

# **NETWORKING AND SYSTEM ADMINISTRATION LAB RECORD**

**Submitted By:**

**Sangeetha V Sebastian**

**RMCB-S2**

**RollNo:18**

1. Basic Linux Commands: Explain linux commands pwd, history, man, ls, cd, mkdir, rmdir, touch, rm, cat with examples.

### 1.PWD(print working directory)

It prints the path of the working directory, starting from the root. pwd is shell built-in command(pwd) or an actual binary(/bin/pwd).

\$PWD is an environment variable which stores the path of the current directory.

```
sangeetha@sangeetha-VirtualBox:~$ pwd  
/home/sangeetha
```

### 2.history To review the commands you have entered

```
sangeetha@sangeetha-VirtualBox:~$ history  
1 pwd  
2 history  
3 man man  
4 cd ..  
5 cd-  
6 cd_  
7 mkdir file1  
8 mkdir music  
9 cd  
10 mkdir music  
11 #history  
12 history  
13 #pwd  
14 #cd desktop  
15 3HISTORY  
16 #HISTORY  
17 HISTORY  
18
```

### 3.man – shows the manual instruction of the tail command. man man to start learning about man utility

```
MAN(1)                               Manual pager utils                               MAN(1)  
NAME  
man - an interface to the system reference manuals  
SYNOPSIS  
man [man options] [[section] page ...] ...  
man -k [apropos options] regexp ...  
man -K [man options] [section] term ...  
man -f [whatis options] page ...  
man -l [man options] file ...  
man -w|-W [man options] page ...  
DESCRIPTION  
man is the system's manual pager. Each page argument given to man is normally the name of a program, utility or function. The manual page associated with each of these arguments is then found and displayed. A section, if provided, will direct man to look only in that section of the manual. The default action is to search in all of the available sections following a pre-defined order (see DEFAULTS), and to show only the first page found, even if page exists in several sections.  
The table below shows the section numbers of the manual followed by the types of pages they contain.  
1 Executable programs or shell commands  
2 System calls (functions provided by the kernel)  
Manual page man(1) line 1 (press h for help or q to quit)
```

#### 4).cd

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

```
sangeetha@sangeetha-VirtualBox:~$ cd desktop
bash: cd: desktop: No such file or directory
sangeetha@sangeetha-VirtualBox:~$ cd Desktop
sangeetha@sangeetha-VirtualBox:~/Desktop$ cd ..
sangeetha@sangeetha-VirtualBox:~/Desktop$ cd Desktop
sangeetha@sangeetha-VirtualBox:~/Desktop$ cd -
/home/sangeetha
```

#### 5. ls –

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

```
sangeetha@sangeetha-VirtualBox:~$ ls
Desktop  Downloads  Music  Public  Videos
Documents  music      Pictures  Templates
sangeetha@sangeetha-VirtualBox:~$ ls -R
.:
Desktop  Downloads  Music  Public  Videos
Documents  music      Pictures  Templates

./Desktop:
mcab

./Desktop/mcab:
2020

./Desktop/mcab/2020:
newfile

./Desktop/mcab/2020/newfile:

./Documents:
```

```
sangeetha@sangeetha-VirtualBox:~$ ls -l
total 36
drwxr-xr-x 3 sangeetha sangeetha 4096 Jun 15 08:26 Desktop
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Documents
```

```
sangeetha@sangeetha-VirtualBox:~$ ls -l
total 36
drwxr-xr-x 3 sangeetha sangeetha 4096 Jun 15 08:26 Desktop
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Documents
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Downloads
drwxrwxr-x 2 sangeetha sangeetha 4096 Jun 15 08:13 music
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Music
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun 14 21:39 Pictures
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Public
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Templates
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun  8 12:50 Videos
sangeetha@sangeetha-VirtualBox:~$ ls -a
.           .bashrc  Documents  music      Public
..          .cache   Downloads  Music       .ssh
.bash_history .config  .gnupg    Pictures   Templates
.bash_logout  Desktop  .local    .profile  Videos
sangeetha@sangeetha-VirtualBox:~$ ls -al
total 80
drwxr-x--- 16 sangeetha sangeetha 4096 Jun 15 08:13 .
drwxr-xr-x  3 root     root      4096 Jun  8 12:47 ..
-rw-------  1 sangeetha sangeetha 286 Jun 15 08:29 .bash_history
-rw-r--r--  1 sangeetha sangeetha 220 Jun  8 12:47 .bash_logout
-rw-r--r--  1 sangeetha sangeetha 3771 Jun  8 12:47 .bashrc
drwx----- 11 sangeetha sangeetha 4096 Jun 14 21:36 .cache
drwx----- 10 sangeetha sangeetha 4096 Jun 15 08:28 .config
```

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

```
sangeetha@sangeetha-VirtualBox:~$ mkdir mca22
sangeetha@sangeetha-VirtualBox:~$ mkdir -p mca22/2022/file1
```

7. **rmdir** to delete a directory.(only allows you to delete empty directories)

```
sangeetha@sangeetha-VirtualBox:~$ rmdir/mca22/2022/file1
```

8. **touch** to create a blank new file

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

```
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ rm lab
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat>file3
```

## 10. cat -

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

```
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat>file3
hello
hai
^C
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat>file4.txt
world
all
^C
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file3 file4.txt>file5.txt
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file5.txt
hello
hai
world
all
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file5.txt | tr a-z A-Z>output.txt
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file5.txt | tr a-z A-Z>file5.txt
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file5.txt
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat file3
sangeetha@sangeetha-VirtualBox:~/Desktop/mcab$ cat >>myfile
update
insert
^C
```

2. Basic Linux Commands: Explain linux commands echo, head, tail, read, more, less, cut, paste, uname, cp, mv, locate, find, grep, df, du, useradd, userdel, sudo, passwd with examples.

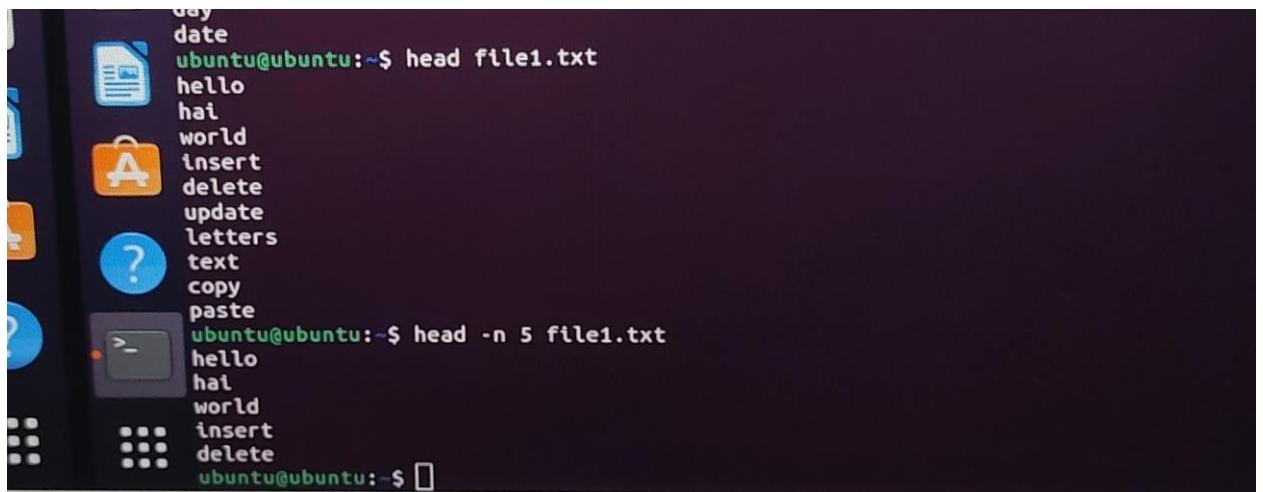
### 1. Echo

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

```
ubuntu@ubuntu:~$ echo hello world
hello world
ubuntu@ubuntu:~$ var="mark"
ubuntu@ubuntu:~$ echo $var
mark
ubuntu@ubuntu:~$ x=10
ubuntu@ubuntu:~$ echo "the value of x is $x"
the value of x is 10
ubuntu@ubuntu:~$ 
```

### 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

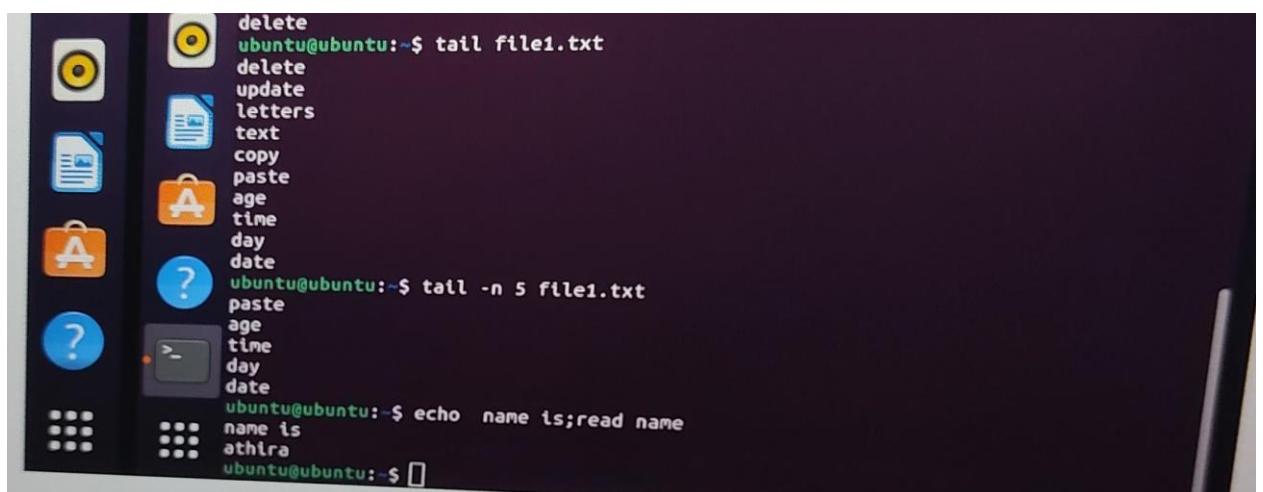


```
day  
date  
ubuntu@ubuntu:~$ head file1.txt  
hello  
hai  
world  
insert  
delete  
update  
letters  
text  
copy  
paste  
ubuntu@ubuntu:~$ head -n 5 file1.txt  
hello  
hai  
world  
insert  
delete  
ubuntu@ubuntu:~$ 
```

### 3. Tail

- This one has a similar function to the head command, but instead of showing the

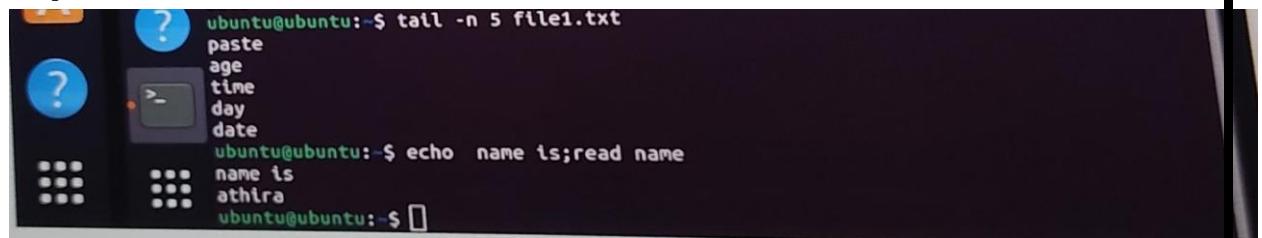
First lines, the tail command will display the last ten lines of a text file.



```
delete  
ubuntu@ubuntu:~$ tail file1.txt  
delete  
update  
letters  
text  
copy  
paste  
age  
time  
day  
date  
ubuntu@ubuntu:~$ tail -n 5 file1.txt  
paste  
age  
time  
day  
date  
ubuntu@ubuntu: $ echo name is;read name  
name is  
athira  
ubuntu@ubuntu:~$ 
```

#### 4. Read

- read the contents of a line into a variable. The read command can be used with and without arguments read command is used to read [options] [name...]



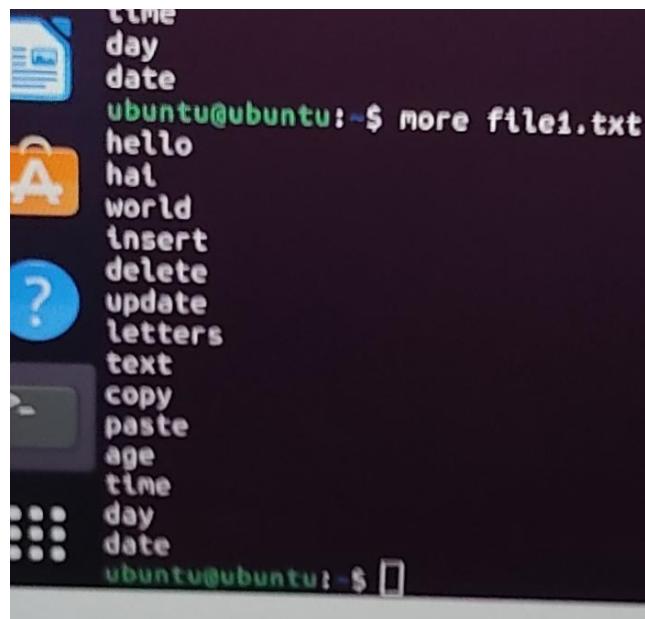
```
ubuntu@ubuntu:~$ tail -n 5 file1.txt
paste
age
time
day
date
ubuntu@ubuntu:~$ echo name is;read name
name is
athira
ubuntu@ubuntu:~$ 
```

A screenshot of a terminal window on an Ubuntu system. The window title bar shows a question mark icon and the text 'tail'. The terminal itself displays the output of the 'tail' command followed by the execution of an 'echo' command and a 'read' command to capture user input.

#### 5. More

- Like cat command, more command displays the content of a file. Only difference is

That, in case of larger files, 'cat' command output will scroll off your screen while



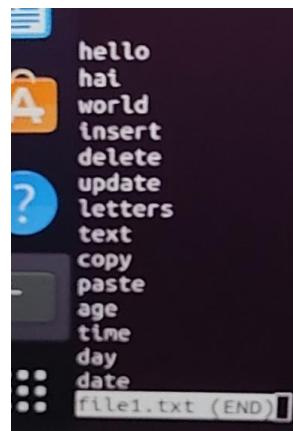
```
time
day
date
ubuntu@ubuntu:~$ more file1.txt
hello
hai
world
insert
delete
update
letters
text
copy
paste
age
time
day
date
ubuntu@ubuntu:~$ 
```

A screenshot of a terminal window on an Ubuntu system. The window title bar shows a question mark icon and the text 'more'. The terminal displays the content of the 'file1.txt' file using the 'more' command, which allows the user to page through the text.

'more' command displays output one screenful at a time.

## 6. Less

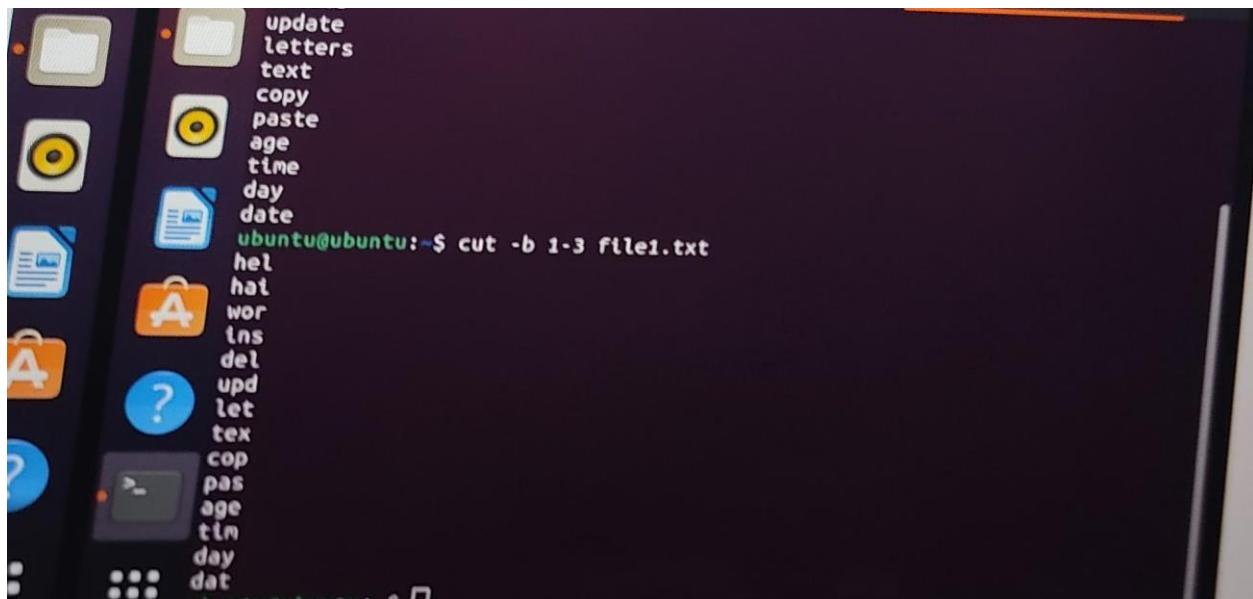
- The ‘less’ command is same as ‘more’ command but include some more features
- It automatically adjust with the width and height of the terminal window,



while ‘more’

## 7. Cut

- The cut command is used for cutting out the sections from each line of files and writing



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

```
update  
letters  
text  
copy  
paste  
age  
time  
day  
date  
ubuntu@ubuntu:~$ cut -b 1-3 file1.txt  
hel  
hai  
wor  
ins  
del  
upd  
let  
tex  
cop  
pas  
age  
tim  
day  
dat
```

The result to standard output. It can be used to cut parts of a line by byte position,

#### Character and field

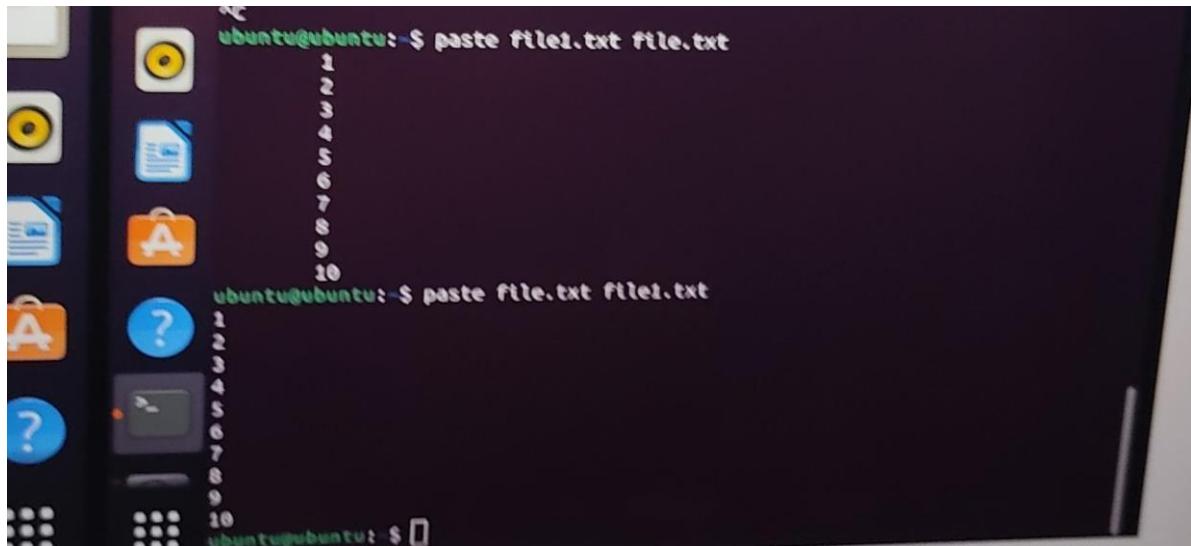
#### 8. paste

- 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



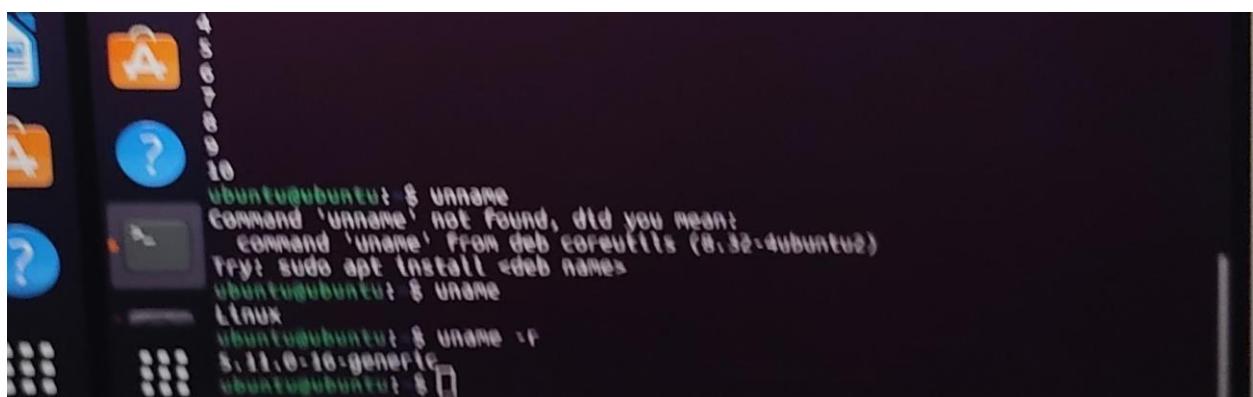
A screenshot of a Ubuntu desktop environment. On the left, there's a dock with various icons. In the center, a terminal window is open with the following text:

```
ubuntu@ubuntu:~$ paste file1.txt file2.txt
1
2
3
4
5
6
7
8
9
10
ubuntu@ubuntu:~$ paste file1.txt file2.txt
1
2
3
4
5
6
7
8
9
10
ubuntu@ubuntu:~$
```

your Linux system like the machine name, operating system, kernel, and so on.

- \$uname

- \$uname -r



A screenshot of a Ubuntu desktop environment. On the left, there's a dock with various icons. In the center, a terminal window is open with the following text:

```
ubuntu@ubuntu:~$ uname
Command 'uname' not found, did you mean:
  command 'uname' from deb coreutils (0.32-2ubuntu2)
Try: sudo apt install <deb name>
ubuntu@ubuntu:~$ uname
Linux
ubuntu@ubuntu:~$ uname -r
3.11.0-16-generic
ubuntu@ubuntu:~$
```

## 10. cp

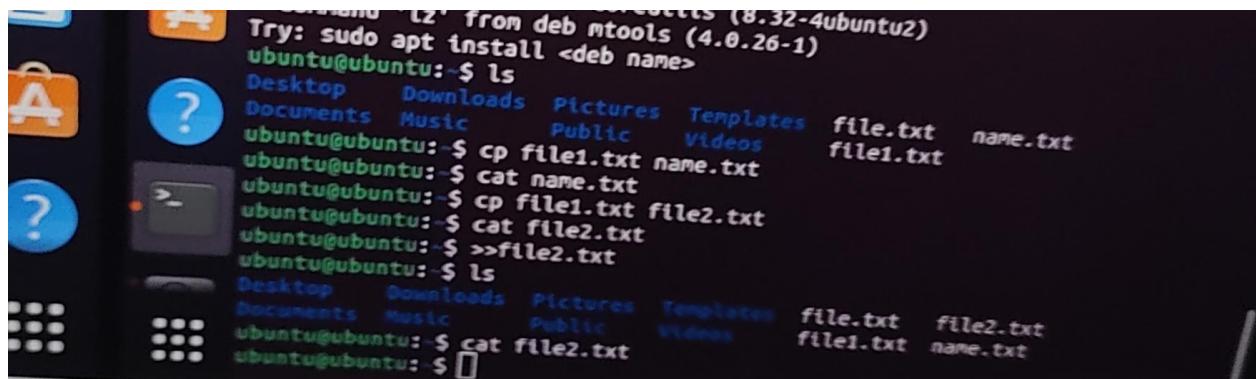
- cp command is used to copy files from the current directory to

A different directory. For instance, the command cp scenery.jpg

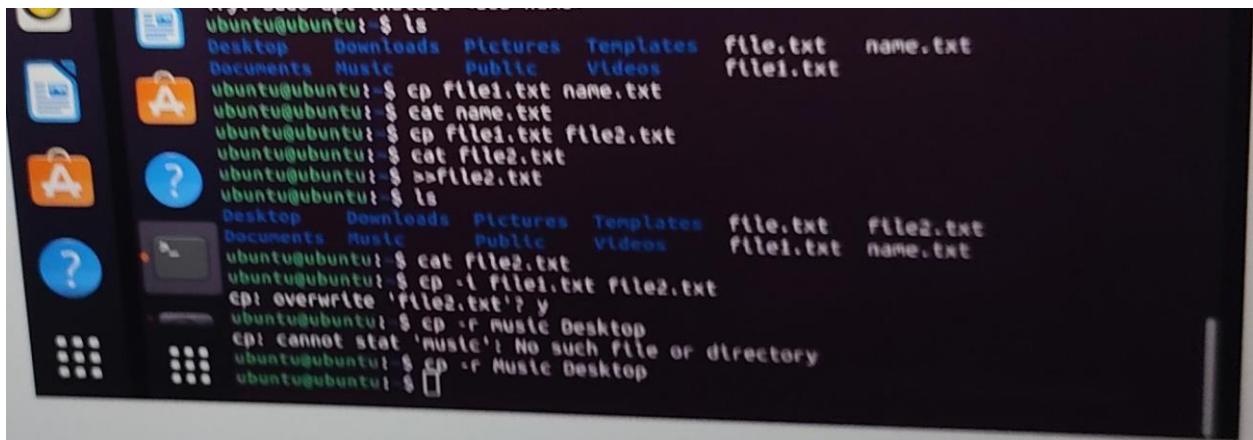
/home/username/Pictures would create a copy of scenery.jpg (from your current directory) into the Pictures directory.

- cp -I will ask for user's consent in case of a potential file overwrite.
- cp -p will preserve source files' mode, ownership and timestamp.
- cp -r will copy directories recursively.
- cp -u copies files only if the destination file is not existing or the source file is newer

Than the destination file.



```
Try: sudo apt install debmtools (8.32-4ubuntu2)
ubuntu@ubuntu:~$ ls
Desktop  Downloads  Pictures  Templates  file.txt  file1.txt  name.txt
Documents  Music  Public  Videos
ubuntu@ubuntu:~$ cp file1.txt name.txt
ubuntu@ubuntu:~$ cat name.txt
ubuntu@ubuntu:~$ cp file1.txt file2.txt
ubuntu@ubuntu:~$ cat file2.txt
ubuntu@ubuntu:~$ >>file2.txt
ubuntu@ubuntu:~$ ls
Desktop  Downloads  Pictures  Templates  file.txt  file2.txt
Documents  Music  Public  Videos  file1.txt  name.txt
ubuntu@ubuntu:~$ cat file2.txt
ubuntu@ubuntu:~$ 
```



```
ubuntu@ubuntu:~$ ls
Desktop  Downloads  Pictures  Templates  file1.txt  name.txt
Documents  Music  Public  Videos  file1.txt

ubuntu@ubuntu:~$ cp file1.txt name.txt
ubuntu@ubuntu:~$ cat name.txt
ubuntu@ubuntu:~$ cp file1.txt file2.txt
ubuntu@ubuntu:~$ cat file2.txt
ubuntu@ubuntu:~$ >>file2.txt
ubuntu@ubuntu:~$ ls
Desktop  Downloads  Pictures  Templates  file1.txt  file2.txt
Documents  Music  Public  Videos  file1.txt  name.txt
ubuntu@ubuntu:~$ cat file2.txt
ubuntu@ubuntu:~$ cp -l file1.txt file2.txt
cp: overwrite 'file2.txt'? y
ubuntu@ubuntu:~$ cp -r Music Desktop
cp: cannot stat 'music': No such file or directory
ubuntu@ubuntu:~$ cp -r Music Desktop
ubuntu@ubuntu:~$
```

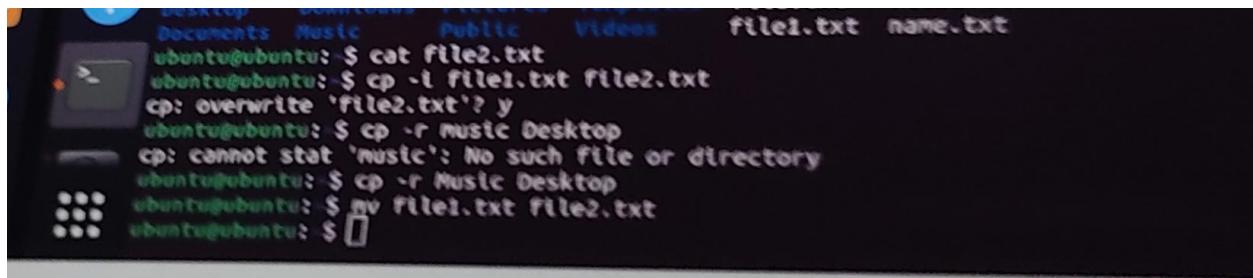
## 11. mv

- 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.

- mv file.txt /home/username/Documents
- To rename files, the Linux is mv oldname.ex



```
ubuntu@ubuntu:~$ cat file2.txt
ubuntu@ubuntu:~$ cp -l file1.txt file2.txt
cp: overwrite 'file2.txt'? y
ubuntu@ubuntu:~$ cp -r Music Desktop
cp: cannot stat 'music': No such file or directory
ubuntu@ubuntu:~$ cp -r Music Desktop
ubuntu@ubuntu:~$ mv file1.txt file2.txt
ubuntu@ubuntu:~$
```

## 12. locate

- To locate a file, just like the search command in Windows. • What's more, using the -i argument along with this command will make it case insensitive, so you can search for a file even if you don't remember its exact name.

```
ubuntubuntu:~$ locate Music
ubuntubuntu:~$ locate Music
/home/ubuntu/Music
/home/ubuntu/.icons/.cache/menus/Music
/home/ubuntu/.icons/.cache/menus/Music
/home/ubuntu/.icons/.cache/menus/Music
/home/ubuntu/.icons/.cache/menus/Music
/home/ubuntu/.icons/.cache/menus/Music
```

### 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.

```
ubuntubuntu:~$ touch file1.txt file2.txt file3.txt file4.txt
ubuntubuntu:~$ touch file1.txt file2.txt
ubuntubuntu:~$ find . -name file2.txt
./file2.txt
```

### 14. grep

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

```
ubuntubuntu:~$ ls
Desktop Documents Pictures Templates file.txt file2.txt file3.txt name.txt
Documents music Public Videos
ubuntubuntu:~$ cat>file1.txt
hat
hello
ubuntubuntu:~$ grep "hat" file1.txt
hat
```

### 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.

```
ubuntubuntu:~$ grep 'hat' file1.txt
hat
ubuntubuntu:~$ df
Filesystem      1K-blocks   Used   Available  Use%   Mounted on
tmpfs            511252    1992    509260  1% /run
tmpfs            2752674  2752674     0  100% /cdrom
/dev/sr0        2350244  92460  2350244  0% /
/cow           2350244     0  2350244  0% /dev/shm
tmpfs            5120      0    5112  1% /run/lock
tmpfs            4096      0    4096  0% /sys/fs/cgroup
tmpfs            2350244     0  2350244  0% /tmp
tmpfs            51248    108    511400  1% /run/user/1000
```

### 16. du

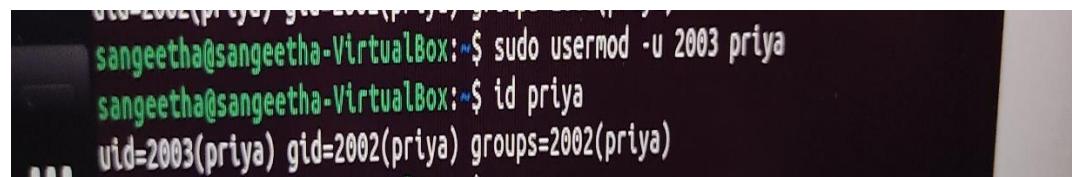
- If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer

```
sangeetha@sangeetha-VirtualBox:~$ du
4      ./Music
1788   ./Pictures
4      ./Templates
4      ./local/share/nano
4      ./local/share/sounds
4      ./local/share/evolution/addressbook/trash
4      ./local/share/evolution/addressbook/system/photos
92     ./local/share/evolution/addressbook/system
100    ./local/share/evolution/addressbook
4      ./local/share/evolution/tasks/trash
8      ./local/share/evolution/tasks/system
16     ./local/share/evolution/tasks
4      ./local/share/evolution/mail/trash
8      ./local/share/evolution/mail
4      ./local/share/evolution/calendar/trash
4      ./local/share/evolution/calendar/system
12     ./local/share/evolution/calendar
4      ./local/share/evolution/memos/trash
8      ./local/share/evolution/memos
148    ./local/share/evolution
12     ./local/share/keyrings
4      ./local/share/gnome-settings-daemon
148    ./local/share/gvfs-metadata
4      ./local/share/nautilus/scripts
```

## basic linux command part 3

### [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



```
sangeetha@sangeetha-VirtualBox:~$ sudo usermod -u 2003 priya
sangeetha@sangeetha-VirtualBox:~$ id priya
uid=2003(priya) gid=2002(priya) groups=2002(priya)
```

### [groupadd](#)

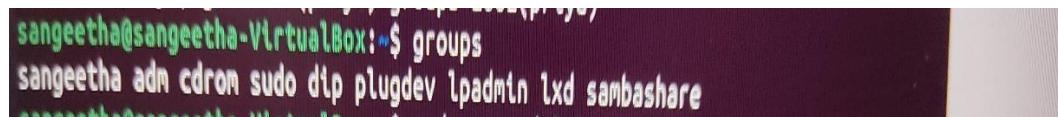
groupadd command creates a new group account using the values specified on the command line and the default values from the system.



```
sangeetha@sangeetha-VirtualBox:~$ sudo groupadd tly
```

### [groups –](#)

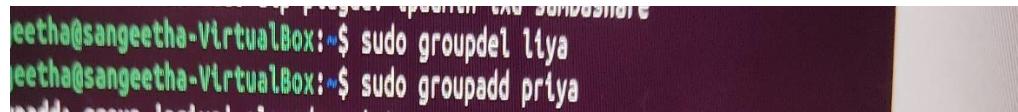
print the groups a user is in.



```
sangeetha@sangeetha-VirtualBox:~$ groups
sangeetha adm cdrom sudo dtp plugdev lpadmin lxd sambashare
```

## groupdel

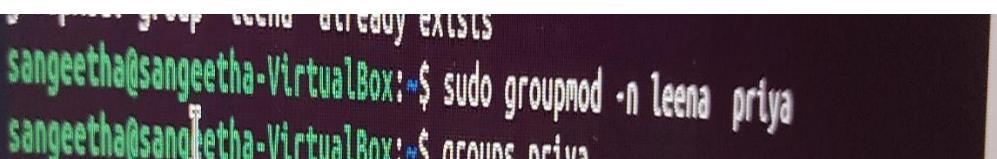
groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist



```
sangeetha@sangeetha-VirtualBox:~$ sudo groupdel liya
sangeetha@sangeetha-VirtualBox:~$ sudo groupadd priya
```

## groupmod

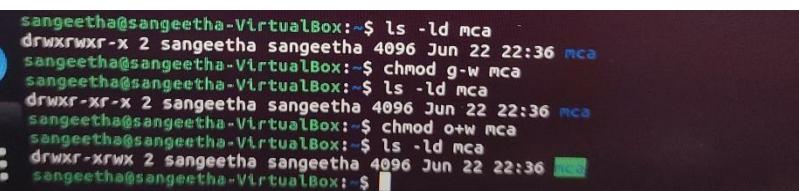
The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database.



```
sangeetha@sangeetha-VirtualBox:~$ sudo groupmod -n leena priya
sangeetha@sangeetha-VirtualBox:~$ groups priya
```

## chmod

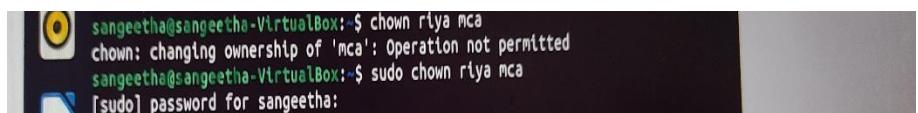
- To change directory permissions of file/ Directory in Linux. #chmod whowhatwhich file/directory
- chmod +rwx filename to add permissions.
- chmod -rwx directoryname to remove permissions.
- chmod +x filename to allow executable permissions.
- chmod -wx filename to take out write and executable permissions.



```
sangeetha@sangeetha-VirtualBox:~$ ls -ld mca
drwxrwxr-x 2 sangeetha sangeetha 4096 Jun 22 22:36 mca
sangeetha@sangeetha-VirtualBox:~$ chmod g-w mca
sangeetha@sangeetha-VirtualBox:~$ ls -ld mca
drwxr-xr-x 2 sangeetha sangeetha 4096 Jun 22 22:36 mca
sangeetha@sangeetha-VirtualBox:~$ chmod o+rw mca
sangeetha@sangeetha-VirtualBox:~$ ls -ld mca
drwxr-xrwx 2 sangeetha sangeetha 4096 Jun 22 22:36 mca
sangeetha@sangeetha-VirtualBox:~$
```

## chown

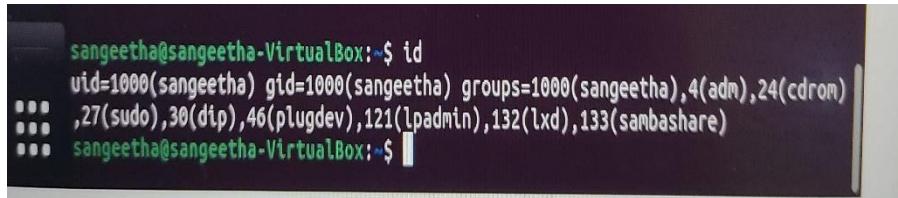
The chown command allows you to change the user and/or group ownership of a given file, directory



```
sangeetha@sangeetha-VirtualBox:~$ chown riya mca
chown: changing ownership of 'mca': Operation not permitted
sangeetha@sangeetha-VirtualBox:~$ sudo chown riya mca
[sudo] password for sangeetha:
```

## id

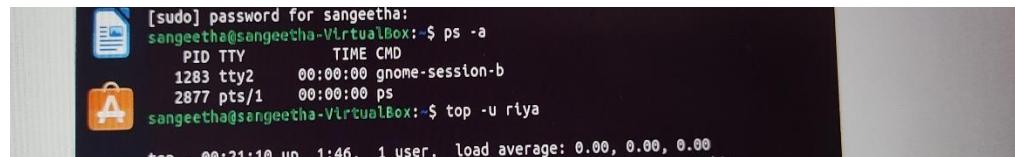
id command in Linux is used to find out user and group names and numeric ID's (UID or group ID) of the current user.



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

## ps

- The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system.
- PID – This is the unique process ID
- TTY – This is the type of terminal that the user is logged in to
- TIME – This is the time in minutes and seconds that the process has been running
- CMD – The command that launched the process



```
[sudo] password for sangeetha:  
sangeetha@sangeetha-VirtualBox:~$ ps -a  
PID TTY      TIME CMD  
1283 ttys2    00:00:00 gnome-session-b  
2877 pts/1    00:00:00 ps  
sangeetha@sangeetha-VirtualBox:~$ top -u riya  
top - 00:21:10 up 1:46, 1 user, load average: 0.00, 0.00, 0.00
```

## top

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

```
sangeetha@sangeetha-VirtualBox:~$ top
top - 14:58:22 up 13:40, 1 user, load average: 0.06, 0.02, 0.00
Tasks: 223 total, 1 running, 222 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.3 us, 0.4 sy, 0.0 ni, 98.0 id, 0.1 wa, 0.0 hi, 0.2 si, 0.0 st
MiB Mem : 4992.7 total, 588.3 free, 866.1 used, 3538.2 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 3809.4 avail Mem

 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
 1401 sangeet+ 20 0 5696116 396664 132912 S 5.6 7.8 15:43.35 gnome-
 42681 sangeet+ 20 0 411072 50192 38424 S 1.0 1.0 0:02.35 gnome-
 43029 sangeet+ 20 0 21548 4124 3340 R 0.7 0.1 0:00.03 top
 43016 root 20 0 0 0 0 I 0.3 0.0 0:00.02 kworker-
 43020 sangeet+ 20 0 21552 4068 3276 S 0.3 0.1 0:00.10 top
 1 root 20 0 167792 12452 7884 S 0.0 0.2 0:09.03 systemd
 2 root 20 0 0 0 0 S 0.0 0.0 0:00.04 kthrea-
 3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp
```

4.Basic Linux Commands: Explain linux commands wc, tar(create, extract using gzip, xz, bzip2), expr, redirections and piping, ssh, ssh-keygen, scp, ssh-copy-id with examples

#### 1. wc

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

```
^C
sangeetha@sangeetha-VirtualBox:~$ wc test.txt
wc: test.txt: No such file or directory
sangeetha@sangeetha-VirtualBox:~$ wc test.tx
 4 4 16 test.tx
sangeetha@sangeetha-VirtualBox:~$
```

#### 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  
#tarxf /home/meera/Documents/Meera\_Linux/archive.tar

```
sangeetha@sangeetha-VirtualBox:~/Desktop$ tar cf archive1.tar list
sangeetha@sangeetha-VirtualBox:~/Desktop$ ls
archive1.tar  list 'Old Firefox Data'
sangeetha@sangeetha-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

```
sangeetha@sangeetha-VirtualBox: $ expr 10 + 2
12
sangeetha@sangeetha-VirtualBox: $
```

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

```
sangeetha@sangeetha-VirtualBox:~$ cd Sample
sangeetha@sangeetha-VirtualBox:~/Sample$ ls -l | more
total 4
drwxrwxr-x 2 sangeetha sangeetha 4096 Oct  2 08:54 Trail
sangeetha@sangeetha-VirtualBox:~/Samples$
```

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>

```
sangeetha@sangeetha-VirtualBox:~$ ssh --help
unknown option -- -
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:
           [-E log_file] [-e escape_char] [-F configfile] [-I pk
           [-i identity_file] [-L [user@]host[:port]] [-l address]
```

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:/path Syntax:  
scp [OPTION] [user@]SRC\_HOST:]file1 [user@]DEST\_HOST:]file2

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

```
sangeetha@sangeetha-VirtualBox:~$ scp  
usage: scp [-346ABCpqrv] [-c cipher] [-F ssh_config] [-i identity_file]  
           [-J destination] [-l limit] [-o ssh_option] [-P port]  
           [-S program] source ... target
```

## 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

```
sangeetha@sangeetha-VirtualBox:~$ ssh-keygen  
Generating public/private rsa key pair.  
Enter file in which to save the key (/home/sangeetha/.ssh/id_rsa):  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in test  
Your public key has been saved in test.pub  
The key fingerprint is:  
SHA256:cahqX+8BVzaqpx06934zjv3IfXAcpDvEi6ci1N8SWLU sangeetha@sangeetha-VirtualBox  
The key's randomart image is:  
+---[RSA 3072]---+  
|  
| . E | .  
| o . = + |  
| . o + * . |  
| . S o + o.. |  
| . ..= + =. o |  
| o ..o.* = .o |  
| . ..oo* 0++ . |  
| ooo=Bo*+o. |
```

## 8. ssh-copy-id

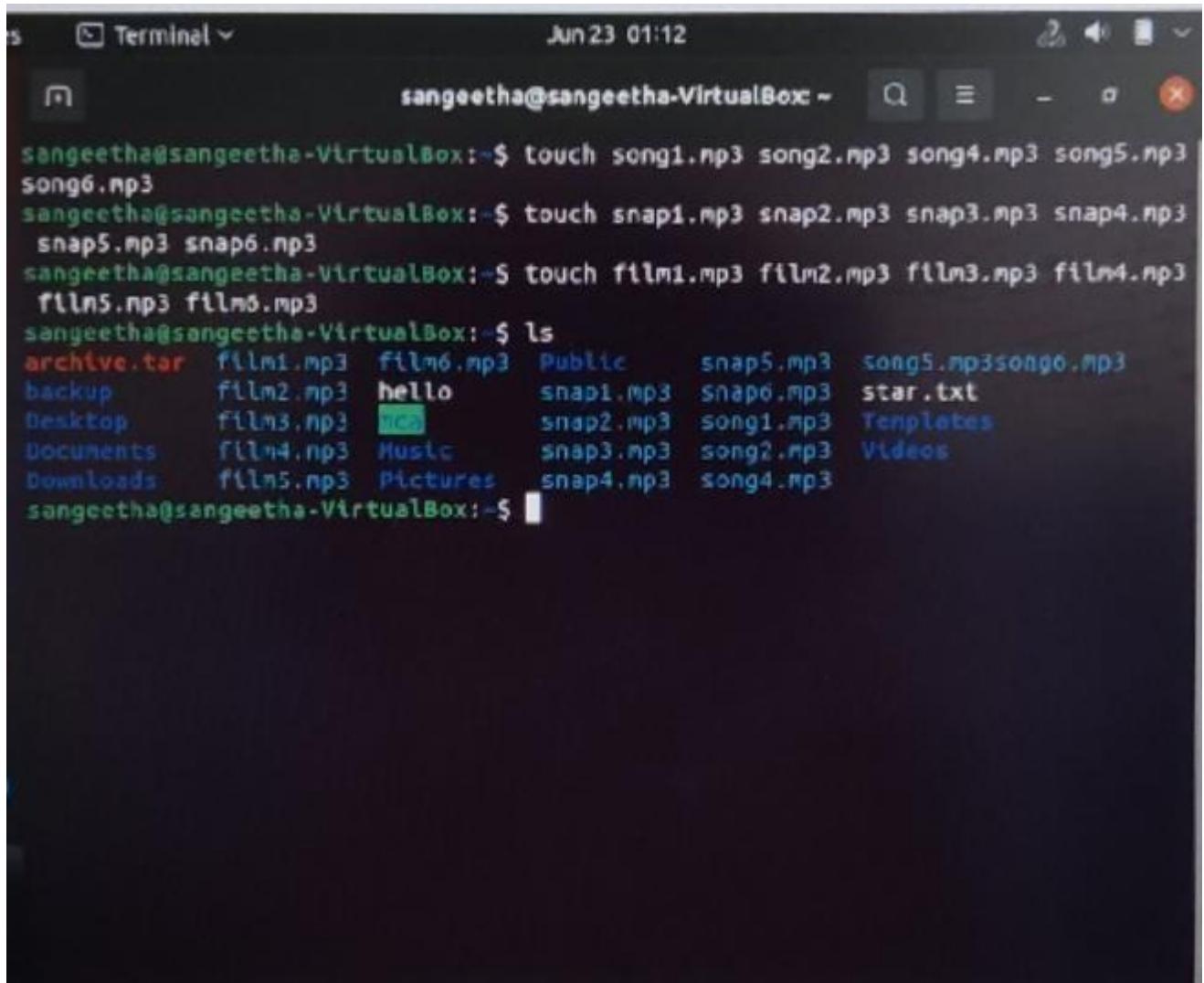
- The ssh-copy-id command allows you to install an SSH key on a remote server's authorized keys.
- This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

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

```
sangeetha@sangeetha-VirtualBox:~$ ssh-copy-id  
Usage: /usr/bin/ssh-copy-id [-h|-?|-f|-n] [-i [identity_file]] [-p port] [-F alternative_ssh_config_file] [[-o <ssh -o options>] ...] [user@]hostname  
      -f: force mode -- copy keys without trying to check if they are already  
      installed  
      -n: dry run -- no keys are actually copied  
      -h|-?: print this help
```

## 5.Managing Files, Creating Users and Groups Using Command-line tools

1. a. Create six files with name of the form songX.mp3
- b. Create six files with name of the form snapX.mp3
- c. Create six files with name of the form filmX.mp3



The screenshot shows a terminal window with the following command history:

```
sangeetha@sangeetha-VirtualBox ~$ touch song1.mp3 song2.mp3 song4.mp3 song5.mp3  
song6.mp3  
sangeetha@sangeetha-VirtualBox ~$ touch snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3  
snap5.mp3 snap6.mp3  
sangeetha@sangeetha-VirtualBox ~$ touch film1.mp3 film2.mp3 film3.mp3 film4.mp3  
film5.mp3 film6.mp3  
sangeetha@sangeetha-VirtualBox ~$ ls
```

The terminal lists the following files and directories:

File/Directory	File/Directory	File/Directory	File/Directory	File/Directory	File/Directory
archive.tar	film1.mp3	film6.mp3	Public	snap5.mp3	song5.mp3
backup	film2.mp3	hello	snapshot1.mp3	snap6.mp3	song6.mp3
Desktop	film3.mp3	ICQ	snapshot2.mp3	song1.mp3	Templates
Documents	film4.mp3	Music	snapshot3.mp3	song2.mp3	Videos
Downloads	film5.mp3	Pictures	snapshot4.mp3	song4.mp3	

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.

```

sangeetha@sangeetha-VirtualBox:~$ mv song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 ./Music/
sangeetha@sangeetha-VirtualBox:~$ ls
archive.tar  film1.mp3  film6.mp3  Public      snap5.mp3          Videos
backup       film2.mp3  hello      snap1.mp3  snap6.mp3
Desktop      film3.mp3  [red]     snap2.mp3  song5.mp3song6.mp3
Documents    film4.mp3  Music      snap3.mp3  star.txt
Downloads   film5.mp3  Pictures   snap4.mp3  Templates
sangeetha@sangeetha-VirtualBox:~$ ls -R Music
Music:
song1.mp3  song3.mp3  song5.mp3          song6.mp3
song2.mp3  song4.mp3  song5.mp3song6.mp3
sangeetha@sangeetha-VirtualBox:~$ mv snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3 ./picture/
mv: target './picture/' is not a directory
sangeetha@sangeetha-VirtualBox:~$ mv snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3 ./Pictures/
sangeetha@sangeetha-VirtualBox:~$ ls -R Pictures
Pictures:
snap1.mp3  snap2.mp3  snap3.mp3  snap4.mp3  snap5.mp3  snap6.mp3
sangeetha@sangeetha-VirtualBox:~$ mv film1.mp3 film2.mp3 film3.mp3 film4.mp3 film5.mp3 film6.mp3 ./Videos/
sangeetha@sangeetha-VirtualBox:~$ ls -R Videos
Videos:
film1.mp3  film2.mp3  film3.mp3  film4.mp3  film5.mp3  film6.mp3

```

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.

```

sangeetha@sangeetha-VirtualBox:~$ mkdir friends family work
sangeetha@sangeetha-VirtualBox:~$ ls
archive.tar  Documents  friends  [red]  music  songs.mp3song8.mp3  Videos
[red]         Downloads  Hello    Pictures  star.txt
Desktop      family     [red]     Public    Templates
sangeetha@sangeetha-VirtualBox:~$ 

```

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

```

Desktop      family  [red]  Public  Templates
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap6.mp3 family
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap5.mp3 family
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap4.mp3 family
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap3.mp3 family
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap2.mp3 family
sangeetha@sangeetha-VirtualBox:~$ cp Pictures/snap1.mp3 family
sangeetha@sangeetha-VirtualBox:~$ ls family
snap1.mp3  snap2.mp3  snap3.mp3  snap4.mp3  snap5.mp3  snap6.mp3
sangeetha@sangeetha-VirtualBox:~$ 

```

```
sangeetha@sangeetha-VirtualBox:~$ cp Music/song6.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ cp Music/song5.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ cp Music/song4.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ cp Music/song3.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ cp Music/song2.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ cp Music/song1.mp3 friends
sangeetha@sangeetha-VirtualBox:~$ ls friends
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
sangeetha@sangeetha-VirtualBox:~$
```

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

```
sangeetha@sangeetha-VirtualBox:~$ mkdir family friends
sangeetha@sangeetha-VirtualBox:~$ rmdir family friends
sangeetha@sangeetha-VirtualBox:~$ ls
archive.tar  Documents  Hello  Public  Templates
backup      Downloads  Music  song5.mp3  song6.mp3  Videos
Desktop     hello    Pictures  star.txt  work
```

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

```
sangeetha@sangeetha-VirtualBox:~$ rm -r family friends
rm: cannot remove 'family': No such file or directory
rm: cannot remove 'friends': No such file or directory
sangeetha@sangeetha-VirtualBox:~$
```

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.

```
sangeetha@sangeetha-VirtualBox:~$ ls -al > allfiles.txt
sangeetha@sangeetha-VirtualBox:~$ ls
allfiles.txt  Desktop  hello  Pictures          star.txt  work
archive.tar   Documents  Hello  Public           Templates
backup        Downloads  Music  song5.mp3  song6.mp3  Videos
sangeetha@sangeetha-VirtualBox:~$
```

```
sangeetha@sangeetha-VirtualBox:~$ cat allfiles.txt
total 108
drwxr-x--- 18 sangeetha sangeetha 4096 Jun 23 01:45 .
drwxr-xr-x  3 root    root    4096 Jun 22 22:32 ..
-rw-rw-r--  1 sangeetha sangeetha  0 Jun 23 01:45 allfiles.txt
-rw-rw-r--  1 sangeetha sangeetha 10240 Jun 23 00:53 archive.tar
drwxrwxr-x  2 sangeetha sangeetha 4096 Jun 23 00:54 backup
-rw-------  1 sangeetha sangeetha 1689 Jun 23 01:07 .bash_history
-rw-r--r--  1 sangeetha sangeetha  220 Jun 22 22:32 .bash_logout
-rw-r--r--  1 sangeetha sangeetha 3771 Jun 22 22:32 .bashrc
drwx----- 11 sangeetha sangeetha 4096 Jun 22 22:36 .cache
drwx----- 11 sangeetha sangeetha 4096 Jun 23 00:28 .config
drwxr-xr-x  2 sangeetha sangeetha 4096 Jun 22 22:35 Desktop
drwxr-xr-x  2 sangeetha sangeetha 4096 Jun 22 22:35 Documents
drwxr-xr-x  2 sangeetha sangeetha 4096 Jun 22 22:35 Downloads
drwx----- 2 sangeetha sangeetha 4096 Jun 22 22:36 .gnupg
-rw-rw-r--  1 sangeetha sangeetha  17 Jun 23 00:44 hello
```

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

```
sangeetha@sangeetha-VirtualBox:~$ date
Wednesday 23 June 2021 01:47:51 AM IST
sangeetha@sangeetha-VirtualBox:~$ █
```

- Add the user Juliet

```
sudo: useradd: command not found
sangeetha@sangeetha-VirtualBox:~$ sudo useradd juliet
sangeetha@sangeetha-VirtualBox:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
sangeetha:x:1000:1000:Sangeetha Sangeetha:/home/sangeetha:/usr/bin/ksh
```

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

```
sangeetha@sangeetha-VirtualBox:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
rc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
sangeetha@sangeetha-VirtualBox:~$
```

```
:x:126:131:Gnome Display Manager:/var/lib/gdm3:/bin/false
sangeetha:x:1000:1000:Sangeetha V Sebastian,,,,:/home/sangeetha:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
riya:x:2001:1001::/home/riya:/bin/sh
priya:x:2003:2004::/home/priya:/bin/sh
juliet:x:2004:2005::/home/juliet:/bin/sh
sangeetha@sangeetha-VirtualBox:~$
```

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

```
juliet:x:2004:2005::/home/juliet:/bin/sh
sangeetha@sangeetha-VirtualBox:~$ sudo passwd juliet
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
sangeetha@sangeetha-VirtualBox:~$
```

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

```
sangeetha@sangeetha-VirtualBox:~$ sudo groupadd -g 3000 shakespeare
sangeetha@sangeetha-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,sangeetha
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:sangeetha
floppy:x:25:
tape:x:26:
sudo:x:27:sangeetha
```

```
avahi-autoipd:x:117:
rtkit:x:118:
netdev:x:119:
avahi:x:120:
lpadmin:x:121:sangeetha
nm-openvpn:x:122:
whoopsie:x:123:
sssd:x:124:
scanner:x:125:saned
saned:x:126:
colord:x:127:
geoclue:x:128:
pulse:x:129:
pulse-access:x:130:
gdm:x:131:
lxd:x:132:sangeetha
sangeetha:x:1000:
sambashare:x:133:sangeetha
systemd-coredump:x:999:
priya:x:1001:priya
liya:x:2004:
teena:x:2003:
leena:x:2002:
juliet:x:2005:
shakespeare:x:3000:
sangeetha@sangeetha-VirtualBox:~$
```

12.Create a supplementary group called artists

13. Confirm that Sh

```
sangeetha@sangeetha-VirtualBox:~$ sudo groupadd artists
sangeetha@sangeetha-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,sangeetha
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
```

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

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

```
priya:x:2003:2004::/home/priya:/bin/sh
juliet:x:2004:2005::/home/juliet:/bin/sh
sangeetha@sangeetha-VirtualBox: $ id -u juliet
2004
sangeetha@sangeetha-VirtualBox: $ id -g juliet
2005
sangeetha@sangeetha-VirtualBox: $
```

16. Add Romeo and Hamlet to the Shakespeare group.

```
priya:x:2003:2004::/home/priya:/bin/sh
juliet:x:2004:2005::/home/juliet:/bin/sh
sangeetha@sangeetha-VirtualBox: $ id -u juliet
2004
sangeetha@sangeetha-VirtualBox: $ id -g juliet
2005
sangeetha@sangeetha-VirtualBox: $
```

18.Dolly and Elvis to the artists group

```
sangeetha@sangeetha-VirtualBox: ~ sangeetha@sangeetha-VirtualBox: ~ sangeetha@sangeetha-VirtualBox: ~
lubuntu password :[REDACTED]
usermod: user 'Romeo' does not exist
sangeetha@sangeetha-VirtualBox: $ sudo useradd Romeo
sangeetha@sangeetha-VirtualBox: $ sudo usermod -G shakespeare Romeo
sangeetha@sangeetha-VirtualBox: $ sudo usermod -G shakespeare juliet
sangeetha@sangeetha-VirtualBox: $ sudo usermod -G shakespeare Hamlet
sangeetha@sangeetha-VirtualBox: $ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,sangeetha
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
```

```
[sangeetha@sangeetha-VirtualBox: ~]$ cat /etc/group
liya:x:2004:
teena:x:2003:
leena:x:2002:
juliet:x:2005:
shakespheare:x:3000:juliet,Romeo,Hamlet
artists:x:3001:
Romeo:x:3002:
Hamlet:x:2000:
sangeetha@sangeetha-VirtualBox: ~$
```

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

```
[sangeetha@sangeetha-VirtualBox: ~]$ cat /etc/group
liya:x:2004:
teena:x:2003:
leena:x:2002:
juliet:x:2005:
shakespheare:x:3000:juliet,Romeo,Hamlet
artists:x:3001:
Romeo:x:3002:
Hamlet:x:2000:
sangeetha@sangeetha-VirtualBox: ~$
```

0

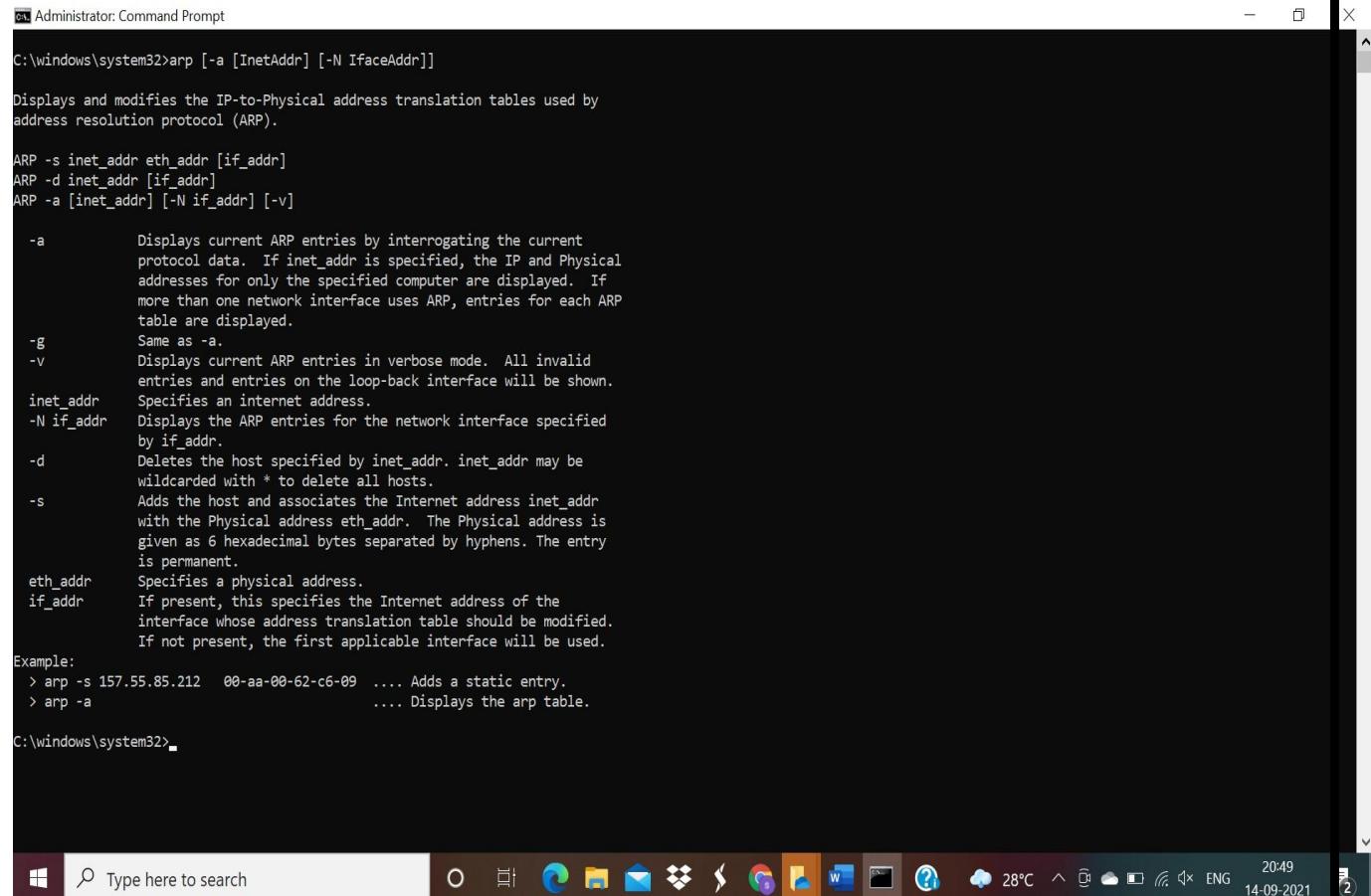
20. Attempt to remove user Dolly.

```
Dolly:x:2009:
Elvis:x:2010:
sangeetha@sangeetha-VirtualBox: ~$ sudo userdel Dolly
sangeetha@sangeetha-VirtualBox: ~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,sangeetha
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
saneetha@sangeetha-VirtualBox: ~$
```

6.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 . COs : CO2, BLs : Remembering,Understanding 2. Identify and perform 5 more network commands and it's working. COs : CO2, BLs : Remembering,Understanding

## Arp

Displays and modifies entries in the Address Resolution Protocol (ARP) cache, which contains one or more tables that are used to store IP addresses and their resolved Ethernet or Token Ring physical addresses. There is a separate table for each Ethernet or Token Ring network adapter installed on your computer. Used without parameters, arp displays help.



```
C:\Administrator: Command Prompt
C:\windows\system32>arp [-a [InetAddr] [-N IfaceAddr]]
Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

-a      Displays current ARP entries by interrogating the current
        protocol data. If inet_addr is specified, the IP and Physical
        addresses for only the specified computer are displayed. If
        more than one network interface uses ARP, entries for each ARP
        table are displayed.
-g      Same as -a.
-v      Displays current ARP entries in verbose mode. All invalid
        entries and entries on the loop-back interface will be shown.
inet_addr
-N if_addr
        Specifies an internet address.
        Displays the ARP entries for the network interface specified
        by if_addr.
-d      Deletes the host specified by inet_addr. inet_addr may be
        wildcarded with * to delete all hosts.
-s      Adds the host and associates the Internet address inet_addr
        with the Physical address eth_addr. The Physical address is
        given as 6 hexadecimal bytes separated by hyphens. The entry
        is permanent.
eth_addr
if_addr
        Specifies a physical address.
        If present, this specifies the Internet address of the
        interface whose address translation table should be modified.
        If not present, the first applicable interface will be used.

Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a                         .... Displays the arp table.

C:\windows\system32>
```

## Ipconfig

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without

parameters, ipconfig displays the IP address, subnet mask, and default gateway for all adapters.

```
C:\Administrator: Command Prompt
The operation failed as no adapter is in the state permissible for
this operation.

C:\windows\system32>ipconfig /all

Windows IP Configuration

Host Name . . . . . : LAPTOP-BVCVKAR3
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . :
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : 30-24-A9-7B-BE-04
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-0B
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::dd92:cc10:fb5:b13f%11(Preferred)
IPv4 Address . . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 785298471
DHCPv6 Client DUID. . . . . : 00-01-00-01-27-45-D4-96-30-24-A9-7B-BE-04
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                      fec0:0:0:ffff::2%1
                      fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

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

## Ping

Verifies IP-level connectivity to another TCP/IP computer by sending Internet Control Message Protocol (ICMP) Echo Request messages. The receipt of corresponding Echo Reply messages are displayed, along with round-trip times. Ping is the primary TCP/IP command used to troubleshoot connectivity, reachability, and name resolution. Used without parameters, ping displays help.

```
C:\Administrator: Command Prompt - pathping -n 2409:4073:8d:9a8d:448f:a138:99e7:f67e
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\windows\system32>ping 2409:4073:8d:9a8d:448f:a138:99e7:f67e

Pinging 2409:4073:8d:9a8d:448f:a138:99e7:f67e with 32 bytes of data:
Reply from 2409:4073:8d:9a8d:448f:a138:99e7:f67e: time<1ms
Reply from 2409:4073:8d:9a8d:448f:a138:99e7:f67e: time<1ms
Reply from 2409:4073:8d:9a8d:448f:a138:99e7:f67e: time<1ms
Reply from 2409:4073:8d:9a8d:448f:a138:99e7:f67e: time<1ms

Ping statistics for 2409:4073:8d:9a8d:448f:a138:99e7:f67e:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

## Tracert

Determines the path taken to a destination by sending Internet Control Message Protocol (ICMP) Echo Request messages to the destination with incrementally increasing Time to Live (TTL) field values. The path displayed is the list of near-side router interfaces of the routers in the path between a source host and a destination. The near-side interface is the interface of the router that is closest to the sending host in the path. Used without parameters, tracert displays help.

```
C:\windows\system32>trace C:\Users\Sangeetha\PycharmProjects\pythonProject6\venv\Lib\site-packages\pip\_vendor\urllib3\packages\ssl_match_hostname
C:\windows\system32>tracert 2409:4073:8d:9a8d:448f:a138:99e7:f67e
Tracing route to LAPTOP-BVCVKAR3 [2409:4073:8d:9a8d:448f:a138:99e7:f67e]
over a maximum of 30 hops:
  1 <1 ms <1 ms <1 ms LAPTOP-BVCVKAR3 [2409:4073:8d:9a8d:448f:a138:99e7:f67e]
Trace complete.

C:\windows\system32>pathping -n 2409:4073:8d:9a8d:448f:a138:99e7:f67e
Tracing route to 2409:4073:8d:9a8d:448f:a138:99e7:f67e over a maximum of 30 hops
  0 2409:4073:8d:9a8d:448f:a138:99e7:f67e
  1 2409:4073:8d:9a8d:448f:a138:99e7:f67e
Computing statistics for 25 seconds...
```

## Pathping

Provides information about network latency and network loss at intermediate hops between a source and destination. Pathping sends multiple Echo Request messages to each router between a source and destination over a period of time and then computes results based on the packets returned from each router. Because pathping displays the degree of packet loss at any given router or link, you can determine which routers or subnets might be having network problems. Pathping performs the equivalent of the tracert command by identifying which routers are on the path. It then sends pings periodically to all of the routers over a specified time period and computes statistics based on the number returned from each. Used without parameters, pathping displays help.

```
>
C:\windows\system32>pathping

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
                [-p period] [-q num_queries] [-w timeout]
                [-4] [-6] target_name

Options:
  -g host-list      Loose source route along host-list.
  -h maximum_hops  Maximum number of hops to search for target.
  -i address        Use the specified source address.
  -n               Do not resolve addresses to hostnames.
  -p period         Wait period milliseconds between pings.
  -q num_queries   Number of queries per hop.
```

## Netstat

Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols). Used without parameters, netstat displays active TCP connections.

```
C:\windows\system32>netstat -e -s
Interface Statistics

                                Received          Sent
Bytes                      218304695      132251875
Unicast packets            271523        155281
Non-unicast packets        357           6293
Discards                   0              0
Errors                     0              0
Unknown protocols          0              0

IPv4 Statistics

Packets Received           = 588235
Received Header Errors     = 0
Received Address Errors    = 22
Datagrams Forwarded       = 0
Unknown Protocols Received = 0
Received Packets Discarded = 609
Received Packets Delivered = 1061967
Output Requests            = 848316
Routing Discards          = 0
Discarded Output Packets   = 961
Output Packet No Route     = 75
Reassembly Required        = 0
Reassembly Successful      = 0
Reassembly Failures       = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created          = 0

IPv6 Statistics
```

## Nbtstat

Displays NetBIOS over TCP/IP (NetBT) protocol statistics, NetBIOS name tables for both the local computer and remote computers, and the NetBIOS name cache. Nbtstat allows a refresh of the NetBIOS name cache and the names registered with Windows Internet Name Service (WINS). Used without parameters, nbtstat displays help.

```
C:\windows\system32>nbtstat -n

VirtualBox Host-Only Network:
NodeIpAddress: [192.168.56.1] Scope Id: []

          NetBIOS Local Name Table

      Name        Type      Status
-----
LAPTOP-BVCVKAR3<00>  UNIQUE   Registered
LAPTOP-BVCVKAR3<20>  UNIQUE   Registered
WORKGROUP    <00>    GROUP    Registered
WORKGROUP    <1E>    GROUP    Registered
WORKGROUP    <1D>    UNIQUE   Registered
@@_MSBROWSE__@<01>  GROUP    Registered

Ethernet:
NodeIpAddress: [0.0.0.0] Scope Id: []

      No names in cache
```

## Getmac

Every network capable device on the internet has a unique identifying number called its MAC address. The number is assigned during manufacture and is established in the hardware of the device. Using the Getmac command, a user can determine the MAC address of their various network devices. Some administrators will use the unique MAC addresses of devices to limit what can and cannot connect to a network.

```
C:\windows\system32>getmac

Physical Address      Transport Name
=====
DC-41-A9-CD-61-58    \Device\Tcpip_{785C4EC1-41E7-485E-A6E9-7F4D088F9466}
30-24-A9-7B-BE-04    Media disconnected
DC-41-A9-CD-61-5C    Media disconnected
0A-00-27-00-00-0B    \Device\Tcpip_{69EB26FE-1AD7-4675-873A-56E36B864AA1}
```

## HostName

The Windows 10 HostName network command will simply display the current name of your Windows 10 computer (**Figure B**). This is the name your computer uses to identify itself to the other devices and servers on your local network. You can find this name in the System information screen in the GUI, but this command is quicker.

```
C:\windows\system32>Hostname  
LAPTOP-BVCVKAR3
```

### NSLookUp

The NSLookUp Windows 10 network command displays information that you can use to diagnose Domain Name System (DNS) infrastructure. Using NSLookUp without a parameter will show the DNS server your PC is currently using to resolve domain names into IP addresses. As you can see in **Figure C**, I am using Google's DNS service because the server provided by my ISP is slow and prone to crashes.

```
C:\windows\system32>nslookup  
Default Server: UnKnown  
Address: 192.168.43.1
```

## 7. Lamp installation procedure

install Apache

Update system

```
sudo apt update Install
```

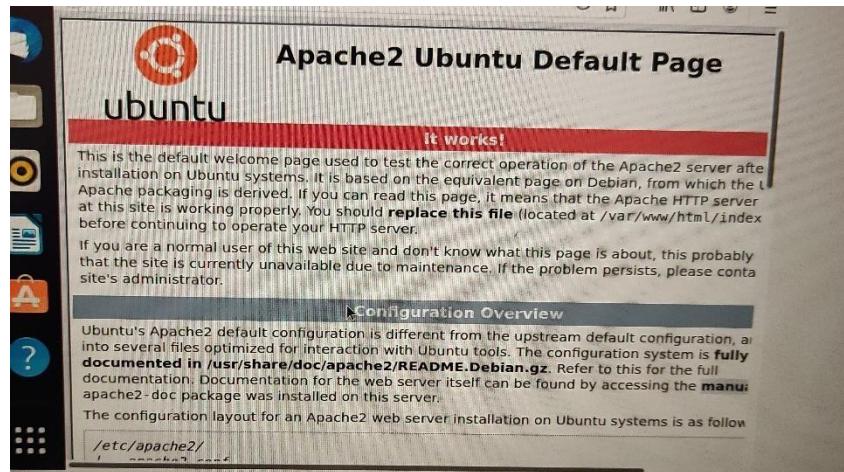
Apache using apt

```
sudo apt install apache2
```

Confirm that Apache is now running with the following command

```
sudo systemctl status apache2
```

```
sangeetha@sangeetha-VirtualBox: ~  
Tasks: 7 (limit: 5913)  
Memory: 14.0M  
CGroup: /system.slice/apache2.service  
    ├─26893 /usr/sbin/apache2 -k start  
    ├─26895 /usr/sbin/apache2 -k start  
    ├─26896 /usr/sbin/apache2 -k start  
    ├─26897 /usr/sbin/apache2 -k start  
    ├─26898 /usr/sbin/apache2 -k start  
    ├─26899 /usr/sbin/apache2 -k start  
    └─26909 /usr/sbin/apache2 -k start  
  
Aug 31 15:24:20 sangeetha-VirtualBox systemd[1]: Starting The Apache HTTP Server  
Aug 31 15:24:20 sangeetha-VirtualBox apachectl[26892]: AH00558: apache2: Could  
... skipping...  
● apache2.service - The Apache HTTP Server  
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres  
  Active: active (running) since Tue 2021-08-31 15:24:20 IST; 3 weeks 2 days  
    Docs: https://httpd.apache.org/docs/2.4/  
  Process: 26889 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/0  
 Main PID: 26893 (apache2)  
  Tasks: 7 (limit: 5913)  
  Memory: 14.0M  
  CGroup: /system.slice/apache2.service  
      ├─26893 /usr/sbin/apache2 -k start  
      ├─26895 /usr/sbin/apache2 -k start  
      ├─26896 /usr/sbin/apache2 -k start  
      ├─26897 /usr/sbin/apache2 -k start  
      └─26898 /usr/sbin/apache2 -k start
```



Restart

```
sudo systemctl start apache2
```

install php and modules

```
sudo apt install php libapache2-mod-php php-ocache phpcli php-gd php-curl php-mysql
```

Restart

```
sudo systemctl restart apache2 check php
```

installation

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

<http://127.0.0.1/phpinfo.php>

Install phpMyAdmin

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

sudo systemctl restart apache2 Install

phpmyadmin

```
sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json phpcurl Restart  
sudo systemctl restart apache2 Check  
phpMyAdmin http://localhost/phpmyadmin
```

The image contains two screenshots of the phpMyAdmin interface.

The top screenshot shows the login page. It features a logo of a sailboat on water, the text "Welcome to phpMyAdmin", a "Language" dropdown set to "English", and a "Log in" button. Below the login button are fields for "Username" (set to "root") and "Password" (set to "sangeetha sangeetha v sebastian").

The bottom screenshot shows the "General settings" and "Appearance settings" sections. The "General settings" section includes a "Change password" link, a "Server connection collation" dropdown set to "utf8mb4\_unicode\_ci", and a "Font size" dropdown set to "82%". The "Appearance settings" section includes a "Language" dropdown set to "English", a "Theme" dropdown set to "pmahomme", and a "Font size" dropdown set to "82%".

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

Sudo apt install ansible

```
sangeetha@sangeetha-VirtualBox:~$ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu hirsute InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute-updates InRelease [115 kB]
Get:3 http://security.ubuntu.com/ubuntu hirsute-security InRelease [110 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu hirsute-backports InRelease [101 kB]
Get:5 http://security.ubuntu.com/ubuntu hirsute-security/main amd64 DEP-11 Meta
data [9,696 B]
Get:6 http://security.ubuntu.com/ubuntu hirsute-security/universe amd64 DEP-11
Metadata [5,664 B]
Get:7 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main amd64 Packages [387 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main i386 Packages [196 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main amd64 DEP-11 Met
adata [94.9 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu hirsute-updates/universe amd64 Packa
ges [324 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu hirsute-updates/universe amd64 DEP-1
1 Metadata [57.8 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu hirsute-updates/multiverse amd64 DEP
-11 Metadata [940 B]
/usr/lib/python3/dist-packages/ansible_collections/azure/azcollection/plugins/m
odules/azure_rm_registrationassignment.py:233: SyntaxWarning: "is" with a liter
al. Did you mean "=="?
    if self.state is 'present':
/usr/lib/python3/dist-packages/ansible_collections/cyberark/pas/plugins/modules
/cyberark_account.py:532: SyntaxWarning: 'str' object is not callable; perhaps
you missed a comma?
    ("child_module_parm_value: %s "
/usr/lib/python3/dist-packages/ansible_collections/cyberark/pas/plugins/modules
/cyberark_account.py:573: SyntaxWarning: 'str' object is not callable; perhaps
you missed a comma?
    "parameter_name=%s value=%s existing=%s"
/usr/lib/python3/dist-packages/ansible_collections/cyberark/pas/plugins/modules
/cyberark_account.py:634: SyntaxWarning: 'str' object is not callable; perhaps
you missed a comma?
    "parameter_name=%s value=%s existing=%s"
Processing triggers for man-db (2.9.4-2) ...
```

Ansible – version

```
sangeetha@sangeetha-VirtualBox:~$ ansible --version
ansible 2.10.5
  config file = None
  configured module search path = ['/home/sangeetha/.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]
sangeetha@sangeetha-VirtualBox:~$
```

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

Sudo apt install tcpdump

```
angeetha@sangeetha-VirtualBox:~$ sudo apt update && sudo apt install tcpdump
[sudo] password for sangeetha:
[...]
59 packages can be upgraded. Run 'apt list --upgradable' to see them.
[...]
tcpdump is already the newest version (4.9.3-7).
tcpdump set to manually installed.
  upgraded, 0 newly installed, 0 to remove and 259 not upgraded.
```

### Sudo tcpdump

```
sangeetha@sangeetha-VirtualBox:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
-vv
10:53:16.893938 IP sangeetha-VirtualBox.40154 > golem.canonical.com.ntp: NTPv4,
  Client, length 48
10:53:16.896288 IP sangeetha-VirtualBox.40066 > 192.168.43.1.domain: 26670+ PTR
? 199.89.189.91.in-addr.arpa. (44)
10:53:17.462663 IP golem.canonical.com.ntp > sangeetha-VirtualBox.40154: NTPv4,
  Server, length 48
10:53:17.778259 IP 192.168.43.1.domain > sangeetha-VirtualBox.40066: 26670 1/0/
0 PTR golem.canonical.com. (77)
10:53:17.779346 IP sangeetha-VirtualBox.34878 > 192.168.43.1.domain: 35741+ PTR
? 15.2.0.10.in-addr.arpa. (40)
10:53:17.864853 IP 192.168.43.1.domain > sangeetha-VirtualBox.34878: 35741 NXDo
[...]
10:57:01.210636 IP 192.168.43.1.domain > sangeetha-VirtualBox.48332: 26497 0/0/
0 (47)
10:57:01.212806 IP sangeetha-VirtualBox.60416 > 192.168.43.1.domain: 14327+ AAA
A? connectivity-check.ubuntu.com. (47)
10:57:01.218302 IP 192.168.43.1.domain > sangeetha-VirtualBox.60416: 14327 0/0/
0 (47)
10:57:06.349062 ARP, Request who-has _gateway tell sangeetha-VirtualBox, length
28
10:57:06.349773 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), leng
th 46
10:57:34.668723 IP sangeetha-VirtualBox.50632 > golem.canonical.com.ntp: NTPv4,
  Client, length 48
10:57:35.053864 IP golem.canonical.com.ntp > sangeetha-VirtualBox.50632: NTPv4,
  Server, length 48
10:57:39.892673 ARP, Request who-has _gateway tell sangeetha-VirtualBox, length
28
10:57:39.893232 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), leng
th 46
[...]
44 packets captured
44 packets received by filter
0 packets dropped by kernel
```

### Sudo tcpdump -d

```
sangeetha@sangeetha-VirtualBox:~$ sudo tcpdump -d
(000) ret      #262144
sangeetha@sangeetha-VirtualBox:~$ [ ]
```

### Sudo tcpdump -c 5

```

sangeetha@sangeetha-VirtualBox:~$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
-vv
11:17:56.126638 IP sangeetha-VirtualBox.40596 > golem.canonical.com.ntp: NTPv4,
Client, length 48
11:17:56.129386 IP sangeetha-VirtualBox.49490 > 192.168.43.1.domain: 25882+ PTR
? 15.2.0.10.in-addr.arpa. (40)   .
11:17:56.198566 IP 192.168.43.1.domain > sangeetha-VirtualBox.49490: 25882 NXDo
main 0/0/0 (40)
11:17:56.199745 IP sangeetha-VirtualBox.55023 > 192.168.43.1.domain: 15086+ PTR
? 1.43.168.192.in-addr.arpa. (43)
11:17:56.289940 IP 192.168.43.1.domain > sangeetha-VirtualBox.55023: 15086 NXDo
main 0/0/0 (43)
5 packets captured
5 packets received by filter
0 packets dropped by kernel
sangeetha@sangeetha-VirtualBox:~$ -vv
Sudo tcpdum -l enp2s0
sangeetha@sangeetha-VirtualBox:~$ sudo tcpdump -i enp2s0
tcpdump: enp2s0: No such device exists   .
(SIOCGIFHWADDR: No such device)
```

## Shell Scripting Lab Assignments- 10

1. Write a shell script to ask your name, and college name and print it on the screen. #!/bin/bash

```

echo " Enter Details and View" echo
"======" echo Enter your Name
read name echo Enter your College name
read college
clear
echo Details you entered echo Name:
$name echo College: $college
```

```

college.shcc
sangeetha@sangeetha-VirtualBox:~$ ./bash1.sh
enter your details
=====
enter your name
sangeetha
enter your college name
ajce
```

```
details you entered
name:sangeetha
college:ajce
sangeetha@sangeetha:~$
```

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

```
#!/bin/bash

echo "Display value of a Variable" echo
"======" a=10 echo "$a"
```

```
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.

```
#!/bin/bash

echo "ARITHMETIC OPERATIONS" echo
"======" echo "Enter a number"

read a

echo "Enter another number" read b

echo "Enter operation needed"

echo "\n1.Addition\n2.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
```

```
user@user-VirtualBox:~$ bash 3.sh
enter a number
5
enter another number
6
enter operation
\n1.addition \n2.subtraction \n3.multiplication \n4.division
1
a+b=11
```

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

```

#!/bin/bash

echo "Finding a number" echo
"======" echo "Enter a
number" read a if [ $a == 10 ]; then

echo "Number found ;)"

else

echo "Number NOT found !"

fi

```

```

user@user-VirtualBox:~$ bash 4.sh
enter a number
10
number found

```

5. Write a shell script to display current date, calendar. `#!/bin/bash echo "Time and Calendar"`

```

echo "======" echo "Today is $(date)" echo "" echo "Calendar :" cal

```

```

user@user-VirtualBox:~$ bash 5.sh
Today is Saturday 02 October 2021 05:53:45 PM IST
calendar:
    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 "EVEN OR ODD"

echo "======" echo "Enter a
number" read n x=$((n%2)) if [ $x -
eq 0 ]; then

echo "Number is Even"

else

echo "Number is odd"

fi

```

```

user@user-VirtualBox:~$ bash 6.sh
enter a number
9
number is odd

```

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

```

#!/bin/bash echo "Comparing numbers"
echo "======" echo "Enter
first number" read a

echo "Enter second number" read b if [ $a
-gt $b ]; then echo "$a is greater" elif [ $b
-gt $a ];

then

echo "$b is greater" else

echo "Both are Equal" fi

```

```

user@user-VirtualBox:~$ bash 7.sh
enter first number
23
enter second number
22
23 is larger

```

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

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

echo "Sum of first 10 numbers = $s"

```

```

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.
- ```

#!/bin/bash
echo "AVG, SUM & Product of 4 No." echo
"======"
```

```

echo "Please enter your first number: " read a

echo "Second number: "

read b

echo "Third number: " read c echo

"Fourth number: " read d

sum=$((a + b + c + d)) avg=$(echo $sum / 4 | bc -l )
prod=$((a * b * c * d)) echo "The sum of these numbers is: "

```

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

```
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:2.50000000000000000000000000  
the product is:24
```

```
10. Write a shell script to find the smallest of three numbers. #!/bin/bash  
echo "LARGEST OF THREE" echo "===== "  
echo "Enter first number" read a  
echo "Enter second number" read b  
echo "Enter third number" read c  
if [ $a -gt $b ];  
then if [ $a -gt $c ]; then  
echo "$a is big" else e  
cho "$c is big" fi  
elif [ $b -gt $c ]; then echo  
"$b is big" else echo "$c is  
big" fi
```

```
user@user-VirtualBox:~$ bash 10.sh  
enter first number  
5  
enter second number  
6  
enter third number  
7  
5 is smallest
```

```
11. Write a shell program to find factorial of given number. #!/bin/bash  
echo "Factorial" echo "===== "  
echo "Enter a number" read num  
fact=1 for((i=2;i<=num;i++))  
{
```

```
fact=$((fact * i)) #fact = fact * i  
}
```

```
echo "Factorial is $fact"
```

```
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. #!/bin/bash echo  
"Palindrome or Not" echo "======" echo "Enter number to check" read n  
rev=$(echo $n | rev) if [ $n -eq $rev ]; then  
echo "Number is Palindrome"  
else  
echo "Number is not Palindrome" fi
```

```
user@user-VirtualBox:~$ bash 12.sh  
enter a number  
121  
number is palindrome
```

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

```
#!/bin/bash echo "Average of N numbers" echo "======" echo "Enter Size"  
read n i=1 sum=0  
  
echo "Enter Numbers" while [ $i -le  
$n ] do read num sum=$((sum +  
num)) i=$((i + 1))  
  
done  
  
avg=$(echo $sum / $n | bc -l) echo $avg
```

```
user@user-VirtualBox:~$ bash 13.sh  
enter size  
5  
enter numbers  
6  
7  
8  
9  
4  
average is 6.80000000000000000000000000000000
```

```
14. Write a shell program to find the sum of all the digits in a number. #!/bin/bash echo "Sum of  
all digits" echo "======" echo "Enter a number:" read num sum=0
```

```
while [ $num -gt 0 ] do  
mod=$((num % 10)) sum=$((sum  
+ mod)) num=$((num / 10))
```

done

echo "Sum of digits is \$sum"

```
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. `#!/bin/bash echo "LEAP YEAR OR NOT" echo "===== echo "Enter the year"`

```
read y a=`expr $y % 4` b=`expr $y % 100` c=`expr $y % 400` if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ]; then
```

echo "\$y is leap year" else echo "\$y is not leap year"

fi

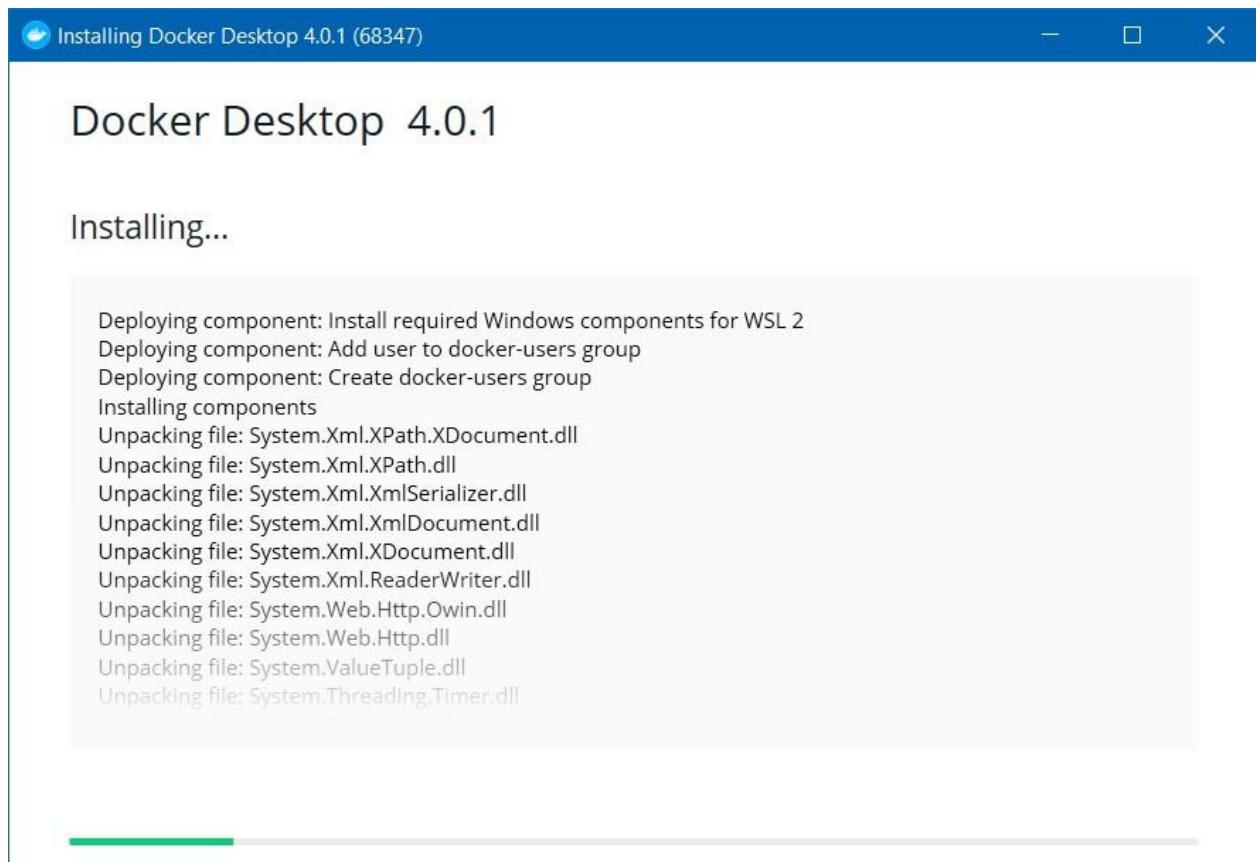
```
user@user-VirtualBox:~$ bash 15.sh  
enter year  
1994  
1994 is leap year
```

# Docker Installation

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

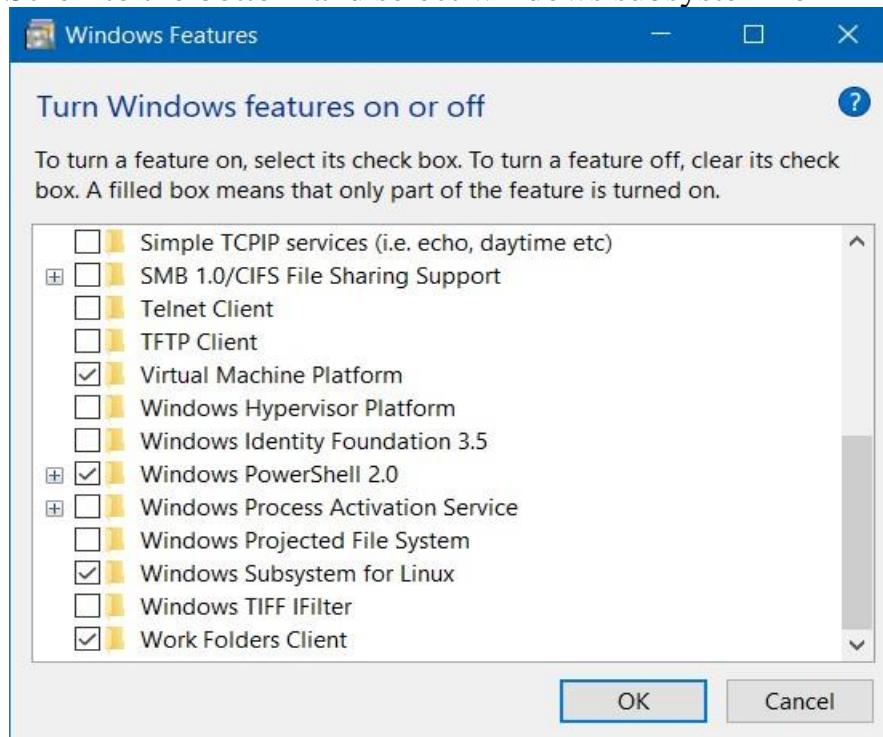


Open the .exe file and follow the steps after clicking install button.

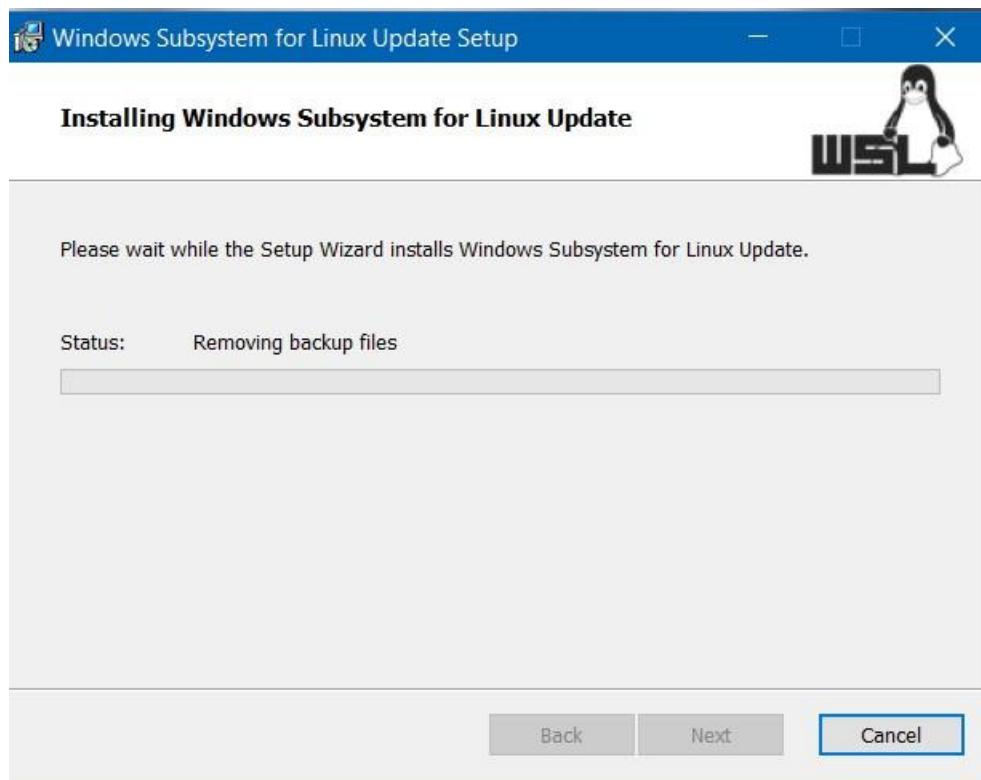


Once installed go to programs and features and click turn on windows features on or off

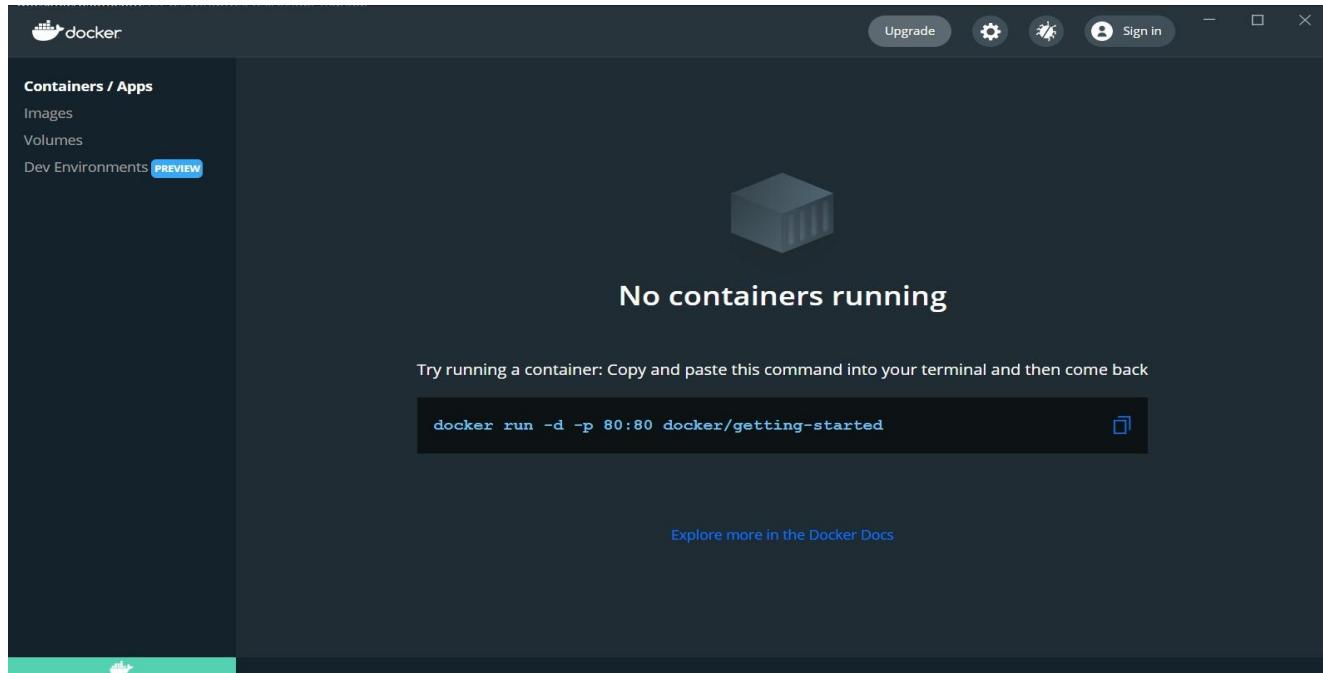
Scroll to the bottom and select windows subsystem for Linux



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.



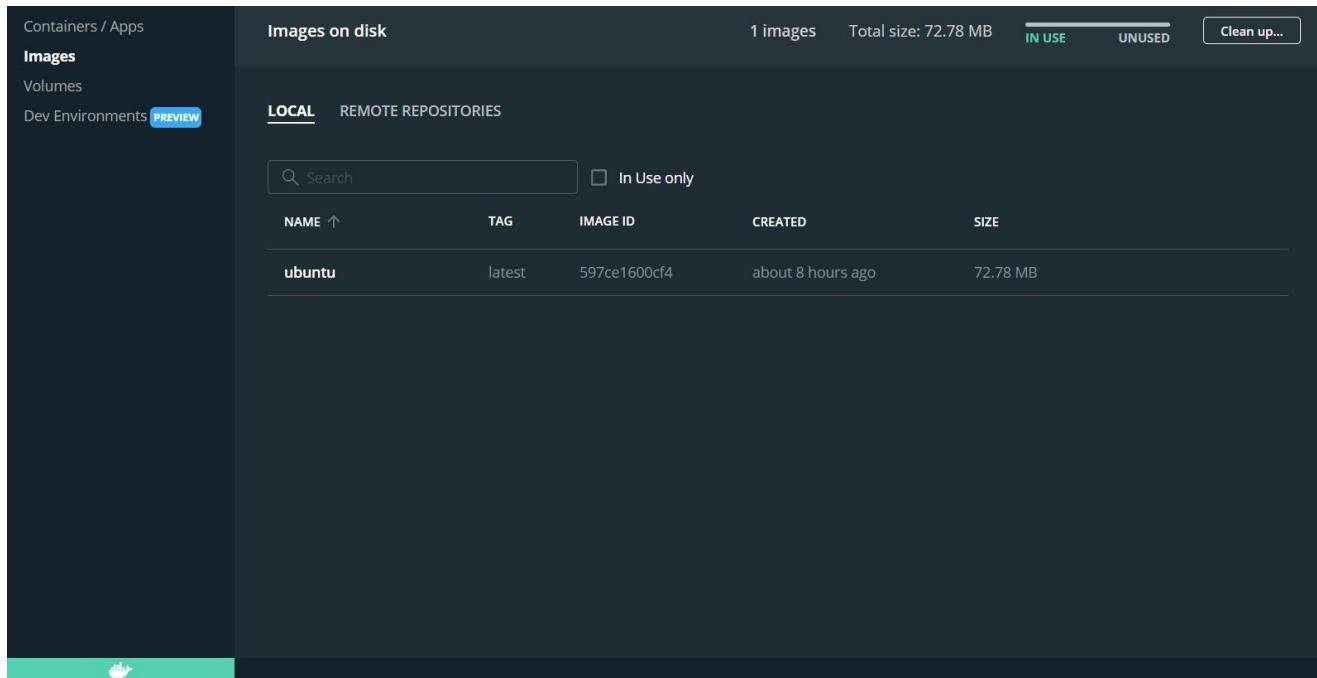
Once installed, open the docker desktop app, and signin using the dockerID



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

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The title bar also shows 'Microsoft Windows [Version 10.0.19042.1081]' and '(c) Microsoft Corporation. All rights reserved.'. The command entered is 'C:\Windows\system32>docker run -d -p 80:80 docker/getting-started'. The output shows an error: 'Unable to find image 'docker/getting-started:latest' locally'. It then attempts to pull the image from Docker Hub: '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.' followed by 'See 'docker run --help''. The next command is 'C:\Windows\system32>docker pull ubuntu', which successfully pulls the image: 'Using default tag: latest', 'latest: Pulling from library/ubuntu', 'f3ef4ff62e0d: Pull complete', 'Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b', 'Status: Downloaded newer image for ubuntu:latest', and 'docker.io/library/ubuntu:latest'. The final prompt is '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

- Installing Wireshark on Linux can be a little different depending on the Linux distribution. If you aren't running one of the following distros, please double-check the commands.

Ubuntu

- From a terminal prompt, run these commands:
- `sudo apt-get install wireshark`
- `sudo dpkg-reconfigure wireshark-common`
- `sudo adduser $USER wireshark`

```
sangeetha@sangeetha-VirtualBox:~$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
 libbcg729-0 libc-ares2 libdouble-conversion3 liblua5.2-0 libmd4c0
 libminizip1 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasupports5
 libqt5multimediacomposition5 libqt5network5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiredtap11 libwsutil12 libxcb-xinerama0 libxcb-xinput0
 qt5-gtk-platformtheme qttranslations5-l10n wireshark-common wireshark-qt
Suggested packages:
 qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geoipupdate
 geoip-database geoip-database-extra libjs-leaflet
 libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed:
 libbcg729-0 libc-ares2 libdouble-conversion3 liblua5.2-0 libmd4c0
 libminizip1 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasupports5
 libqt5multimediacomposition5 libqt5network5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiredtap11 libwsutil12 libxcb-xinerama0 libxcb-xinput0
```

```
Setting up libwsutil12:amd64 (3.4.4-1ubuntu1) ...
Setting up libqt5core5a:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libwireshark-data (3.4.4-1ubuntu1) ...
Setting up liblua5.2-0:amd64 (5.2.4-1.1build3) ...
Setting up libqt5dbus5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libmd4c0:amd64 (0.4.7-1) ...
Setting up libqt5network5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libwiredtap11:amd64 (3.4.4-1ubuntu1) ...
Setting up libwireshark14:amd64 (3.4.4-1ubuntu1) ...
Setting up wireshark-common (3.4.4-1ubuntu1) ...
Setting up libqt5gui5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libqt5widgets5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up qt5-gtk-platformtheme:amd64 (5.15.2+dfsg-5ubuntu1)
Setting up libqt5multimedia5:amd64 (5.15.2-3) ...
Setting up libqt5printsupport5:amd64 (5.15.2+dfsg-5ubuntu1)
Setting up libqt5multimediacomponents5:amd64 (5.15.2-3) ...
Setting up libqt5multimediasupport5:amd64 (5.15.2-3) ...
Setting up libqt5multimedia5-plugins:amd64 (5.15.2-3) ...
Setting up libqt5svg5:amd64 (5.15.2-3) ...
Setting up wireshark-qt (3.4.4-1ubuntu1) ...
Setting up wireshark (3.4.4-1ubuntu1) ...
Processing triggers for libc-bin (2.33-0ubuntu5) ...
Processing triggers for man-db (2.9.4-2) ...
Processing triggers for shared-mime-info (2.0-1) ...
Processing triggers for mailcap (3.68ubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu1) .
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
sangeetha@sangeetha-VirtualBox:~$
```

```
sangeetha@sangeetha-VirtualBox:~$ sudo adduser $USER wireshark
Adding user `sangeetha' to group `wireshark' ...
Adding user sangeetha to group wireshark
Done.
sangeetha@sangeetha-VirtualBox:~$
```

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

File Edit View Go Capture Analyze Statistics Telephone Wireless Tools Help

not arp

Welcome to Wireshark

Capture

...using this filter:  All interfaces sh

- Cisco remote capture: ciscodump
- DisplayPort AUX channel monitor capture: dpauxmon
- Random packet generator: randpkt
- systemd Journal Export: sdjournal
- SSH remote capture: sshdump
- UDP Listener remote capture: udpdump

Learn

User's Guide · Wiki · Questions and Answers · Mailing Lists

You are running Wireshark 3.4.4 (Git v3.4.4 packaged as 3.4.4-1ubuntu1).

No.	Time	Source	Destination	Protocol	Length	Info
29	7.990850823	10.0.2.15	142.250.76.34	TCP	54	583
30	7.991143356	10.0.2.15	142.250.205.226	TCP	54	472
31	13.238462786	10.0.2.15	52.84.6.56	TCP	54	[TC]
32	13.238861425	52.84.6.56	10.0.2.15	TCP	60	[TC]
33	17.334396657	10.0.2.15	142.250.67.67	TCP	54	[TC]
34	17.335486185	142.250.67.67	10.0.2.15	TCP	60	[TC]

```

▶ Frame 1: 93 bytes on wire (744 bits), 93 bytes captured (744 bits) on interface
▶ Ethernet II, Src: RealtekU_12:35:02 (52:54:00:12:35:02), Dst: PcsCompu_21:53:0e
▶ Internet Protocol Version 4, Src: 142.250.195.67, Dst: 10.0.2.15
▶ Transmission Control Protocol, Src Port: 443, Dst Port: 51518, Seq: 1, Ack: 1, Len: 60
▶ Transport Layer Security

```

```

0000  08 00 27 21 53 0e 52 54  00 12 35 02 08 00 45 00  .!S.RT..5..E.
0010  00 4f 67 9f 00 00 40 06  b4 bd 8e fa c3 43 0a 00  .og..@.....C..
0020  02 0f 01 bb c9 3e 1e 48  f7 00 61 6a ac cb 50 18  ..>H..aj..P..
0030  ff ff 53 0a 00 00 17 03  03 00 22 d1 62 6c 52 db  ..S....".blR.
0040  50 05 71 a9 36 46 9f b3  41 b1 c8 ad 11 c6 c3 d8  P.q.6F..A....
0050  93 4d 05 55 a1 0b 5f dd  a8 c9 8c bd d7  .M.U._.....

```

● eth0: <live capture in progress> | Packets: 34 · Displayed: 34 (100.0%) | Profile: Default