27 00 00 07 ....VirtualBox Host-Only Ethernet Adapter
13...22 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter
21...a2 4e f6 6f ba 8d ....Microsoft Wi-Fi Direct Virtual Adapter #2
9...20 4e f6 6f ba 8d ....Realtek RTL8822CE 802.11ac PCIe Adapter
11...20 4e f6 6f ba 8c ....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
=====

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

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

Traceroute:

```
C:\Users\sojas>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

 1   8 ms    3 ms    2 ms  192.168.23.105
 2  191 ms   100 ms   202 ms  117.96.121.97
 3  190 ms   99 ms   99 ms  dsl-tn-dynamic-029.223.22.125.airtelbroadband.in [125.22.223.29]
 4  182.79.154.111  reports: Destination net unreachable.

Trace complete.
```

```
C:\Users\sojas>tracert www.google.com

Tracing route to www.google.com [2404:6800:4007:806::2004]
over a maximum of 30 hops:

 1    2 ms    2 ms    2 ms  2401:4900:22dc:5e2::4b
 2    *        *        * Request timed out.
 3  191 ms   202 ms   100 ms  2404:a800:3a00:207::d
 4  106 ms   202 ms    99 ms  2404:a800::92
 5  666 ms    99 ms   202 ms  2001:4860:1:1::160e
 6  212 ms   202 ms   190 ms  2404:6800:80f8::1
 7  613 ms    *        *  2001:4860:0:1::1108
 8  199 ms    *        *  2001:4860:0:e00::3
 9  196 ms    *        113 ms  2001:4860::12:0:c004
10  227 ms  1225 ms    *        2001:4860:0:1::47df
11  196 ms   200 ms   202 ms  maa03s34-in-x04.1e100.net [2404:6800:4007:806::2004]

Trace complete.
```

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

Tracing route to new-fp-shed.wg1.b.yahoo.com [2406:2000:e4:1605::9001]
over a maximum of 30 hops:

 1    2 ms    2 ms    2 ms  2401:4900:22dc:5e2::4b
 2    *        *        * Request timed out.
 3  196 ms   202 ms   201 ms  2404:a800:3a00:207::d
 4  212 ms   203 ms   202 ms  2404:a800::226
 5  206 ms   309 ms   197 ms  2001:de8:4::1:310:2
 6  510 ms   202 ms   201 ms  2406:2000:f015:205::1
 7  210 ms   202 ms   406 ms  2406:2000:e4:fc01::1
 8  213 ms   202 ms   116 ms  2406:2000:e4:f815::1
 9  411 ms   122 ms   177 ms  2406:2000:e4:e408::1
10  190 ms   202 ms   201 ms  2406:2000:e4:1605::9001

Trace complete.
```

```
C:\Users\sojas>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1  11 ms    3 ms    2 ms  192.168.23.105
 2  191 ms   202 ms   99 ms  117.96.121.97
 3  189 ms   99 ms   202 ms  ds1-tri-dynamic-029.223.22.125.airtelbroadband.in [125.22.223.29]
 4  1125 ms  407 ms  408 ms  182.79.245.6
 5  445 ms   304 ms  304 ms  ve951.core2.nyc6.he.net [184.105.64.178]
 6  335 ms   406 ms  407 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
 7  432 ms   407 ms  406 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
 8  373 ms   407 ms  407 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.
```

Nslookup:

```
C:\Users\sojas>nslslookup
Default Server: UnKnown
Address: 192.168.23.105
```

```
C:\Users\sojas>nslslookup google.com
Server: UnKnown
Address: 192.168.23.105

Non-authoritative answer:
Name:    google.com
Addresses: 2404:6800:4007:826::200e
          142.250.196.14
```

```
C:\Users\sojas>nslookup -q=MX google.com
Server: UnKnown
Address: 192.168.23.105

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

alt2.aspmx.l.google.com internet address = 142.250.141.27
alt2.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:c0b::1b
alt3.aspmx.l.google.com internet address = 142.250.115.27
alt3.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4023:1004::1b
alt1.aspmx.l.google.com internet address = 173.194.202.27
alt1.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:400e:c00::1a
aspmx.l.google.com   internet address = 172.217.194.27
aspmx.l.google.com   AAAA IPv6 address = 2404:6800:4003:c05::1b
alt4.aspmx.l.google.com internet address = 64.233.171.27
alt4.aspmx.l.google.com AAAA IPv6 address = 2607:f8b0:4003:c15::1a
```

```
C:\Users\sojas>nslookup -type=ns google.com
Server: UnKnown
Address: 192.168.23.105

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

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

IPCONFIG:

```
C:\Users\sojas>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Ethernet 2 while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

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

Ethernet adapter Ethernet 2:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .

Ethernet adapter VirtualBox Host-Only Network:
  Connection-specific DNS Suffix . .
  Link-local IPv6 Address . . . . . : fe80::589a:c0ff:6066:cc5d%7
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . .

Wireless LAN adapter Local Area Connection* 1:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .

Wireless LAN adapter Local Area Connection* 2:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .

Wireless LAN adapter Wi-Fi:
  Connection-specific DNS Suffix . .
  IPv6 Address. . . . . : 2401:4900:22dc:5e2:c5d3:3989:25bc:7ed4
  Temporary IPv6 Address. . . . . : 2401:4900:22dc:5e2:ed69:1063:cb2e:1674
  Link-local IPv6 Address . . . . . : fe80::c5d3:3989:25bc:7ed4%9
  Default Gateway . . . . . : fe80::14b4:85ff:fela:342b%9

Ethernet adapter Bluetooth Network Connection:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .
```

```
C:\Users\sojas>ipconfig

Windows IP Configuration

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

Wireless LAN adapter Local Area Connection* 1:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .

Wireless LAN adapter Local Area Connection* 2:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . .

Wireless LAN adapter Wi-Fi:
  Connection-specific DNS Suffix . .
  IPv6 Address. . . . . : 2401:4900:22dc:5e2:c5d3:3989:25bc:7ed4
  Temporary IPv6 Address. . . . . : 2401:4900:22dc:5e2:ed69:1063:cb2e:1674
  Link-local IPv6 Address . . . . . : fe80::c5d3:3989:25bc:7ed4%9
  IPv4 Address. . . . . : 192.168.23.26
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : fe80::14b4:85ff:fela:342b%9
  192.168.23.105
```

```
C:\Users\sojas>ipconfig /displaydns

Windows IP Configuration

play.google.com
-----
Record Name . . . . .: play.google.com
Record Type . . . . .: 28
Time To Live . . . . .: 256
Data Length . . . . .: 16
Section . . . . .: Answer
AAAA Record . . . . .: 2404:6800:4007:808::200e

play.google.com
-----
Record Name . . . . .: play.google.com
Record Type . . . . .: 1
Time To Live . . . . .: 256
Data Length . . . . .: 4
Section . . . . .: Answer
A (Host) Record . . . . .: 142.250.195.174

1.0.0.127.in-addr.arpa
-----
Record Name . . . . .: 1.0.0.127.in-addr.arpa.
Record Type . . . . .: 12
Time To Live . . . . .: 0
Data Length . . . . .: 8
Section . . . . .: Answer
PTR Record . . . . .: localhost

client.wns.windows.com
-----
Record Name . . . . .: client.wns.windows.com
Record Type . . . . .: 5
Time To Live . . . . .: 56
Data Length . . . . .: 8
Section . . . . .: Answer
CNAME Record . . . . .: wns.notify.trafficmanager.net
```

```
C:\Users\sojas>ipconfig /showclassid

Error: unrecognized or incomplete command line.

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

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

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

Netstat:

```
C:\Users\sojas>netstat
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:59206	LAPTOP-VL4G9H1M:59207	ESTABLISHED
TCP	127.0.0.1:59207	LAPTOP-VL4G9H1M:59206	ESTABLISHED
TCP	127.0.0.1:59208	LAPTOP-VL4G9H1M:59209	ESTABLISHED
TCP	127.0.0.1:59209	LAPTOP-VL4G9H1M:59208	ESTABLISHED
TCP	127.0.0.1:59210	LAPTOP-VL4G9H1M:59211	ESTABLISHED
TCP	127.0.0.1:59211	LAPTOP-VL4G9H1M:59210	ESTABLISHED
TCP	127.0.0.1:59212	LAPTOP-VL4G9H1M:59213	ESTABLISHED
TCP	127.0.0.1:59213	LAPTOP-VL4G9H1M:59212	ESTABLISHED
TCP	127.0.0.1:59257	LAPTOP-VL4G9H1M:59259	ESTABLISHED
TCP	127.0.0.1:59259	LAPTOP-VL4G9H1M:59257	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:52540	[2606:2800:147:120f:30c:1ba0:fc6:265a]:https	CLOSE_WAIT
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:54655	si-in-f188:5228	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:59277	g2600-140f-0006-0780-0000-0000-0000-0057:https	CLOSE_WAIT
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:62334	maa03s40-in-x0e:https	TIME_WAIT

```
C:\Users\sojas>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:59206	127.0.0.1:59207	ESTABLISHED
TCP	127.0.0.1:59207	127.0.0.1:59206	ESTABLISHED
TCP	127.0.0.1:59208	127.0.0.1:59209	ESTABLISHED
TCP	127.0.0.1:59209	127.0.0.1:59208	ESTABLISHED
TCP	127.0.0.1:59210	127.0.0.1:59211	ESTABLISHED
TCP	127.0.0.1:59211	127.0.0.1:59210	ESTABLISHED
TCP	127.0.0.1:59212	127.0.0.1:59213	ESTABLISHED
TCP	127.0.0.1:59213	127.0.0.1:59212	ESTABLISHED
TCP	127.0.0.1:59257	127.0.0.1:59259	ESTABLISHED
TCP	127.0.0.1:59259	127.0.0.1:59257	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:52540	[2606:2800:147:120f:30c:1ba0:fc6:265a]:443	CLOSE_WAIT
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:54655	[2404:6800:4003:c04::bc]:5228	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:59277	[2600:140f:6:780::57]:443	CLOSE_WAIT

```
C:\Users\sojas>netstat -n 5
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:59206	127.0.0.1:59207	ESTABLISHED
TCP	127.0.0.1:59207	127.0.0.1:59206	ESTABLISHED
TCP	127.0.0.1:59208	127.0.0.1:59209	ESTABLISHED
TCP	127.0.0.1:59209	127.0.0.1:59208	ESTABLISHED
TCP	127.0.0.1:59210	127.0.0.1:59211	ESTABLISHED
TCP	127.0.0.1:59211	127.0.0.1:59210	ESTABLISHED
TCP	127.0.0.1:59212	127.0.0.1:59213	ESTABLISHED
TCP	127.0.0.1:59213	127.0.0.1:59212	ESTABLISHED
TCP	127.0.0.1:59257	127.0.0.1:59259	ESTABLISHED
TCP	127.0.0.1:59259	127.0.0.1:59257	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:52540	[2606:2800:147:120f:30c:1ba0:fc6:265a]:443	CLOSE_WAIT
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:54655	[2404:6800:4003:c04::bc]:5228	ESTABLISHED
TCP	[2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:59277	[2600:140f:6:780::57]:443	CLOSE_WAIT

```
C:\Users\sojas>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:445            LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:5040           LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:5357           LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49664          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49665          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49666          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49667          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49668          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    0.0.0.0:49670          LAPTOP-VL4G9HIM:0  LISTENING
  TCP    127.0.0.1:2015         LAPTOP-VL4G9HIM:0  LISTENING
  TCP    127.0.0.1:59206        LAPTOP-VL4G9HIM:59207 ESTABLISHED
  TCP    127.0.0.1:59207        LAPTOP-VL4G9HIM:59206 ESTABLISHED
  TCP    127.0.0.1:59208        LAPTOP-VL4G9HIM:59209 ESTABLISHED
  TCP    127.0.0.1:59209        LAPTOP-VL4G9HIM:59208 ESTABLISHED
  TCP    127.0.0.1:59210        LAPTOP-VL4G9HIM:59211 ESTABLISHED
  TCP    127.0.0.1:59211        LAPTOP-VL4G9HIM:59210 ESTABLISHED
  TCP    127.0.0.1:59212        LAPTOP-VL4G9HIM:59213 ESTABLISHED
  TCP    127.0.0.1:59213        LAPTOP-VL4G9HIM:59212 ESTABLISHED
  TCP    127.0.0.1:59257        LAPTOP-VL4G9HIM:0  LISTENING
  TCP    127.0.0.1:59257        LAPTOP-VL4G9HIM:59259 ESTABLISHED
  TCP    127.0.0.1:59259        LAPTOP-VL4G9HIM:59257 ESTABLISHED
  TCP    169.254.126.212:139   LAPTOP-VL4G9HIM:0  LISTENING
  TCP    192.168.56.1:139      LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:135               LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:445               LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:5357              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49664              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49665              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49666              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49667              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49668              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49670              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [::]:49669              LAPTOP-VL4G9HIM:0  LISTENING
  TCP    [2401:4900:22dc:5e2:ed69:1063:cb2e:1674]:52540  [2606:2800:147:120f:30c:1ba0:fc6:265a]:https  CLOSE_WAIT
```

UBUNTU

Ping:

```
soja@soja-HP-250-G7-Notebook-PC: ~$ ping www.google.com
PING www.google.com(maa05s24-in-x04.1e100.net (2404:6800:4007:81f::2004)) 56 data bytes
64 bytes from maa05s24-in-x04.1e100.net (2404:6800:4007:81f::2004): icmp_seq=1 ttl=117 time=205 ms
64 bytes from maa05s24-in-x04.1e100.net (2404:6800:4007:81f::2004): icmp_seq=2 ttl=117 time=258 ms
64 bytes from maa05s24-in-x04.1e100.net (2404:6800:4007:81f::2004): icmp_seq=3 ttl=117 time=186 ms
64 bytes from maa05s24-in-x04.1e100.net (2404:6800:4007:81f::2004): icmp_seq=4 ttl=117 time=72.8 ms
^C
--- www.google.com ping statistics ---
5 packets transmitted, 4 received, 20% packet loss, time 4007ms
rtt min/avg/max/mdev = 72.838/180.587/257.962/67.532 ms
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ ping -a google.com
PING google.com(maa03s41-in-x0e.1e100.net (2404:6800:4007:826::200e)) 56 data bytes
64 bytes from maa03s41-in-x0e.1e100.net (2404:6800:4007:826::200e): icmp_seq=1 ttl=118 time=204 ms
64 bytes from maa03s41-in-x0e.1e100.net (2404:6800:4007:826::200e): icmp_seq=2 ttl=118 time=227 ms
64 bytes from maa03s41-in-x0e.1e100.net (2404:6800:4007:826::200e): icmp_seq=3 ttl=118 time=249 ms
64 bytes from maa03s41-in-x0e.1e100.net (2404:6800:4007:826::200e): icmp_seq=4 ttl=118 time=272 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 204.181/238.100/272.305/25.383 ms
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ ping -V google.com
ping from iputils 20210202
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ ping -b google.com
PING google.com(maa03s44-in-x0e.1e100.net (2404:6800:4007:829::200e)) 56 data bytes
64 bytes from maa03s44-in-x0e.1e100.net (2404:6800:4007:829::200e): icmp_seq=1 ttl=59 time=205 ms
64 bytes from maa03s44-in-x0e.1e100.net (2404:6800:4007:829::200e): icmp_seq=2 ttl=59 time=227 ms
64 bytes from maa03s44-in-x0e.1e100.net (2404:6800:4007:829::200e): icmp_seq=3 ttl=59 time=250 ms
64 bytes from maa03s44-in-x0e.1e100.net (2404:6800:4007:829::200e): icmp_seq=4 ttl=59 time=273 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 204.638/238.841/273.351/25.638 ms
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$
```

Route:

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    600    0        0 wlo1
link-local      0.0.0.0        255.255.0.0   U     1000   0        0 wlo1
192.168.23.0   0.0.0.0        255.255.255.0  U     600    0        0 wlo1
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         192.168.23.105 0.0.0.0        UG    600    0        0 wlo1
169.254.0.0     0.0.0.0        255.255.0.0   U     1000   0        0 wlo1
192.168.23.0   0.0.0.0        255.255.255.0  U     600    0        0 wlo1
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop$ route -Cn
Kernel IP routing cache
Source          Destination      Gateway        Flags Metric Ref    Use Iface
soja@soja:~$
```

```
soja@soja-HP-250-G7-Notebook-PC: ~/Desktop $ ip route
default via 192.168.23.105 dev wlo1 proto dhcp metric 600
169.254.0.0/16 dev wlo1 scope link metric 1000
192.168.23.0/24 dev wlo1 proto kernel scope link src 192.168.23.26 metric 600
```

Traceroute:

```
sojasoja-HP-250-G7-Notebook-PC:~$ traceroute google.com
traceroute to google.com (142.250.196.14), 30 hops max, 60 byte packets
 1 _gateway (192.168.23.105)  2.649 ms  2.016 ms  2.594 ms
 2 117.96.121.97 (117.96.121.97)  203.552 ms  203.539 ms  203.532 ms
 3  dl5.tn-dynamic.029.223.125.airtelbroadband.in (125.22.223.1)  203.514 ms  dl5.tn-dynamic.001.223.22.125.airtelbroadband.in (125.22.223.1)  203.503 ms  203.492 ms
 4 [15.192.115.4] [15.192.115.4]  182.79.198.20 (182.79.198.20)  203.483 ms [15.192.79.198.6 (182.79.198.6)  203.466 ms 116.119.68.242 (116.119.68.242)  203.458 ms
 5  72.14.208.234 (72.14.208.234)  203.447 ms  203.437 ms 72.14.216.192 (72.14.216.192)  203.429 ms
 6  10.252.180.254 (10.252.180.254)  203.383 ms * *
 7  142.250.228.220 (142.250.228.220)  195.687 ms 142.250.233.144 (142.250.233.144)  204.799 ms 74.125.252.208 (74.125.252.208)  204.721 ms
 8  74.125.242.139 (74.125.242.139)  204.729 ms 74.125.242.146 (74.125.242.146)  204.725 ms 74.125.242.138 (74.125.242.138)  204.719 ms
 9  188.170.253.97 (188.170.253.97)  204.727 ms 204.724 ms 204.716 ms
10  142.251.55.43 (142.251.55.43)  204.674 ms 204.665 ms 142.251.55.41 (142.251.55.41)  204.661 ms
11  mead05is44-in-f14.1e100.net (142.250.196.14)  204.653 ms 204.649 ms 204.643 ms
```

```
sojourner-HP-Z90-G7-Notebook-PC:~ % $ traceroute -4 google.com
traceroute to google.com (142.250.196.14), 30 hops max, 66 byte packets
 1 _gateway (192.168.23.105)  3.717 ms  3.784 ms  3.684 ms
 2 117.96.121.97 (117.96.121.97)  204.088 ms  204.056 ms  204.053 ms
 3 dsl-tn-dynamic-001.223.22.125.airtelbroadband.in (125.22.223.29)  284.829 ms  204.015 ms dsl-tn-dynamic-029.223.22.125.airtelbroadband.in (125.22.223.29)  203.084 ms
 4 182.79.198.20 (182.79.198.20)  283.978 ms  116.119.50.117 (116.119.50.117)  203.943 ms
 5 72.14.288.234 (72.14.288.234)  283.933 ms  72.14.216.192 (72.14.216.192)  283.922 ms  72.14.288.234 (72.14.288.234)  203.911 ms
 6 * * *
 7 74.125.242.129 (74.125.242.129)  195.485 ms 142.250.233.144 (142.250.233.144)  193.275 ms 142.250.236.156 (142.250.236.156)  193.251 ms
 8 74.125.242.155 (74.125.242.155)  193.214 ms 74.125.242.151 (74.125.242.151)  193.115 ms 74.125.242.154 (74.125.242.154)  193.102 ms
 9 108.170.253.113 (108.170.253.113)  193.086 ms 193.068 ms 198.176.253.97 (198.176.253.97)  193.087 ms
10 108.054-44-in-f14.1e100.net (142.250.196.14)  193.035 ms 142.251.55.43 (142.251.55.43)  193.021 ms 108.054-44-in-f14.1e100.net (142.250.196.14)  193.007 ms
```

```
soja-soja-MP-358-07-Notebook-PC:~/Desktop$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:829::200e), 30 hops max, 80 byte packets
 1  2401:960:22dc:Se2::4b (2401:4900:22dc:5e9::ab) 3.614 ms  3.581 ms  7.163 ms
 2  *  *
 3  2404:a800:3a00:207::1d (2404:a800:3a00:207::1d) 283.850 ms 2404:a800:3a00:207::d (2404:a800:3a00:207::d) 283.850 ms  283.834 ms
 4  2404:a800:92 (2404:a800:92) 283.848 ms 283.798 ms  283.784 ms
 5  2001:6800:1::1:160e (2001:4860:1::1:160e) 283.764 ms 293.756 ms  283.735 ms
 6  * 2404:a800:8125::1 (2404:a800:8125::1) 204.443 ms 2404:a800:8123::1 (2404:a800:8123::1) 204.363 ms
 7  * 2001:4860:8::1::5059 (2001:4860:8::1::5059) 204.256 ms 2001:4860:8::1::55d0 (2001:4860:8::1::55d0) 204.281 ms
 8  2001:4860:8::1::55b7 (2001:4860:8::1::55b7) 204.198 ms 2001:4860:8::135f::2 (2001:4860:8::135f::2) 204.176 ms  204.163 ms
 9  2001:4860:8::1346::1 (2001:4860:8::1346::1) 204.148 ms  *
10  2001:4860:8::1::5507 (2001:4860:8::1::5507) 204.093 ms 2001:4860:8::1::55b5 (2001:4860:8::1::55b5) 204.235 ms 2001:4860:8::1::55b7 (2001:4860:8::1::55b7) 204.223 ms
11  naad3s44-in-x.ei.xe.10.net (2404:6800:49ff:829::200e) 204.201 ms 204.191 ms  204.179 ms
```

```
soja@soja-HP-250-G7-Notebook-PC:~/desktop$ traceroute -d google.com
traceroute to google.com (142.250.196.14), 30 hops max, 60 byte packets
setsockopt SO_DEBUG: Permission denied
```

Nslookup:

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.196.14
Name:   google.com
Address: 2404:6800:4007:826::200e
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ nslookup -q=MX google.com
Server: 127.0.0.53
Address: 127.0.0.53#53

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

Authoritative answers can be found from:
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ nslookup -type=soa redhat.com
Server: 127.0.0.53
Address: 127.0.0.53#53

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

Authoritative answers can be found from:
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ nslookup -type=a google.com
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
Name: google.com
Address: 142.250.195.174
```

Ipconfig:

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ ifconfig -v
en0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 6c:02:eb:15:72:f8 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
        inets 0:1 prefixlen 128 scopeid 0x10<host>
        loop txqueuelen 1000 (Local Loopback)
        RX packets 934 bytes 102522 (102.5 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 934 bytes 102522 (102.5 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.23.26 netmask 255.255.255.0 broadcast 192.168.23.255
        inets fe80::3e9f:1e5d:a5bc:6dea prefixlen 64 scopeid 0x20<link>
        inets 2401:4900:22dc:5e2:91ef:fd5fe:d939:8cb4 prefixlen 64 scopeid 0x0<global>
        inets 2401:4900:22dc:5e2:6fec:eed8:f8ef:c79b prefixlen 64 scopeid 0x0<global>
        ether 20:4e:fo:6f:ba:b8 txqueuelen 1000 (Ethernet)
        RX packets 4023 bytes 2976505 (2.9 MB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 4120 bytes 634947 (634.9 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ ifconfig
eno1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
      ether 6c:02:e0:15:72:f8 txqueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 B)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 934 bytes 102522 (102.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 934 bytes 102522 (102.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
      inet 192.168.23.26 netmask 255.255.255.0 broadcast 192.168.23.255
        inet6 fe80::3e9f:1e5d:a5bc:6dea prefixlen 64 scopeid 0x20<link>
          inet6 2401:4900:22dc:5e2:91ef:d5fe:d939:8cb4 prefixlen 64 scopeid 0x0<global>
          inet6 2401:4900:22dc:5e2:6fec:eed8:f8ef:c79b prefixlen 64 scopeid 0x0<global>
            ether 20:4e:f6:6f:ba:8d txqueuelen 1000 (Ethernet)
              RX packets 4047 bytes 2989136 (2.9 MB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 4144 bytes 637690 (637.6 KB)
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Iface	MTU	RX-OK	RX-ERR	RX-DRP	RX-OVR	TX-OK	TX-ERR	TX-DRP	TX-OVR	Flg
eno1	1500	0	0	0	0	0	0	0	0	BMU
lo	65536	934	0	0	0	934	0	0	0	LRU
wlo1	1500	4052	0	0	0	4149	0	0	0	BMRU

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ ifconfig -a
eno1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
      ether 6c:02:e0:15:72:f8 txqueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 B)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
      inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 934 bytes 102522 (102.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 934 bytes 102522 (102.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
      inet 192.168.23.26 netmask 255.255.255.0 broadcast 192.168.23.255
        inet6 fe80::3e9f:1e5d:a5bc:6dea prefixlen 64 scopeid 0x20<link>
          inet6 2401:4900:22dc:5e2:91ef:d5fe:d939:8cb4 prefixlen 64 scopeid 0x0<global>
          inet6 2401:4900:22dc:5e2:6fec:eed8:f8ef:c79b prefixlen 64 scopeid 0x0<global>
            ether 20:4e:f6:6f:ba:8d txqueuelen 1000 (Ethernet)
              RX packets 4058 bytes 2990602 (2.9 MB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 4155 bytes 639048 (639.0 KB)
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Netstat:

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 soja-HP-250-G7-No:48078  ec2-44-226-241-1.:https ESTABLISHED
tcp6     0      0 soja-HP-250-G7-No:60814  whatsapp-cdn6-shv:https ESTABLISHED
udp      0      0 soja-HP-250-G7-N:bootpc _gateway:bootps      ESTABLISHED
Active UNIX domain sockets (w/o servers)
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 192.168.23.26:48078       44.226.241.1:443   ESTABLISHED
tcp6     0      0 2401:4900:22dc:5e:60814  2a03:2880:f268:c1:f:443 ESTABLISHED
udp      0      0 192.168.23.26:68        192.168.23.105:67   ESTABLISHED
Active UNIX domain sockets (w/o servers)
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 192.168.23.26:48078       44.226.241.1:443   ESTABLISHED
tcp6     0      0 2401:4900:22dc:5e:60814  2a03:2880:f268:c1:f:443 ESTABLISHED
udp      0      0 192.168.23.26:68        192.168.23.105:67   ESTABLISHED
Active UNIX domain sockets (w/o servers)
```

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 localhost:domain          0.0.0.0:*
tcp      0      0 localhost:ipp            0.0.0.0:*
tcp      0      0 localhost:mysql          0.0.0.0:*
tcp      0      0 soja-HP-250-G7-No:48078  ec2-44-226-241-1.:https ESTABLISHED
tcp6     0      0 [::]:http              [::]:*
tcp6     0      0 ip6-localhost:ipp        [::]:*
tcp6     0      0 soja-HP-250-G7-No:60814  whatsapp-cdn6-shv:https ESTABLISHED
udp      0      0 0.0.0.0:631            0.0.0.0:*
udp      0      0 0.0.0.0:mdns           0.0.0.0:*
udp      0      0 localhost:domain          0.0.0.0:*
udp      0      0 soja-HP-250-G7-N:bootpc _gateway:bootps      ESTABLISHED
udp      0      0 0.0.0.0:49499          0.0.0.0:*
udp6     0      0 [::]:46171             [::]:*
udp6     0      0 [::]:mdns              [::]:*
raw6    0      0 [::]:ipv6-icmp          [::]:*
Active UNIX domain sockets (servers and established)
```

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

i. ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses. Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP - A command.

```
C:\Users\sojas>arp -a

Interface: 192.168.56.1 --- 0x7
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff      stat
  224.0.0.22             01-00-5e-00-00-16      stat
  224.0.0.251            01-00-5e-00-00-fb      stat
  224.0.0.252            01-00-5e-00-00-fc      stat
  239.255.255.250        01-00-5e-7f-ff-fa      stat

Interface: 192.168.235.26 --- 0x9
  Internet Address      Physical Address      Type
  192.168.235.48         16-b4-85-1a-34-2b      dyna
  192.168.235.255        ff-ff-ff-ff-ff-ff      stat
  224.0.0.22             01-00-5e-00-00-16      stat
  224.0.0.251            01-00-5e-00-00-fb      stat
  224.0.0.252            01-00-5e-00-00-fc      stat
  239.255.255.250        01-00-5e-7f-ff-fa      stat
```

ii. NbtStat

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the NetBIOS name.

Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

```
C:\Users\sojas>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server    = 0
Registered By Broadcast   = 251
```

iii. Hostname

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

```
C:\Users\sojas>hostname  
LAPTOP-VL4G9H1M
```

iv. PathPing

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

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

```
C:\Users\sojas>pathping www.google.com  
  
Tracing route to www.google.com [2404:6800:4009:825::2004]  
over a maximum of 30 hops:  
  0  LAPTOP-VL4G9H1M [2401:4900:32fc:169a:a04a:fade:2ae3:7ccb]  
  1  2401:4900:32fc:169a::ae  
  2  *          *          *  
Computing statistics for 25 seconds...  
      Source to Here  This Node/Link  
Hop  RTT     Lost/Sent = Pct Lost/Sent = Pct Address  
  0           LAPTOP-VL4G9H1M [2401:4900:32fc:169a:a04a:fade:2ae3:7ccb]  
          0/ 100 =  0% |  
  1    2ms     0/ 100 =  0%   0/ 100 =  0% 2401:4900:32fc:169a::ae  
  
Trace complete.
```

v. getmac Command

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

```
C:\Users\sojas>getmac  
  
Physical Address      Transport Name  
=====|=====|=====|=====|=====|  
20-4E-F6-6F-BA-8D  \Device\Tcpip_{832308FB-17E3-4F2B-B112-9BB3A6AB8E70}  
6C-02-E0-15-72-F8  Media disconnected  
20-4E-F6-6F-BA-8C  Media disconnected  
00-FF-55-31-BF-CD  Media disconnected  
0A-00-27-00-00-07  \Device\Tcpip_{3BBD5802-AA8E-4B25-B625-46D849CA81E4}  
  
C:\Users\sojas>
```

The name LAMP is an acronym of the following programs:Linux Operating

System

Apache HTTP Server

MySQL database management systemPHP
programming language

1. Installation of Apache Server.

Command:

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

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

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

```
sudo service apache2 status
```

```
soja@soja-HP-250-G7-Notebook-PC: ~ $ sudo systemctl status apache2
[sudo] password for soja:
● apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2021-09-29 17:43:49 IST; 5h 5min left
    Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 794 (apache2)
     Tasks: 6 (limit: 4375)
    Memory: 19.4M
      CGroup: /system.slice/apache2.service
          ├─794 /usr/sbin/apache2 -k start
          ├─810 /usr/sbin/apache2 -k start
          ├─817 /usr/sbin/apache2 -k start
          ├─818 /usr/sbin/apache2 -k start
          ├─820 /usr/sbin/apache2 -k start
          └─822 /usr/sbin/apache2 -k start

Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC systemd[1]: starting The Apache HTTP Server...
Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC apache2[794]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to ...
Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC systemd[1]: Started The Apache HTTP Server.

● apache2@.service - Apache2 HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2@.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2021-09-29 17:43:49 IST; 5h 5min left
    Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 794 (apache2)
     Tasks: 6 (limit: 4375)
    Memory: 19.4M
      CGroup: /system.slice/apache2@.service
          ├─794 /usr/sbin/apache2 -k start
          ├─810 /usr/sbin/apache2 -k start
          ├─817 /usr/sbin/apache2 -k start
          ├─818 /usr/sbin/apache2 -k start
          ├─820 /usr/sbin/apache2 -k start
          └─822 /usr/sbin/apache2 -k start

Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC systemd[1]: Starting The Apache HTTP Server...
Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC apache2[794]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to ...
Sep 29 17:43:49 soja-HP-250-G7-Notebook-PC systemd[1]: Started The Apache HTTP Server.
```

2. Installation of MariaDB

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

```
sudo apt install mariadb-server mariadb-clientCheck
```

mariadb Installation

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

```

soja@soja-HP-250-G7-Notebook-PC: ~ $ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2021-09-29 17:43:50 IST; 5h 2min left
       Docs: man:mariadb(8)
             https://mariadb.com/kb/en/library/systemd/
    Main PID: 808 (mariadb)
      Status: "Taking your SQL requests now.."
        Tasks: 9 (limit: 4375)
       Memory: 101.0M
      Group: 'system.slice/mariadb.service'
         CPU: 4.888s /usr/bin/mariadb
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC mariadb[808]: 2021-09-29 17:43:50 0 [Note] Reading of all Master_Info entries: succeeded
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC mariadb[808]: 2021-09-29 17:43:50 0 [Note] Added new Master_Info entry '' to hash table
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC mariadb[808]: 2021-09-29 17:43:50 0 [Note] /usr/sbin/mariadb: ready for connections.
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC mariadb[808]: Version '10.5.12-MariaDB-0ubuntu21.04.1' socket: '/run/mysqld/mysqld.sock' port: 3306 Ubuntu 21.04
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC mariadb[808]: 2021-09-29 17:43:50 0 [Note] MariaDB server start complete.
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC /etc/mysql/debian-start[1027]: Upgrading MySQL tables, if necessary.
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC /etc/mysql/debian-start[1027]: Looking for 'mysql' as: /usr/bin/mysql
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC /etc/mysql/debian-start[1027]: Looking for 'mysqldump' as: /usr/bin/mysqldump
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC /etc/mysql/debian-start[1027]: The installation of MariaDB is already upgraded to 10.5.12-MariaDB, use --force if you still need to run mysql_upgrade
Sep 29 17:43:50 soja-HP-250-G7-Notebook-PC /etc/mysql/debian-start[1063]: Checking for insecure root accounts.
root@soja-HP-250-G7-Notebook-PC: ~ $ 

```

3. Install PHP

Command:

```
sudo apt install php libapache2-mod-php php-occache php-cli php-gdphp-curl  
php-mysql
```

Restart apache2

```
sudo systemctl restart apache2
```

check installation

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

4. Install phpmyadmin

Command:

```
sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl  
(It asks for webserver select apache2, select db-configuration and setpassword)
```

Restart apache2

```
sudo systemctl restart apache2
```

Check phpmyadmin

Open a browser

<http://localhost/phpmyadmin> username :

root

password : yourpassword



This screenshot shows the phpMyAdmin dashboard with several panels:

- General settings:** Includes 'Change password', 'Server connection collation' set to 'utf8mb4_unicode_ci', and a 'More settings' link.
- Appearance settings:** Includes 'Language' set to 'English', 'Theme' set to 'pinkorange', 'Font size' set to '82%', and a 'More settings' link.
- Database server:** Lists the following details:
 - Server: Localhost via UNIX socket
 - Server type: MariaDB
 - Server connection: SSL is not being used
 - Server version: 10.5.13-MariaDB-Ubuntu0.21.04.1 - Ubuntu 21.04
 - Protocol version: 10
 - User: admin@localhost
 - Server charset: UTF-8 Unicode (utf8mb4)
- Web server:** Lists the following details:
 - Apache/2.4.46 (Ubuntu)
 - Database client version: libmysql - mysqld 7.4.16
 - PHP extension: mysqli curl mbstring
 - PHP version: 7.4.16
- phpMyAdmin:** Lists the following information:
 - Version information: 4.9.7deb1
 - Documentation
 - Official Homepage
 - Contributors
 - Get support
 - List of changes
 - License

Ansible Installation

Step1:sudo apt-get install ansible

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ sudo apt install ansible
[sudo] password for soja:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-lib2to3 python3-libcloud python3-netaddr
  python3-ntlm-auth python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
  python-pyparsing-doc
The following NEW packages will be installed:
  ansible ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-libcloud python3-netaddr python3-ntlm-auth
  python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
The following packages will be upgraded:
  python3-lib2to3
1 upgraded, 21 newly installed, 0 to remove and 239 not upgraded.
Need to get 31.8 MB of archives.
After this operation, 275 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

Installation check

Step2:ansible –version

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ ansible --version
ansible 2.10.5
  config file = None
  configured module search path = ['/home/soja/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.9.4 (default, Apr  4 2021, 19:38:44) [GCC 10.2.1 20210401]
```

1.wc

- wc stands for word count.
- Used for counting purpose.
- It is used to find out number of lines, word count, byte and characters count in the file specified in the file arguments.
- #wc song1.txt

```
soja@soja-VirtualBox:~/Desktop$ wc song1.txt
 3 4 21 song1.txt
soja@soja-VirtualBox:~/Desktop$
```

2. tar

- The Linux ‘tar’ stands for tape archive, is used to create Archive and extract the Archive files
- Linux tar command to create compressed or uncompressed Archive files
- Options:
 - c : Creates Archive
 - x : Extract the archive
 - f : creates archive with given filename
 - t : displays or lists files in archived file
 - u : archives and adds to an existing archive file
 - v : Displays Verbose Information
 - A : Concatenates the archive files
 - z : zip, tells tar command that creates tar file using gzip
 - j : filter archive tar file using tbzip
 - W : Verify a archive file
 - r : update or add file or directory in already existed .tar file

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

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

- Extract an archive created with tar #mkdir backup #cd

```
backup#tar xf
```

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

```
soja@soja-VirtualBox:~/Desktop$ tar cf archive1.tar number.txt
soja@soja-VirtualBox:~/Desktop$ ls
archive1.tar  network  number.txt  song1.txt  v2.txt
soja@soja-VirtualBox:~/Desktop$
```

3. expr

- The expr command evaluates a given expression and displays its corresponding output. It is used for:
 - Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
 - Evaluating regular expressions, string operations like substring, length of strings etc.
 - Performing operations on variables inside a shell script
- ```
#expr 10 + 2
```

```
soja@soja-VirtualBox:~/Desktop$ expr 10 + 2
12
soja@soja-VirtualBox:~/Desktop$
```

#### 4. 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
```

#### 5. ssh

- ssh stands for “Secure Shell”.
- It is a protocol used to securely connect to a remote server/system.
- ssh is secure in the sense that it transfers the data in encrypted form between the host and the client.
- It transfers inputs from the client to the host and relays back the output. ssh runs at TCP/IP port 22.

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

```
soja@soja-VirtualBox:~/Desktop$ 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]
soja@soja-VirtualBox:~/Desktop$ ssh soja@soja-VirtualBox
ssh: connect to host soja-virtualbox port 22: Connection refused
soja@soja-VirtualBox:~/Desktop$
```

```

soja@soja-VirtualBox:~/Desktop$ 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]
soja@soja-VirtualBox:~/Desktop$ ssh soja@soja-VirtualBox
ssh: connect to host soja-virtualbox port 22: Connection refused
soja@soja-VirtualBox:~/Desktop$
```

6. 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:/pathSyntax:  
 scp [OPTION] [user@ ]SRC\_HOST:]file1 [user@ ]DEST\_HOST:]file2  
 \$scp /etc/yum.config /etc/hosts ServerX:/home/student  
 \$scpServerX:/etc/hostname /home/student
7. 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

```
soja@soja-VirtualBox:~/Desktop$ ssh soja@soja-VirtualBox
ssh: connect to host soja-virtualbox port 22: Connection refused
soja@soja-VirtualBox:~/Desktop$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/soja/.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:subJaz4Jdt7Qd/CIHrcbFsKhCfdFagkqUKrq/pqVFMg soja@soja-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
| |
| |
| |
| E . o |
| o.o = |
| o. +.S..+. |
| ...+ o++++=o |
| . +.++= +Bo |
| . o ==.oo.. |
|+=o. o*o |
+---[SHA256]---+
soja@soja-VirtualBox:~/Desktop$
```

#### 8. ssh-copy-id

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

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

Sudo apt install tcpdump

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ sudo apt update && sudo apt install tcpdump
[sudo] password for soja:
Get:1 http://security.ubuntu.com/ubuntu hirsute-security InRelease [110 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute InRelease [269 kB]
Hit:3 http://in.archive.ubuntu.com/ubuntu hirsute-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu hirsute-backports InRelease
Get:5 http://security.ubuntu.com/ubuntu hirsute-security/main amd64 DEP-11 Metadata [9,692 B]
Get:6 http://security.ubuntu.com/ubuntu hirsute-security/universe amd64 DEP-11 Metadata [5,664 B]
Fetched 395 kB in 3s (146 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
258 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
tcpdump is already the newest version (4.9.3-7).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 258 not upgraded.
```

## Sudo tcpdump

```
tcpdump: pcap_loop: The interface disappeared
90 packets captured
90 packets received by filter
0 packets dropped by kernel
```

Sudo tcpdump -d

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ sudo tcpdump -d
(000) ret #262144
```

Sudo tcpdump -c 5

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
Listening on us00, link-type EN10MB (Ethernet), capture size 202144 bytes
12:19:01.834267 IP6 soja-HP-250-G7-Notebook-PC.mdns > ff02::fb.mdns: 0 PTR? _pgpkey-hkp._tcp.local. (40)
12:19:01.834342 IP soja-HP-250-G7-Notebook-PC.mdns > 224.0.0.251.mdns: 0 PTR? _pgpkey-hkp._tcp.local. (40)
12:19:02.052893 IP _gateway.domain > soja-HP-250-G7-Notebook-PC.51592: 25872 NXDomain 0/1/0 (154)
12:19:02.054346 IP soja-HP-250-G7-Notebook-PC.48121 > _gateway.domain: 53635+ PTR? 1.5.2.3.5.9.2.e.8.2.a.d.c.a.a.8.f.1.4.6.c.8.f.4.0.0.9.4.1.0.4.2.ip6.arpa. (90)
5 packets captured
0 packets dropped by kernel
```

Sudo tcpdump -I enp2

```
soja@soja-HP-250-G7-Notebook-PC:~/Desktop$ sudo tcpdump -i enp2s0
tcpdump: enp2s0: No such device exists
(SIOCGIFHWADDR: No such device)
```

## Shell scripting

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

```
echo "enter details and view"echo
enter your name
read name
echo enter your college nameread
c
clear
echo Details you entered
echo Name:$name
echo College:$c
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 1.sh
enter details and view
enter your name
soja
enter your college name
Amal Jyothi college
```

```
Details you entered
Name:soja
College:Amal Jyothi college
user@user-VirtualBox:~$
```

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

```
echo "Display value of a variable" a=50
echo $a
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 2.sh
Display value of a variable
50
```

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

```
echo enter a number
read a
echo enter another number
read b
echo enter operation
echo "\n1.addition \n2.subtraction \n3.multiplication \n4.division"read op
case "$op" in
"1") echo "a+b=\"$((a+b))";;
"2") echo "a-b=\"$((a-b))";;
"3") echo "a*b=\"$((a*b))";;
"4") echo "a/b=\"$((a/b))";;esac
```

**OUTPUT:**

```
user@user-VirtualBox:~$ bash 3.sh
enter a number
7
enter another number
8
enter operation
\n1.addition \n2.subtraction \n3.multiplication \n4.division
2
a-b=-1
```

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

```
echo enter a number
read a
if [$a -eq 10];then
echo "number found"
else
echo "not found"fi
```

**OUTPUT:**

```
user@user-VirtualBox:~$ bash 4.sh
enter a number
9
not found
```

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

```
echo "Today is $(date)"
echo "calender:"
cal
```

### OUTPUT:

```
user@user-VirtualBox:~$ bash 5.sh
Today is Saturday 02 October 2021 05:53:45 PM IST
calender:
 October 2021
Su Mo Tu We Th Fr Sa
 1 2
 3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

## 6. Write a shell script to check a number is even or odd. #!/bin/bash

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

### OUTPUT:

```
user@user-VirtualBox:~$ bash 6.sh
enter a number
4
number is even
```

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

```
echo enter first number
read a
echo enter second number
read b
if [$a -gt $b];
```

```
echo "$a is larger" elif
[$b -gt $a];then
echo "$b is larger" else
echo "both are equal" fi
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 7.sh
enter first number
54
enter second number
34
54 is larger
```

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

```
s=0
for ((i=0;i<=10;i++))do
s=`expr $s + $i`
done
echo "sum of first 10 numbers=$s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 8.sh
sum of first 10 numbers=55
```

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

```
echo please enter your first number read a
echo please enter your second number read b
echo please enter your third number read c
echo please enter your fourth number read d
sum=$((a + b + c + d))
prod=$((a * b * c * d))
avg=$(echo $sum/4 | bc -l)
```

```
echo "the sum is:$sum echo
"the average is:$avg echo "the
product is:$prod
0 0 0 0
```

```
user@user-VirtualBox:~$ bash 9.sh
please enter your first number
1
please enter your second number
2
please enter your third number
3
please enter your fourth number
4
the sum is:10
the average is:2.500000000000000000000000
the product is:24
```

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

```
echo enter first number
read a
echo enter second number
read b
echo enter third number
read c
if [$a -lt $b];then
if [$a -lt $c];then
echo "$a is smallest"fi
elif [$b -lt $c];then
echo "$b is smallest"else
echo "$c is smallest";fi
```

## OUTPUT:

```
user@user-VirtualBox:~$ bash 10.sh
enter first number
5
enter second number
2
enter third number
6
2 is smallest
```

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

```
echo enter a number
read n
f=1
for ((i=2;i<=n;i++))do
f=$((f*i))
done
echo "factorial is $f"
```

**OUTPUT:**

```
user@user-VirtualBox:~$ bash 11.sh
enter a number
5
factorial is 120
```

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

```
echo enter a number
read n
rev=$(echo $n | rev)if [
$n -eq $rev]; then
echo "number is palindrome"
else
echo "number is not palindrome"fi
```

**OUTPUT:**

```
user@user-VirtualBox:~$ bash 12.sh
enter a number
1221
number is palindrome
```

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

```
echo enter size
read n
i=1
s=0
echo "enter numbers"
while [$i -le $n] do
read num
s=$((s+num))
i=$((i+1))
done
avg=$(echo $s/$n | bc -l)
echo "average is $avg"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 13.sh
enter size
5
enter numbers
6
7
8
9
4
average is 6.800000000000000000000000
```

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

```
echo enter a number
read n
s=0
while [$n -gt 0]do
mod=$((n%10))
s=$((s+mod))
n=$((n/10))
done
echo "sum of digit is $s"
```

OUTPUT:

```
user@user-VirtualBox:~$ bash 14.sh
enter a number
678
sum of digit is 21
```

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

```
echo enter year
read y
a=$((y%4))
b=$((y%100))
c=$((y%400))
if [$a -eq 0 -a $b -ne 0 -o $c -eq 0];then
echo "$y is leap year"else
echo "$y is leap year"fi
```

**OUTPUT:**

```
user@user-VirtualBox:~$ bash 15.sh
enter year
1994
1994 is leap year
```

# Assignment: Docker Installation

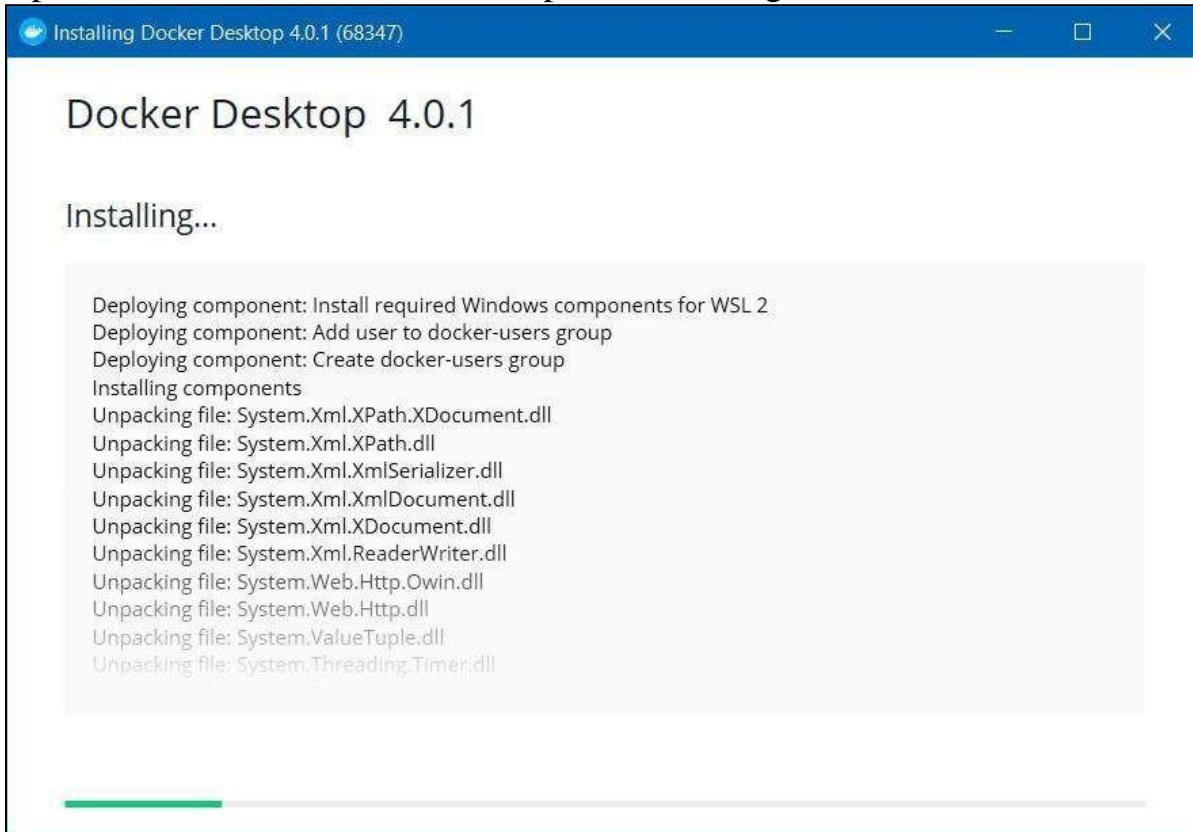
## Step-I

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



## Step-II

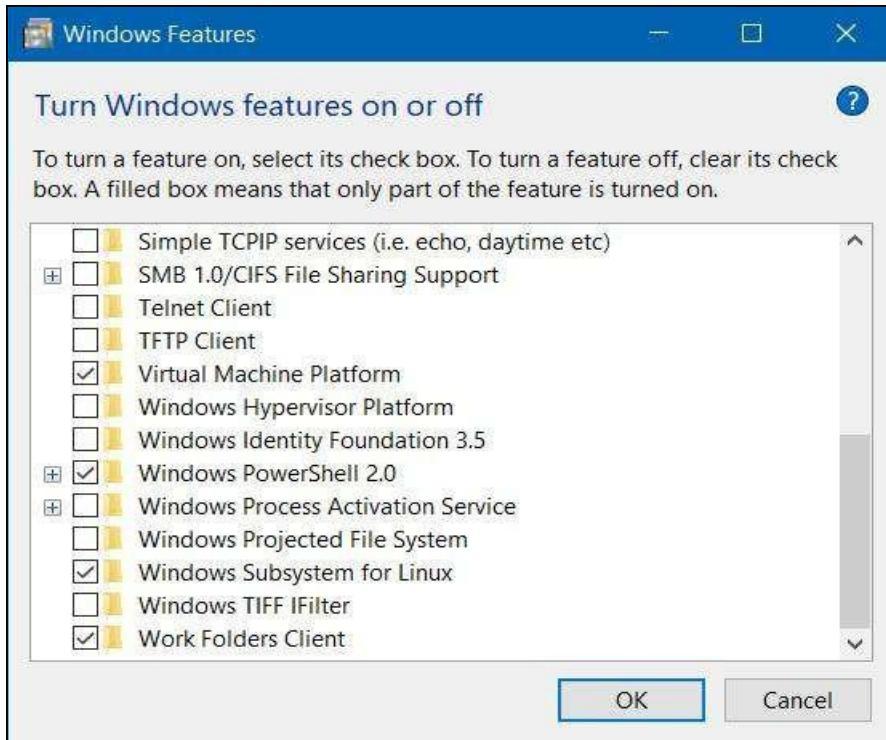
Open the .exe file and follow the steps after clicking install button.



## Step-III

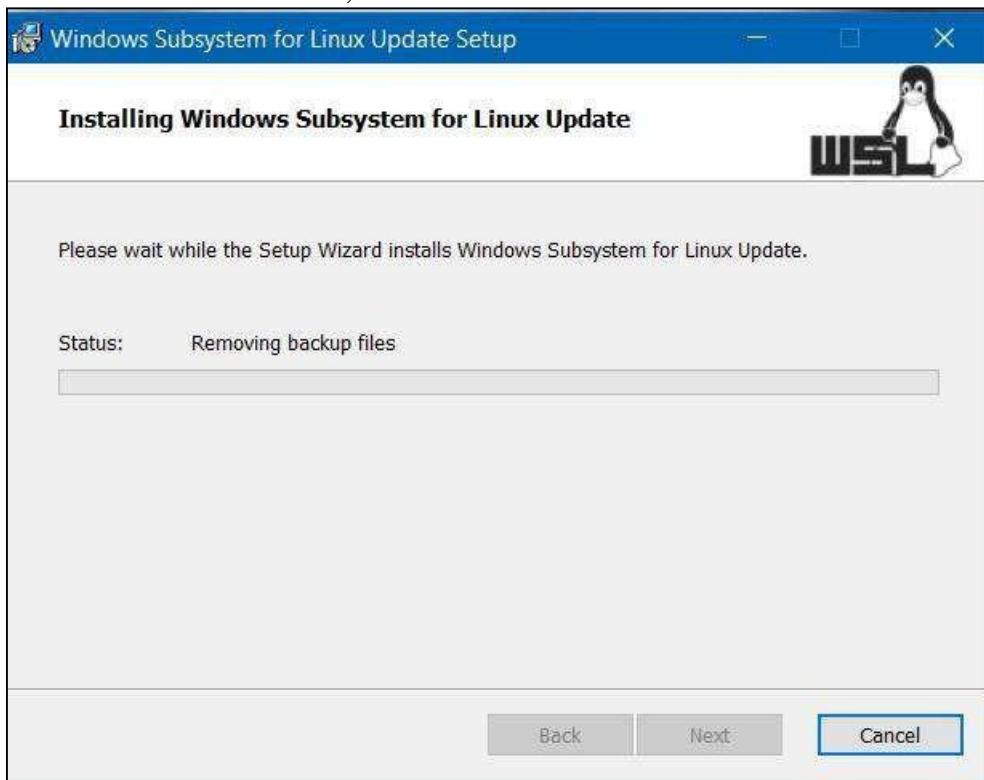
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



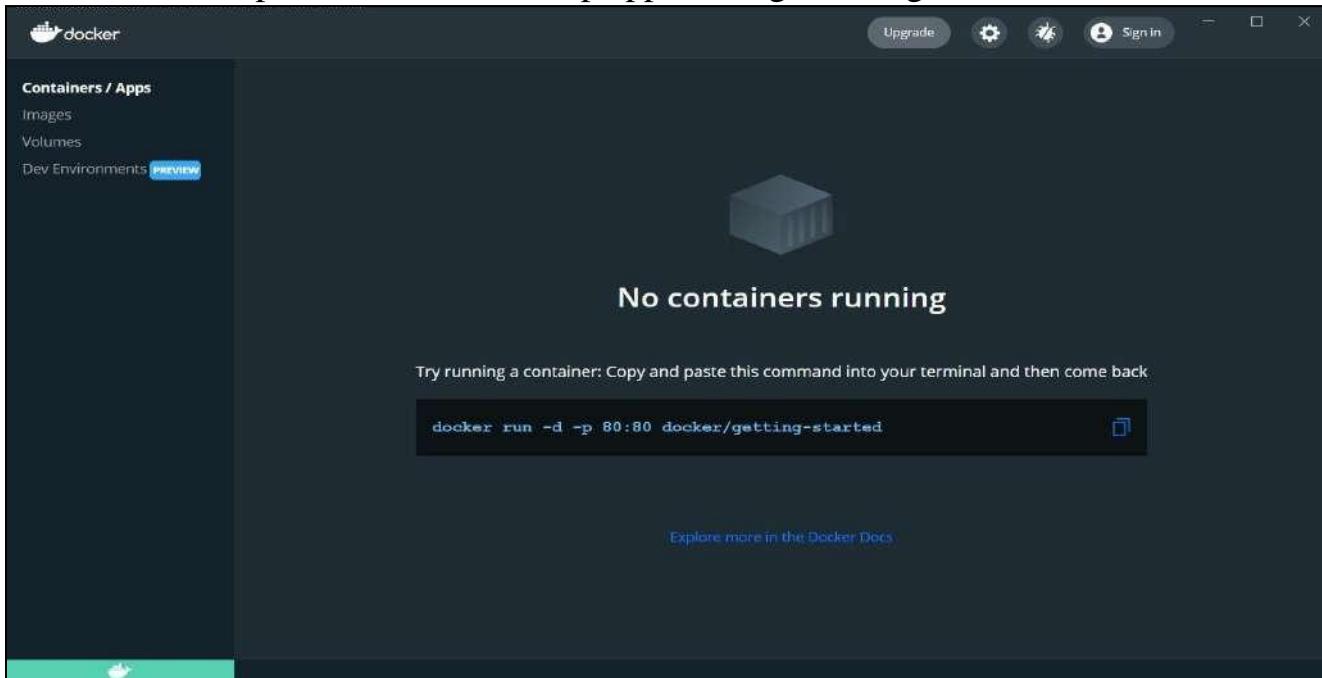
#### Step-IV

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).

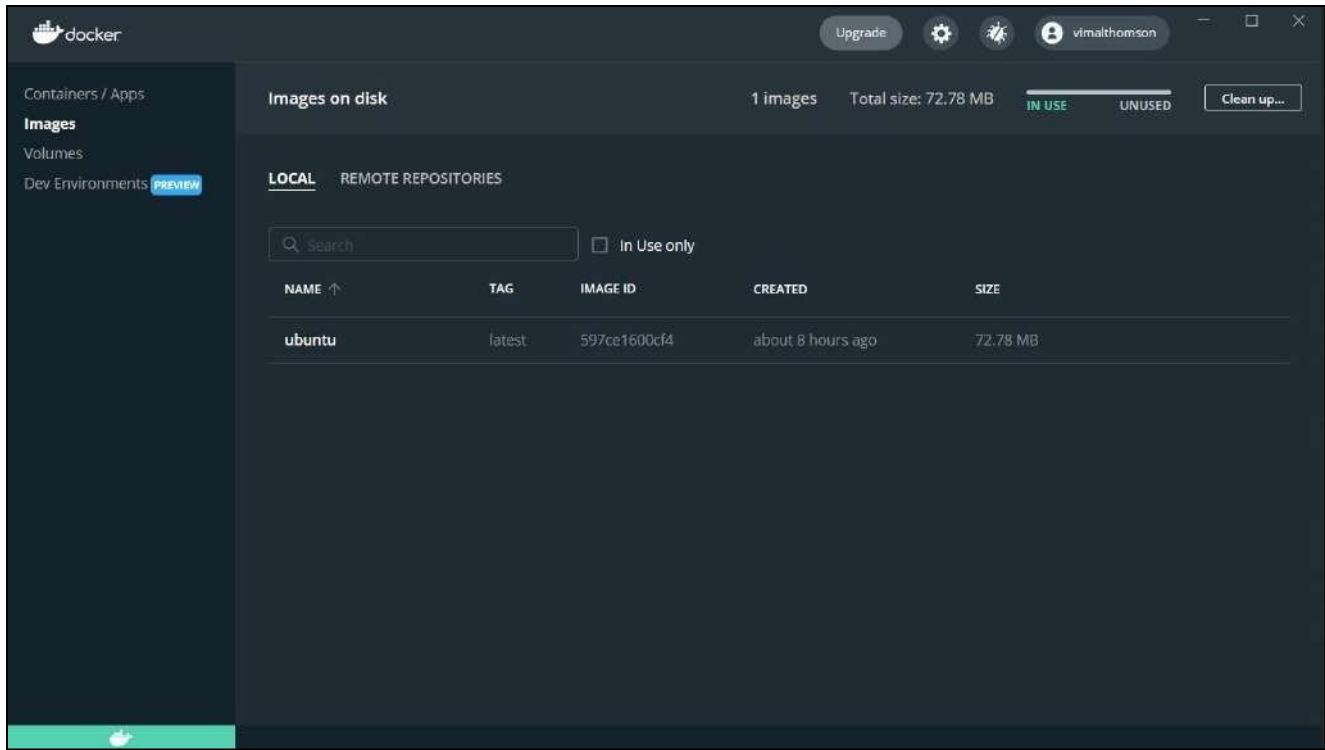
```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

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

C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:65de08a8daf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
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.



# Wireshark

- **sudo apt-get install wireshark**

- **sudo dpkg-reconfigure wireshark-common**

