

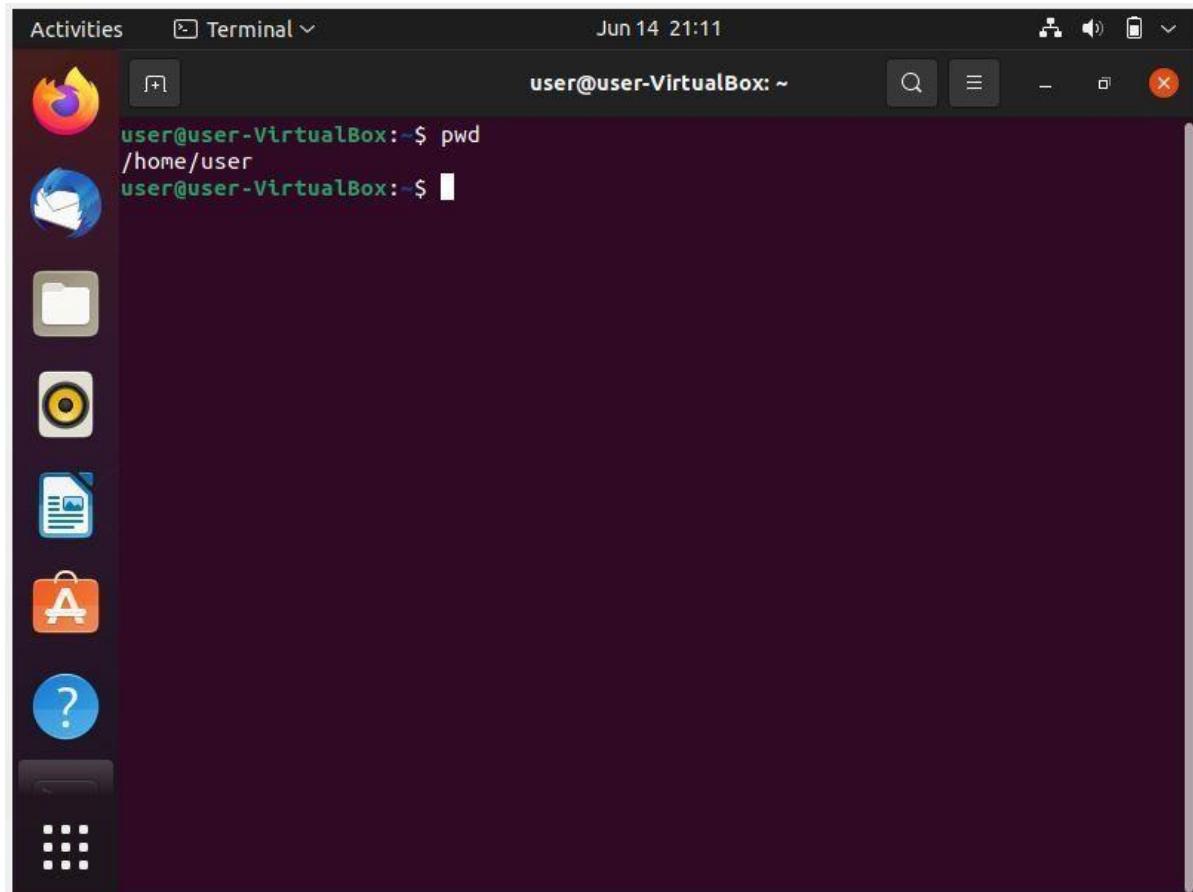
**20MCA136 - Networking & System Administration Lab**

**RECORD**

**AKASH O K  
ROLL NO: 05  
RMCA - A**

## PWD (print working directory)

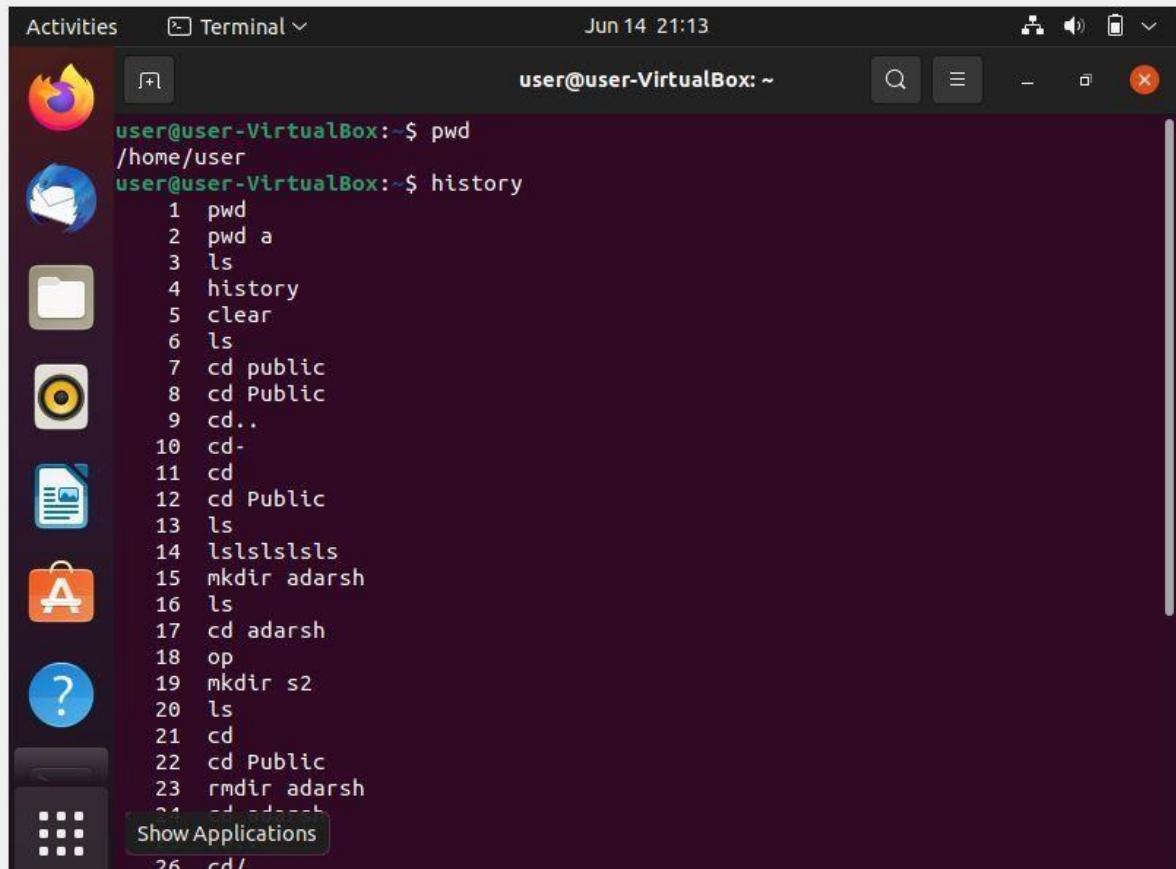
Use the pwd command to find out the path of the current Working directory (folder) you're in



## HISTORY

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

!command number to run a command from history



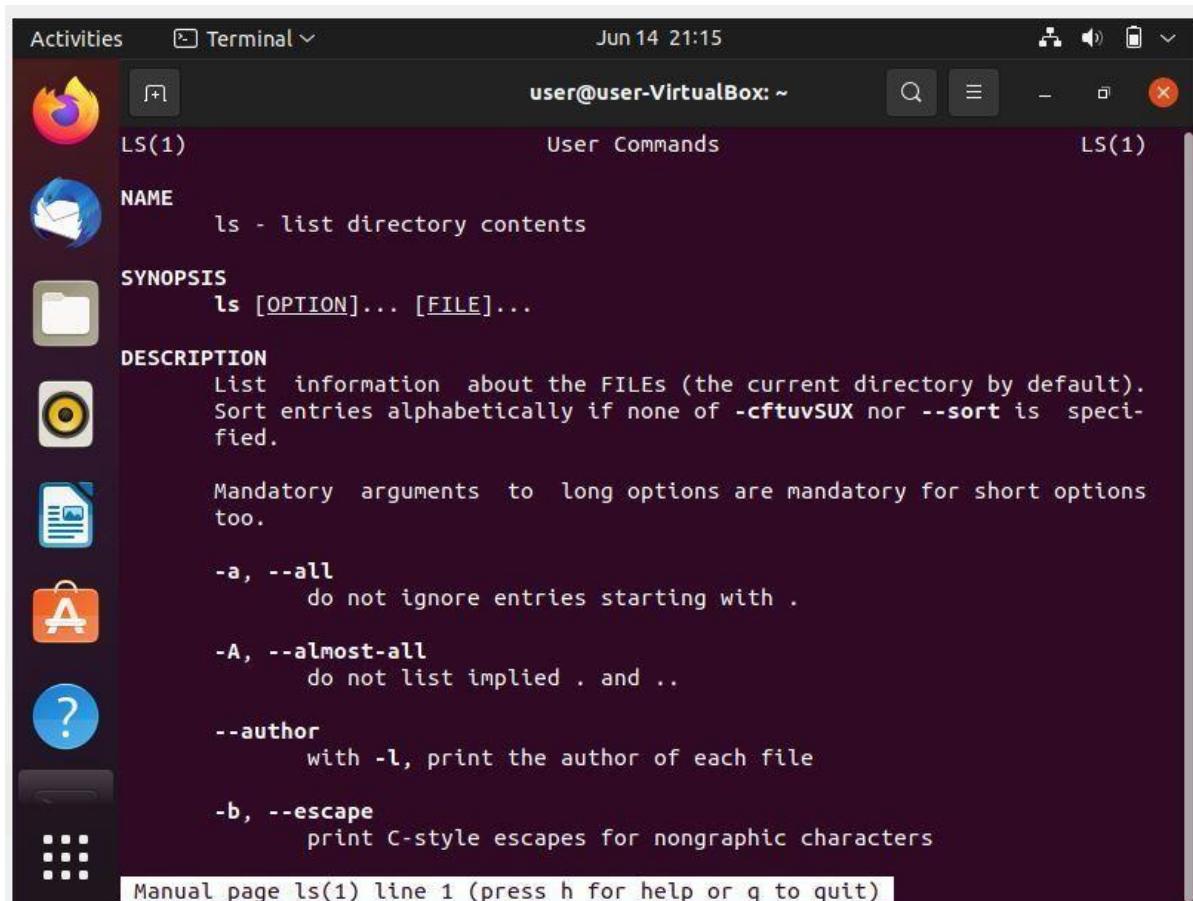
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the status bar shows "Jun 14 21:13". The user is at the prompt "user@user-VirtualBox: ~". The terminal displays the following command history:

```
user@user-VirtualBox:~$ pwd
/home/user
user@user-VirtualBox:~$ history
 1  pwd
 2  pwd a
 3  ls
 4  history
 5  clear
 6  ls
 7  cd public
 8  cd Public
 9  cd..
10  cd-
11  cd
12  cd Public
13  ls
14  lslsllslls
15  mkdir adarsh
16  ls
17  cd adarsh
18  op
19  mkdir s2
20  ls
21  cd
22  cd Public
23  rmdir adarsh
24  -d -----
25
26  cd/
```

The terminal window has a dark background and light-colored text. The left sidebar contains icons for various applications like a browser, file manager, terminal, and help. A "Show Applications" button is visible at the bottom of the sidebar.

## MAN

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



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "Terminal" and the user is "user@user-VirtualBox: ~". The window displays the man page for the "ls" command. The page includes sections for NAME, SYNOPSIS, DESCRIPTION, and various options like -a, -A, --author, and -b. The terminal window has a dark background with light-colored text. The desktop interface includes a dock with icons for a browser, file manager, terminal, and others.

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

NAME
    ls - list directory contents

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

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

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

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

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

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

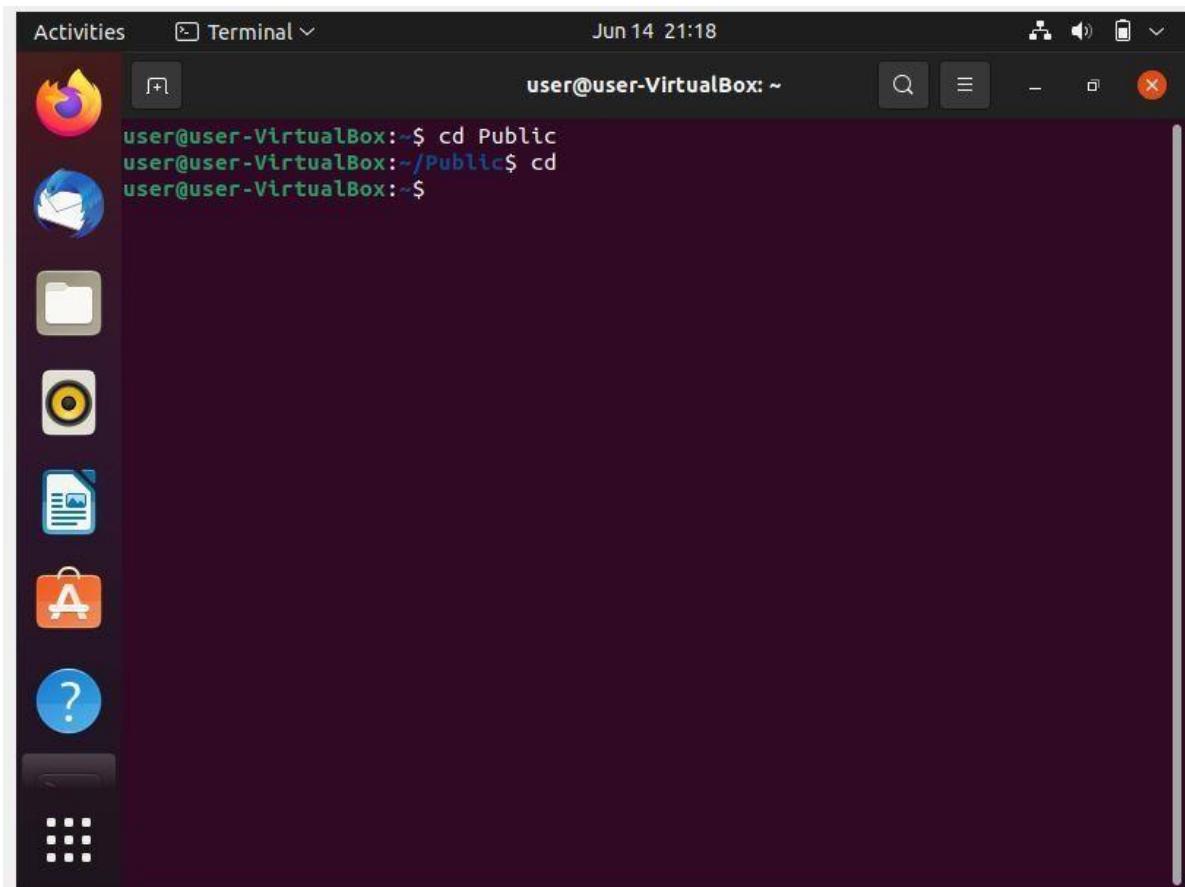
    -b, --escape
        print C-style escapes for nongraphic characters

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

## CD

To navigate through the Linux files and directories, use the cd It requires either the full path or the name of the directory, depending on the current working directory that you're in.

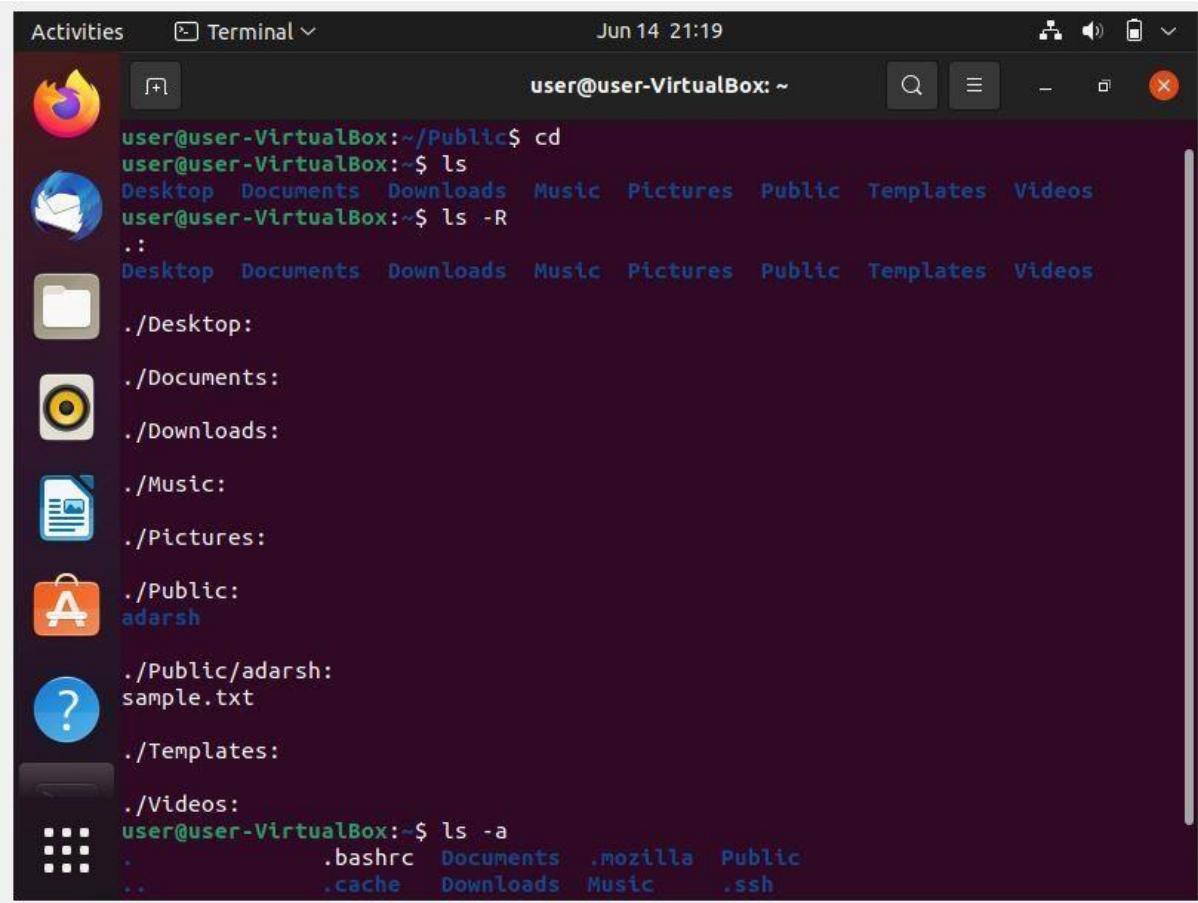
- cd .. (with two dots) to move one directory up
- cd to go straight to the home folder
- cd- (with a hyphen) to move to your previous directory



## 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.

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



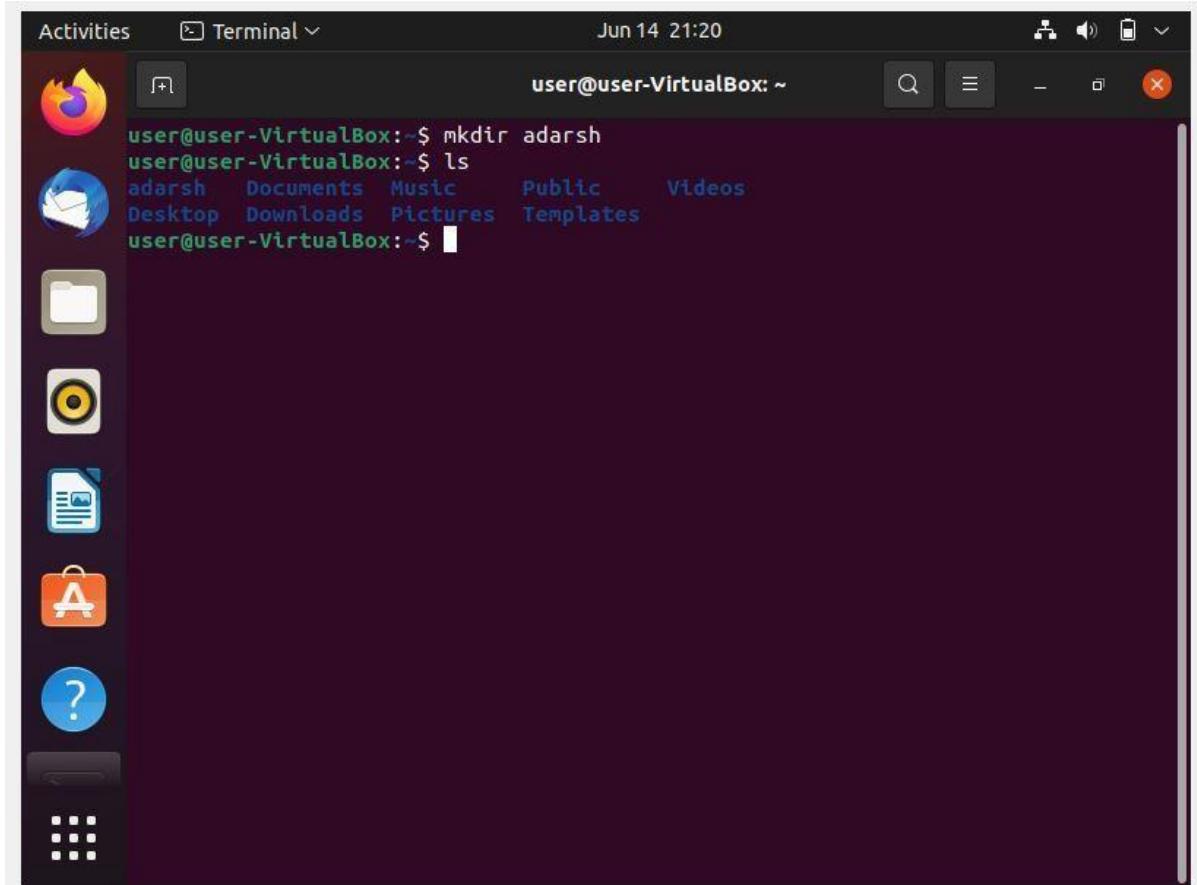
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window has a dark theme and displays the following command-line session:

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

The terminal window also shows icons for various desktop applications on the left side, including a browser, file manager, and system tray icons.

## MKDIR

Use mkdir command to make a new directory .To generate a new directory inside another directory, use this Linux basic command.

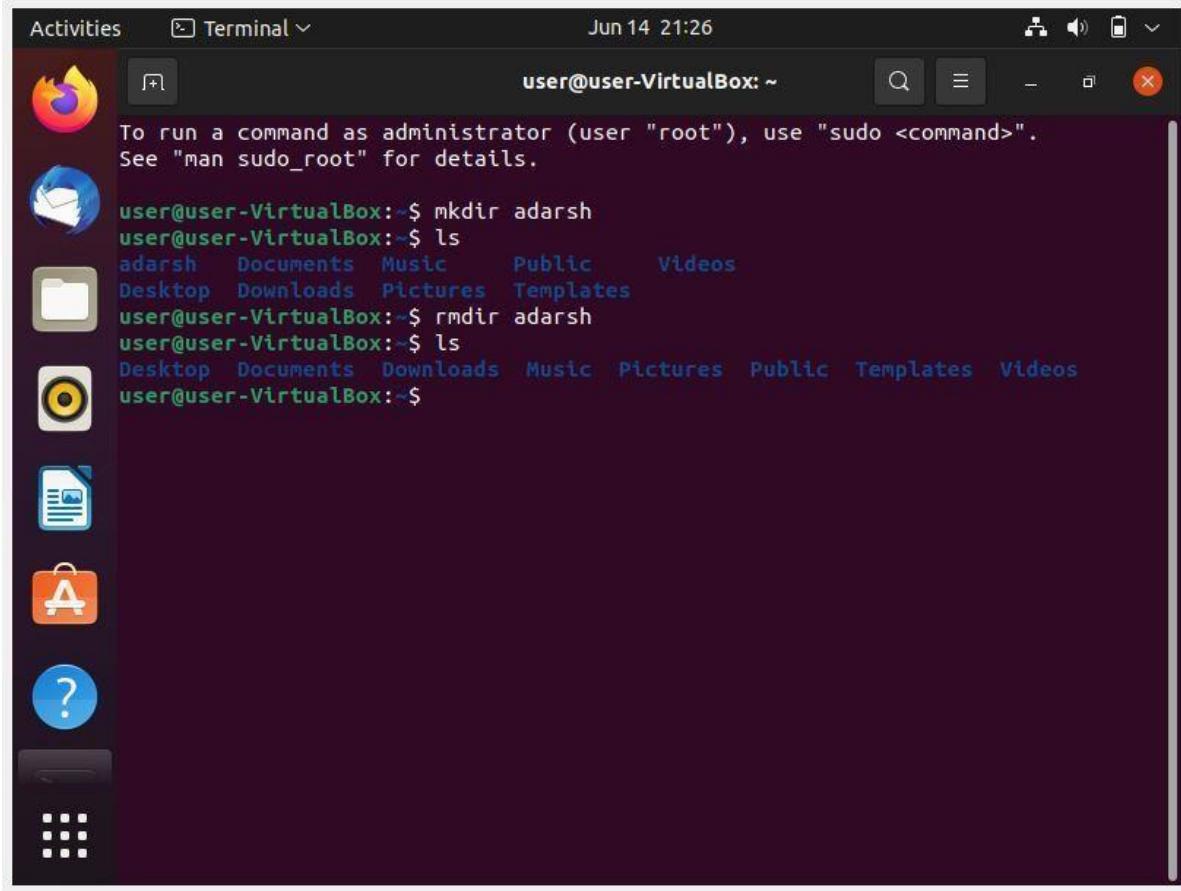


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the status bar "user@user-VirtualBox: ~" and the date "Jun 14 21:20". The terminal content shows the user running the "mkdir adarsh" command followed by an "ls" command to list the contents of the new directory. The desktop interface includes a dock with icons for various applications like a browser, file manager, and system settings.

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

## RMDIR

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

A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the status bar "Jun 14 21:26". The terminal content is as follows:

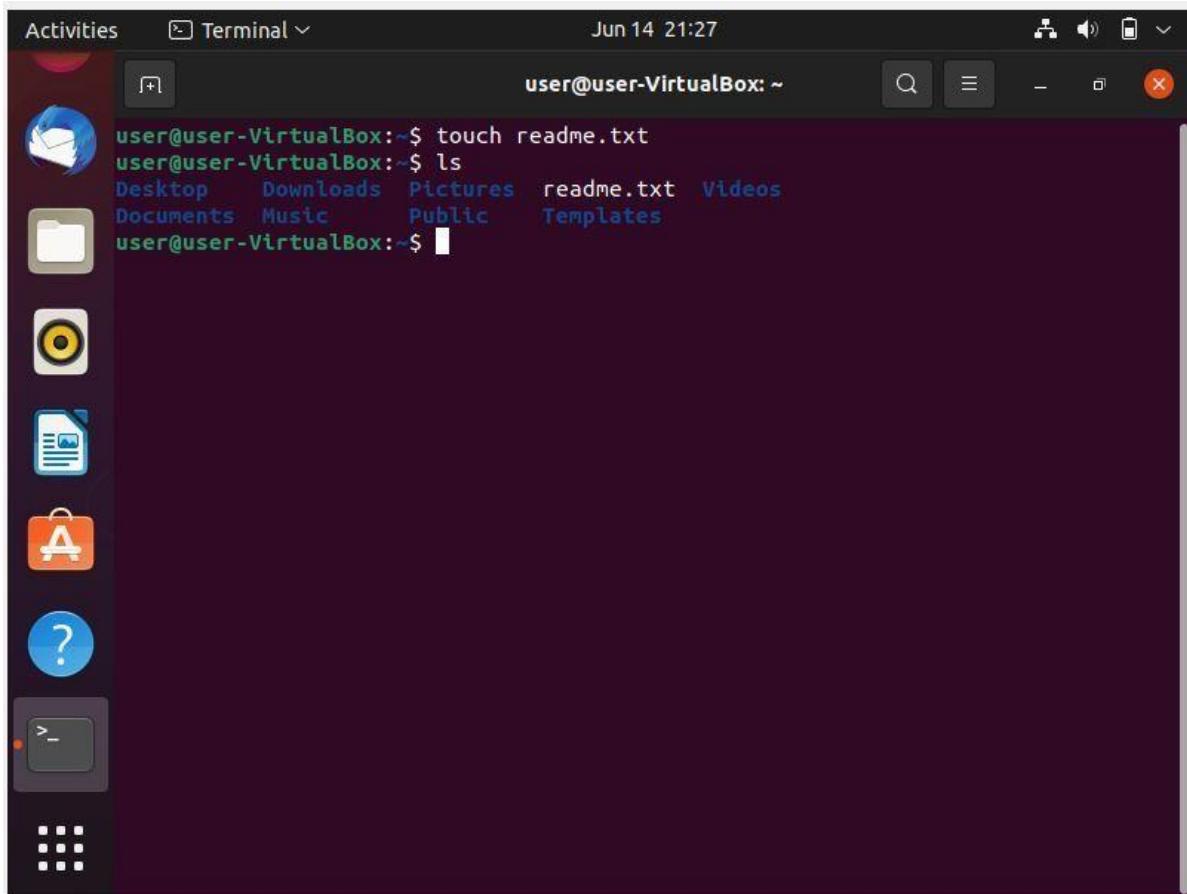
```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

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

The desktop interface includes a dock on the left with icons for various applications like a browser, email, file manager, and system tools. The desktop background is a light blue gradient.

## TOUCH

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

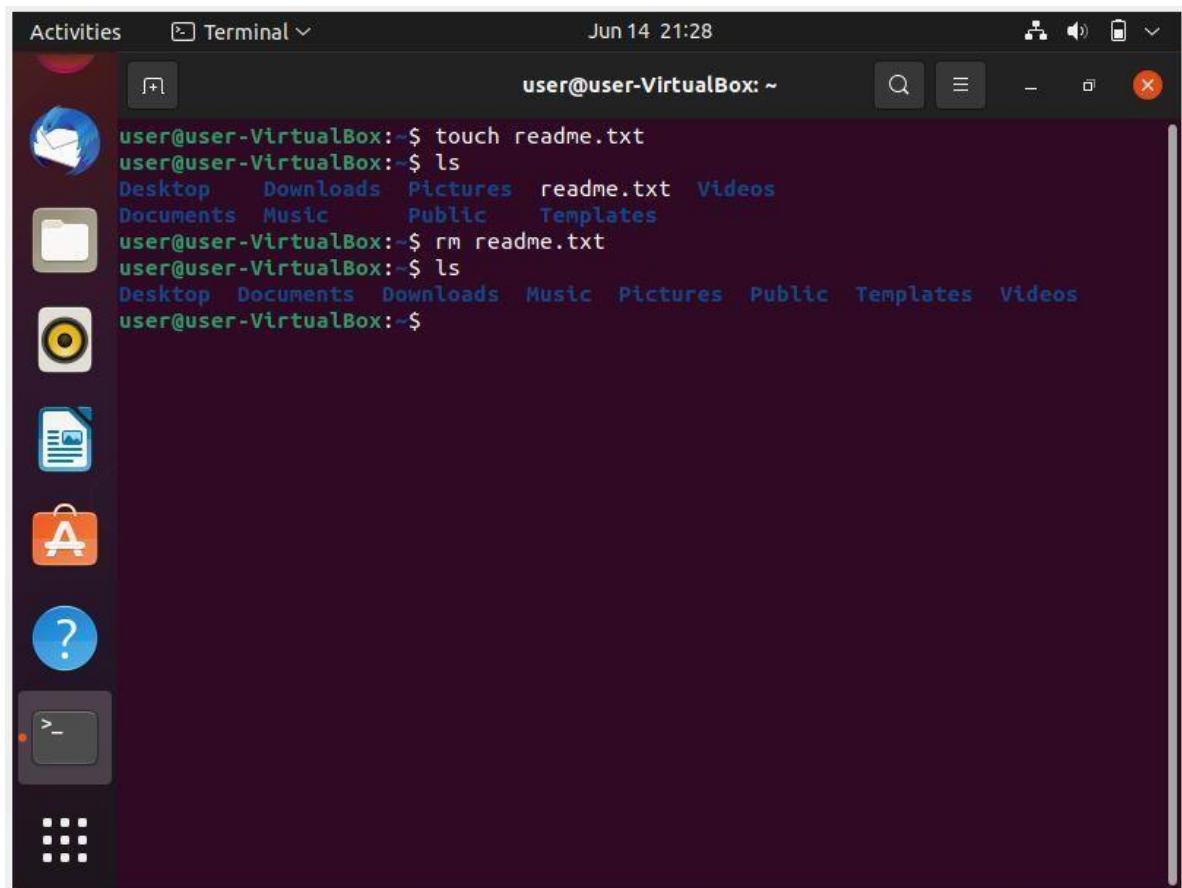


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the date and time "Jun 14 21:27" at the top right. The window title bar also shows "user@user-VirtualBox: ~". Inside the terminal, the user has run the command "touch readme.txt" followed by "ls" to list the contents of the current directory. The output shows files named Desktop, Downloads, Pictures, readme.txt, Videos, Documents, Music, Public, and Templates. The terminal window has a dark background and light-colored text. On the left side of the screen, there is a vertical dock with several icons: a mail icon, a folder icon, a target icon, a document icon, a shopping bag icon, a question mark icon, and a terminal icon.

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

## RM

The rm command is used to delete directories and the contents within them. If you only want to delete the directory — as an alternative to rmdir — use rm -r. To remove a file use rm filename



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the command line "user@user-VirtualBox: ~". The terminal shows the following sequence of commands:

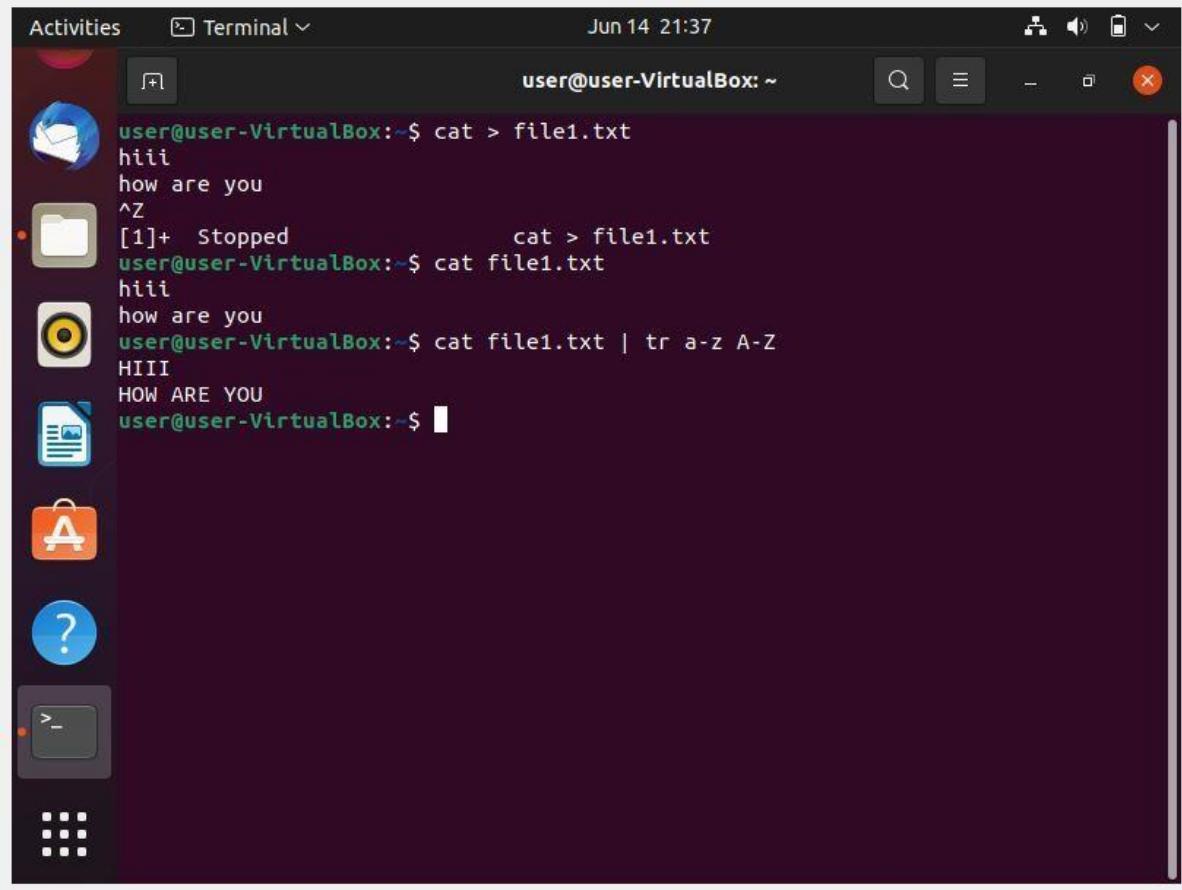
```
user@user-VirtualBox:~$ touch readme.txt
user@user-VirtualBox:~$ ls
Desktop Downloads Pictures readme.txt Videos
Documents Music Public Templates
user@user-VirtualBox:~$ rm readme.txt
user@user-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
user@user-VirtualBox:~$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

The desktop interface includes a dock on the left with icons for Mail, Files, Applications, Help, and Dash.

## CAT

cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output .To run this command, type cat followed by the file's name and its extension. For instance: cat file1.txt.

- ❖ cat > filename creates a new file
- ❖ cat filename1 filename2>filename3 joins two files (1and 2) and stores the output of them in a new file (3) to convert a file to upper or lower case use, cat filename | tr a-z A-Z >file1.txt
- ❖ cat >>myfile insert data to a file



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the status bar shows the date and time as "Jun 14 21:37". The user is running several commands in the terminal:

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

## ECHO

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

```
user@user-VirtualBox:~$ echo hello my name is adarsh>>sample2.txt
user@user-VirtualBox:~$ ls
Desktop  files  name.txt  Public    sample.txt
Documents  halo.txt  new.txt  sample1.txt  Templates
Downloads  Music   Pictures  sample2.txt  Videos
user@user-VirtualBox:~$ SS
```

## HEAD

The head command is used to view the first lines of any text file.

- By default, it will show the first ten lines, but you can change this number to your liking.
- If you only want to show the first five lines, type
- head -n 5 filename.txt

```
user@user-VirtualBox:~$ cat halo.txt
haloo
adarsh
user@user-VirtualBox:~$ head -n 1 halo.txt
haloo
user@user-VirtualBox:~$
```

## TAIL

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

- tail-n 5 filename.txt

```
user@user-VirtualBox:~$ cat halo.txt
haloo
adarsh
user@user-VirtualBox:~$ tail -n 1 halo.txt
adarsh
user@user-VirtualBox:~$
```

## READ

Read the contents of a line into a variable.

- The read command can be used with and without arguments.
- Read command is used to read [options] [name...]
- \$read
- \$read var1 var2 var3
- \$echo"[\$var1] [\$var2] [\$var3]"

```
user@user-VirtualBox:~$ read firstname
adarsh
user@user-VirtualBox:~$ read lastname
V
user@user-VirtualBox:~$ echo $firstname $lastname;
adarsh V
user@user-VirtualBox:~$
```

## MORE

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

- Enter key: To scroll down page line by line.
- Space bar: To go to next page
- b key: To go to the backward page
- / key: Lets you search the string
- Syntax: more <file name>
- more /etc/passwd

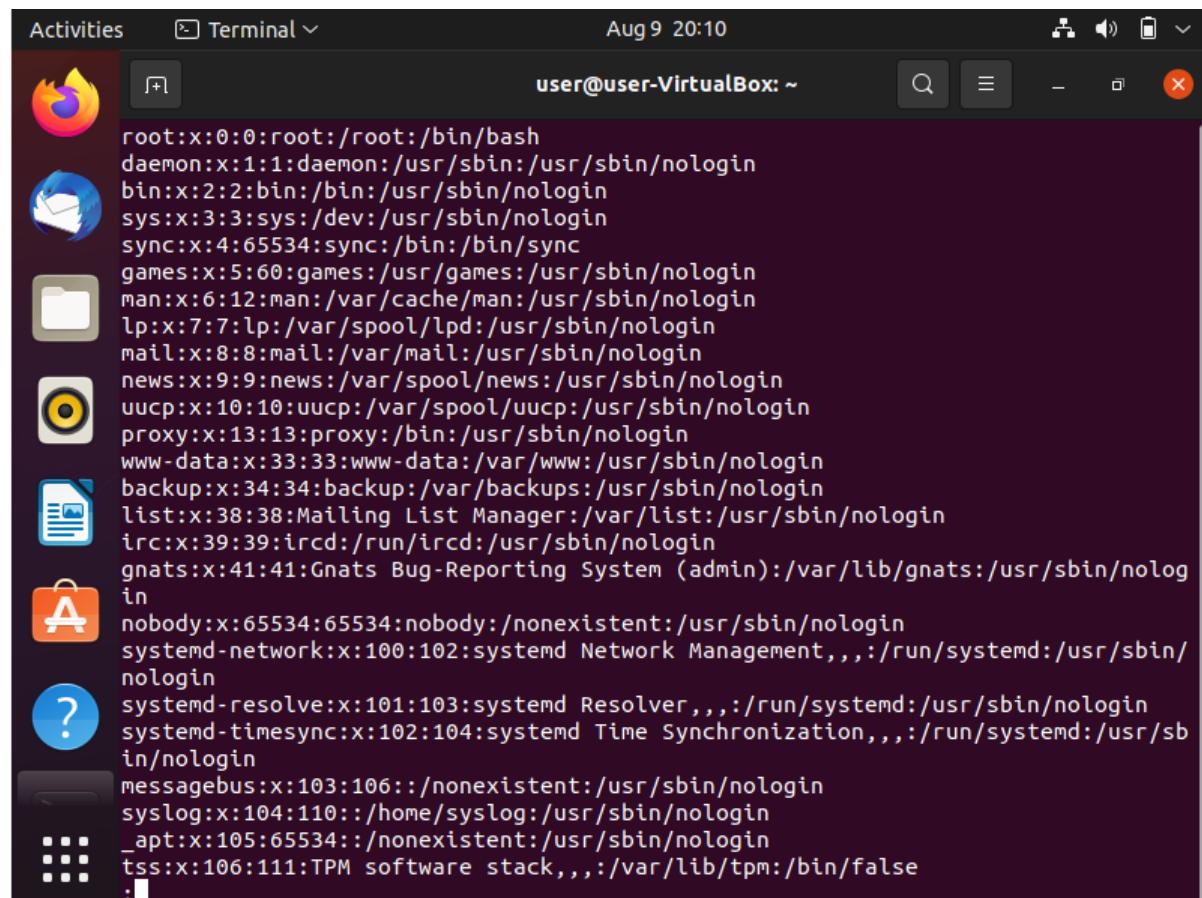
```
user@user-VirtualBox:~$ more /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
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
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
```

## LESS

The 'less' command is same as 'more' command but include some more features. It automatically adjusts with the width and height of the terminal window, while 'more' command cuts the content as the width of the terminal window get shorter

- less <file name>
- less etc/passwd.

```
user@user-VirtualBox:~$ less /etc/passwd
[1]+  Stopped                  less /etc/passwd
user@user-VirtualBox:~$
```



A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "user@user-VirtualBox: ~". The window contains the output of the "less /etc/passwd" command, which displays the contents of the /etc/passwd file. The file lists various system users and their details, such as root, daemon, bin, sys, sync, games, man, lp, mail, news, uucp, proxy, www-data, backup, list, irc, gnats, nobody, systemd-network, systemd-resolve, systemd-timesync, messagebus, syslog, \_apt, and tss. The terminal window is part of a desktop interface with a dock containing icons for the Dash, Home, Applications, and Help, and a taskbar showing other open applications like a browser and file manager.

```
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin.sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
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
```

## CUT

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

- `cut OPTION ... [FILE]...`
- `$cut -b 1, 2, 3 state.txt`

```
user@user-VirtualBox:~$ cut -b 1,2,3 name.txt
my
my
user@user-VirtualBox:~$
```

## PASTE

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

- `paste [ OPTION] ... [FILES] ...`
- `$paste state.txt capital.txt`

```
user@user-VirtualBox:~$ paste halo.txt new.txt
haloo
adarsh
user@user-VirtualBox:~$
```

## UNAME

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

- \$uname
- \$uname -r

```
user@user-VirtualBox:~$ uname  
Linux  
user@user-VirtualBox:~$ uname -r  
5.11.0-18-generic  
user@user-VirtualBox:~$ █
```

## 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

```
user@user-VirtualBox:~$ cp name.txt Pictures  
user@user-VirtualBox:~$ ls  
Desktop  Downloads  halo.txt  name.txt  Pictures  sample.txt  Videos  
Documents  files  Music  new.txt  Public  Templates  
user@user-VirtualBox:~$ cd Pictures  
user@user-VirtualBox:~/Pictures$ ls  
name.txt  
user@user-VirtualBox:~/Pictures$ █
```

## 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.txt newname.ext

```
user@user-VirtualBox:~$ ls
Desktop  Downloads  halo.txt  Pictures  Templates
Documents  file.txt  Music    Public    Videos
user@user-VirtualBox:~$ mv file.txt Public
user@user-VirtualBox:~$ cd Public
user@user-VirtualBox:~/Public$ ls
adarsh  file.txt  Music
user@user-VirtualBox:~/Public$
```

## LOCATE

To locate a file, just like the search command in Windows. What's more, using the -i argument along with this command will make it case-insensitive, so you can search for a file even if you don't remember its exact name. To search for a file that contains two or more words, use an asterisk (\*). For example, locate -i school\*note command will search for any file that contains the word "school" and "note" whether it is uppercase or lowercase.

```
user@user-VirtualBox:~$ locate file.txt
Command 'locate' not found, but can be installed with:
sudo apt install mlocate # version 0.26-Subuntu1, or
sudo apt install plocate # version 1.1.7-1
user@user-VirtualBox:~$
```

## FIND

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

As an example, find / name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories. Other variations when using the find are:

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

```
user@user-VirtualBox:~$ find halo.txt
halo.txt
user@user-VirtualBox:~$
```

## GREP

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

To illustrate, grep blue notepad.txt will search for the word blue in the notepad file. Lines that contain the searched word will be displayed fully usually output of a previous command is piped into the grep command. For example ls -l | grep "kernel".

```
user@user-VirtualBox:~$ ls
Desktop  Downloads  Music  Public  Templates
Documents  halo.txt  Pictures  sample.txt  Videos
user@user-VirtualBox:~$ cat sample.txt
Halo how are you
user@user-VirtualBox:~$ grep Halo sample.txt
Halo how are you
user@user-VirtualBox:~$
```

## 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.

```
user@user-VirtualBox:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
tmpfs            402160     1344   400816   1% /run
/dev/sda3       20038480  8114952  10882584  43% /
tmpfs            2010796      0   2010796   0% /dev/shm
tmpfs             5120       4     5116   1% /run/lock
tmpfs             4096       0     4096   0% /sys/fs/cgroup
/dev/sda2        524252     5340   518912   2% /boot/efi
tmpfs            402156     116   402040   1% /run/user/1000
user@user-VirtualBox:~$
```

## DS

If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer However, the disk usage summary will show disk block numbers instead of the usual size format.

- ❖ If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line. \$du –h

```
user@user-VirtualBox:~$ du -h
4.0K  ./Public/adarsh
16K   ./Public
4.0K   ./Downloads
4.0K   ./ssh
8.0K   ./config/dconf
4.0K   ./config/nautilus
84K   ./config/pulse
8.0K   ./config/gtk-3.0
4.0K   ./config/enchant
16K   ./config/evolution/sources
20K   ./config/evolution
4.0K   ./config/update-notifier
16K   ./config/ibus/bus
20K   ./config/ibus
4.0K   ./config/gnome-session/saved-session
8.0K   ./config/gnome-session
8.0K   ./config/gedit
4.0K   ./config/goa-1.0
188K  ./config
4.0K   ./Templates
4.0K   ./Music
4.0K   ./Desktop
4.0K   ./local/share/ibus-table
4.0K   ./local/share/nautilus/scripts
8.0K   ./local/share/nautilus
8.0K   ./local/share/gnome-shell
4.0K   / local/share/flatpak/db
```

## **USERADD**

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

useradd is used to create a new user, while passwd is adding a password to that user's

account To add a new person named John type, useradd John and then to add his password type, passwd 123456789

```
user@user-VirtualBox:~$ sudo useradd adarsh
useradd: user 'adarsh' already exists
user@user-VirtualBox:~$ █
```

## **USERDEL**

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

**userdel UserName**

```
user@user-VirtualBox:~$ sudo userdel adarsh
user@user-VirtualBox:~$ sudo userdel adarsh
userdel: user 'adarsh' does not exist
user@user-VirtualBox:~$ █
```

## **SUDO**

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

sudo useradd maria

```
user@user-VirtualBox:~$ sudo useradd adarsh
useradd: user 'adarsh' already exists
user@user-VirtualBox:~$ █
```

## 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.

passwd[option] [username]

passwd

passwd user 1

```
user@user-VirtualBox:~$ sudo useradd adarsh
user@user-VirtualBox:~$ passwd adarsh
passwd: You may not view or modify password information for adarsh.
user@user-VirtualBox:~$ sudo passwd adarsh
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
Sorry, passwords do not match.
New password:
BAD PASSWORD: The password fails the dictionary check - it is too simplistic/stematic
Retype new password:
passwd: password updated successfully
user@user-VirtualBox:~$ █
```

## 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 Tom

```
user@user-VirtualBox:~$ 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)
  -o, --non-unique           allow using duplicate (non-unique) UID
  -p, --password PASSWORD   use encrypted password for the new password
  -R, --root CHROOT_DIR      directory to chroot into
  -P, --prefix PREFIX_DIR    prefix directory where are located the /etc/* f
iles
  -s, --shell SHELL          new login shell for the user account
  -u, --uid UID              new UID for the user account
  -U, --unlock                unlock the user account
  -v, --add-subuids FIRST-LAST add range of subordinate uids
```

```
user@user-VirtualBox:~$ usermod -u 1000 user
usermod: no changes
user@user-VirtualBox:~$ usermod -u 2000 user
usermod: user user is currently used by process 678
user@user-VirtualBox:~$
```

## 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

```
user@user-VirtualBox:~$ sudo groupadd student
[sudo] password for user:
root
```

## GROUPS

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

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

## GROUPDEL

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

```
user@user-VirtualBox:~$ sudo groupdel student
user@user-VirtualBox:~$ █
```

## GROUPMOD

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

```
user@user-VirtualBox:~$ sudo groupmod -n student1 teacher
user@user-VirtualBox:~$ █
```

## CHMOD

- To change directory permissions of file/ Directory in Linux.  
#chmod whowhatwhich file/directory
- chmod +rwx filename to add permissions.
- chmod -rwx directoryname to remove permissions.
- chmod +x filename to allow executable permissions.
- chmod -wx filename to take out write and executable permissions.
- #chmod u+x test
- #chmod g-rwx test #chmod o-r test 4

```
user@user-VirtualBox:~$ chmod +rwx halo.txt
user@user-VirtualBox:~$ █
```

## CHOWN

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

```
user@user-VirtualBox:~$ chown user new.txt
user@user-VirtualBox:~$
```

## ID

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

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

```
user@user-VirtualBox:~$ ps -a
  PID TTY      TIME CMD
 764 tty2    00:00:00 gnome-session-b
2996 tty3    00:00:00 sh
3055 tty3    00:00:00 gnome-session-b
 5799 pts/0    00:00:00 ps
user@user-VirtualBox:~$
```

## TOP

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

- #top -u rose

```
user@user-VirtualBox:~$ top -u user
```

```
top - 15:28:49 up 52 min,  2 users,  load average: 0.16, 0.07, 0.09
Tasks: 233 total,   1 running, 232 sleeping,   0 stopped,   0 zombie
%CPU(s): 6.5 us, 3.1 sy, 0.0 ni, 90.4 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 3927.3 total, 1899.8 free, 1068.1 used, 959.4 buff/cache
MiB Swap: 925.4 total, 925.4 free,    0.0 used. 2607.1 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
934	user	20	0	4028072	353952	125104	S	5.6	8.8	2:42.86	gnome-+
4717	user	20	0	411340	49736	37960	S	1.0	1.2	0:07.32	gnome-+
<b>5800</b>	<b>user</b>	<b>20</b>	<b>0</b>	<b>21580</b>	<b>3924</b>	<b>3324</b>	<b>R</b>	<b>0.3</b>	<b>0.1</b>	<b>0:00.10</b>	<b>top</b>
678	user	20	0	16200	9700	7416	S	0.0	0.2	0:01.17	systemd
680	user	20	0	100604	3436	20	S	0.0	0.1	0:00.00	(sd-pa+)
745	user	9	-11	90764	5960	4836	S	0.0	0.1	0:00.11	pipewi+
746	user	9	-11	82828	5816	4804	S	0.0	0.1	0:00.06	pipewi+
747	user	9	-11	1417592	19500	14976	S	0.0	0.5	0:02.13	pulsea+
750	user	39	19	521388	24932	16752	S	0.0	0.6	0:00.39	tracke+
752	user	20	0	250172	7048	6064	S	0.0	0.2	0:00.19	gnome-+
756	user	20	0	171604	6204	5688	S	0.0	0.2	0:00.01	gdm-wa+
759	user	20	0	9608	5900	4040	S	0.0	0.1	0:02.01	dbus-d+
764	user	20	0	229916	15376	13696	S	0.0	0.4	0:00.08	gnome-+
767	user	20	0	249732	7924	7048	S	0.0	0.2	0:00.10	gvfsd
794	user	20	0	379668	5904	5384	S	0.0	0.1	0:00.01	gvfsd-+
798	user	20	0	325104	9816	8404	S	0.0	0.2	0:00.37	gvfs-u+
834	user	20	0	322944	7676	6816	S	0.0	0.2	0:00.33	gvfs-a+
844	user	20	0	246576	6980	6276	S	0.0	0.2	0:00.05	gvfs-g+
855	user	20	0	245836	6644	6112	S	0.0	0.2	0:00.04	gvfs-g+
865	user	20	0	567912	41372	34760	S	0.0	1.0	0:00.20	goa-da+
878	user	20	0	100964	4864	4428	S	0.0	0.1	0:00.00	gnome-+
887	user	20	0	665064	17708	14928	S	0.0	0.4	0:00.33	gnome-+

## WC

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

```
user@user-VirtualBox:~$ wc sample.txt
 1 4 17 sample.txt
user@user-VirtualBox:~$
```

## 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

```
user@user-VirtualBox:~$ tar cf archive.tar sample.txt name.txt
user@user-VirtualBox:~$ ls
archive.tar  Downloads  Music      Pictures      sample2.txt  Videos
Desktop      files      name.txt  Public       sample.txt
Documents    halo.txt   new.txt   sample1.txt  Templates
user@user-VirtualBox:~$
```

## 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
```

```
user@user-VirtualBox:~$ expr 190 + 45
235
user@user-VirtualBox:~$
```

## REDIRECTION & 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
```

```
user@user-VirtualBox:~$ ls -l|wc -l
17
user@user-VirtualBox:~$
```

## 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

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

## SCP

- SCP (secure copy) is a command-line utility that allows you to securely
- copy files and directories between two locations.
- With scp, you can copy a file or directory:
- From your local system to a remote system.
- From a remote system to your local system.
- Between two remote systems from your local system.
- Remote file system locations are specified in format [user@]host:/path

Syntax:

```
scp [OPTION] [user@]SRC_HOST:]file1
     [user@]DEST_HOST:]file2
$scp /etc/yum.config /etc/hosts ServerX:/home/student
```

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

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

## 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
```

```
user@user-VirtualBox:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user/.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:TxDH/FQDRQFUa/MbF0XBShyKvl9XV7uwHoQpOpQLNzw user@user-VirtualBox
The key's randomart image is:
+---[RSA 3072]----+
| .o..=0X++|
| o+ oo +.|
| .. +. =..|
| . o. +o o+|
| . ESo.o o o=|
| + =oo . o B|
| + .. + +|
| . . o o |
| . . |
+---[SHA256]-----+
user@user-VirtualBox:~$
```

## SSH-COPY-ID

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

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

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

```
user@user-VirtualBox:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3  
song6.mp3  
user@user-VirtualBox:~$ ls  
10.sh 2.sh 9.sh      halo.txt    rsa          song1.mp3  
11.sh 3.sh allfiles.txt icmp.pcap   rsa.pub     song2.mp3  
12.sh 4.sh archive.tar Music       SAMPLE      song4.mp3  
13.sh 5.sh Desktop    name.txt    sample1.txt  song5.mp3  
14.sh 6.sh Documents   new.txt    sample2.txt  song6.mp3  
15.sh 7.sh Downloads   Pictures   sample.txt   Templates  
1.sh   8.sh files      Public     somg3.mp3    Videos  
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ touch snap1.jpg snap2.jpg snap2.jpg snap3.jp snap4.jpg  
snap5.jpg snap6.jpg  
user@user-VirtualBox:~$ ls  
10.sh 3.sh      archive.tar  name.txt    sample2.txt  song3.mp3  
11.sh 4.sh      Desktop     new.txt    sample.txt   song1.mp3  
12.sh 5.sh      Documents   Pictures   snap1.jpg   song2.mp3  
13.sh 6.sh      Downloads   Public    snap2.jpg   song4.mp3  
14.sh 7.sh      files      rsa       snap3.jp    song5.mp3  
15.sh 8.sh      halo.txt   rsa.pub    snap4.jpg   song6.mp3  
1.sh   9.sh      icmp.pcap  SAMPLE    snap5.jpg   Templates  
2.sh   allfiles.txt Music     sample1.txt snap6.jpg   Videos  
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4  
film6.mp4  
user@user-VirtualBox:~$ ls  
10.sh 4.sh      Documents  halo.txt  SAMPLE    snap6.jpg  
11.sh 5.sh      Downloads  icmp.pcap sample1.txt somg3.mp3  
12.sh 6.sh      files     Music     sample2.txt song1.mp3  
13.sh 7.sh      film1.mp4 name.txt  sample.txt  song2.mp3  
14.sh 8.sh      film2.mp4 new.txt   snap1.jpg   song4.mp3  
15.sh 9.sh      film3.mp4 Pictures   snap2.jpg   song5.mp3  
1.sh   allfiles.txt film4.mp4 Public    snap3.jp    song6.mp3  
2.sh   archive.tar film5.mp4 rsa      snap4.jpg   Templates  
3.sh   Desktop    film6.mp4 rsa.pub   snap5.jpg   Videos  
user@user-VirtualBox:~$
```

D)

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.

```
user@user-VirtualBox:~$ mv *.mp3 ./Music/  
user@user-VirtualBox:~$ ls  
10.sh 2.sh 9.sh      film1.mp4  icmp.pcap  rsa.pub      snap3.jp  
11.sh 3.sh allfiles.txt film2.mp4  Music     SAMPLE      snap4.jpg  
12.sh 4.sh archive.tar film3.mp4  name.txt  sample1.txt  snap5.jpg  
13.sh 5.sh Desktop    film4.mp4  new.txt   sample2.txt  snap6.jpg  
14.sh 6.sh Documents   film5.mp4  Pictures   sample.txt   Templates  
15.sh 7.sh Downloads   film6.mp4  Public    snap1.jpg    Videos  
1.sh   8.sh files      halo.txt   rsa       snap2.jpg   work  
user@user-VirtualBox:~$  
user@user-VirtualBox:~$ mv *.jpg ./Pictures/  
user@user-VirtualBox:~$ ls  
10.sh 1.sh 7.sh      Documents  film4.mp4  name.txt  SAMPLE      Videos  
11.sh 2.sh 8.sh      Downloads  film5.mp4  new.txt   sample1.txt  work  
12.sh 3.sh 9.sh      files     film6.mp4  Pictures   sample2.txt  
13.sh 4.sh allfiles.txt film1.mp4  halo.txt   Public    sample.txt  
14.sh 5.sh archive.tar film2.mp4  icmp.pcap  rsa      snap3.jp  
15.sh 6.sh Desktop    film3.mp4  Music     rsa.pub    Templates  
user@user-VirtualBox:~$
```

```
user@user-VirtualBox:~$ mv *.mp4 ./Videos/
user@user-VirtualBox:~$ ls
10.sh 15.sh 5.sh allfiles.txt files    new.txt  SAMPLE   Templates
11.sh 1.sh 6.sh archive.tar halo.txt Pictures sample1.txt Videos
12.sh 2.sh 7.sh Desktop    icmp.pcap Public   sample2.txt work
13.sh 3.sh 8.sh Documents  Music    rsa      sample.txt
14.sh 4.sh 9.sh Downloads  name.txt rsa.pub  snap3.jp
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ mkdir family friends work
user@user-VirtualBox:~$ ls
10.sh 15.sh 5.sh allfiles.txt family   Music    rsa       sample.txt
11.sh 1.sh 6.sh archive.tar files    halo.txt Pictures  rsa.pub  snap3.jp
12.sh 2.sh 7.sh Desktop    friends  icmp.pcap Public   sample1.txt Videos
13.sh 3.sh 8.sh Documents  halo.txt Pictures  sample2.txt work
14.sh 4.sh 9.sh Downloads  name.txt Public
```

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

```
user@user-VirtualBox:~$ cp /home/user/Music song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/user/friends/
user@user-VirtualBox:~$ cp /home/user/Pictures snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/user/family/
```

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

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

6. Attempt to delete both family and friends projects with a single rm command.

```
user@user-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.

```
user@user-VirtualBox:~$ ls -a > allfiles.txt
user@user-VirtualBox:~$ ls
10.sh 15.sh 5.sh  allfiles.txt  family      Music      rsa          sample.txt
11.sh 1.sh   6.sh  archive.tar  files       name.txt   rsa.pub      snap3.jp
12.sh 2.sh   7.sh  Desktop     friends    new.txt    SAMPLE     Templates
13.sh 3.sh   8.sh  Documents   halo.txt   Pictures   sample1.txt Videos
14.sh 4.sh   9.sh  Downloads   icmp.pcap Public    sample2.txt work
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ date
Tuesday 17 August 2021 02:41:12 PM IST
user@user-VirtualBox:~$
```

9. Add the user Juliet

```
user@user-VirtualBox:~$ sudo useradd juliet
[sudo] password for user:
```

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

```
user@user-VirtualBox:~$ cat /etc/passwd | grep juliet
juliet:x:1002:1005:::/home/juliet:/bin/sh
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ sudo passwd juliet
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
```

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

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

13. Create a supplementary group called artists

```
user@user-VirtualBox:~$ sudo groupadd artist
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ less /etc/group  
shakespheare:x:30000:  
artist:x:30001:  
(END)
```

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

```
user@user-VirtualBox:~$ sudo usermod -G shakespheare juliet
```

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

```
user@user-VirtualBox:~$ id juliet  
uid=1002(juliet) gid=1005(juliet) groups=1005(juliet),30000(shakespheare)  
user@user-VirtualBox:~$
```

17. Add Romeo and Hamlet to the Shakespeare group.

```
user@user-VirtualBox:~$ sudo useradd romeo  
user@user-VirtualBox:~$ sudo useradd hamlet  
user@user-VirtualBox:~$ sudo usermod -G shakespheare romeo  
user@user-VirtualBox:~$ sudo usermod -G shakespheare hamlet  
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ sudo useradd reba  
user@user-VirtualBox:~$ sudo useradd dolly  
user@user-VirtualBox:~$ sudo useradd elvis  
user@user-VirtualBox:~$ sudo usermod -G artist reba  
user@user-VirtualBox:~$ sudo usermod -G artist dolly  
user@user-VirtualBox:~$ sudo usermod -G artist elvis  
user@user-VirtualBox:~$
```

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

```
user@user-VirtualBox:~$ less /etc/group  
juliet:x:1005:  
shakespheare:x:30000:juliet,romeo,hamlet  
artist:x:30001:reba,dolly,elvis  
romeo:x:30002:  
hamlet:x:30003:  
reba:x:30004:  
dolly:x:1006:  
elvis:x:1007:  
(END)
```

20. Attempt to remove user Dolly

```
user@user-VirtualBox:~$ sudo userdel dolly  
user@user-VirtualBox:~$
```

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

## Windows

### Ping:

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

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

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

C:\Users\Dell>
```

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

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

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

C:\Users\Dell>
```

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

Pinging google.com [216.58.203.14] with 32 bytes of data:
Reply from 216.58.203.14: bytes=32 time=1434ms TTL=114
Reply from 216.58.203.14: bytes=32 time=653ms TTL=114
Reply from 216.58.203.14: bytes=32 time=530ms TTL=114
Reply from 216.58.203.14: bytes=32 time=278ms TTL=114

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

```
C:\Users\Dell>ping -t google.com
Pinging google.com [2404:6800:4009:804::200e] with 32 bytes of data:
Reply from 2404:6800:4009:804::200e: time=1469ms
Reply from 2404:6800:4009:804::200e: time=616ms
Reply from 2404:6800:4009:804::200e: time=1236ms
Reply from 2404:6800:4009:804::200e: time=167ms
Reply from 2404:6800:4009:804::200e: time=107ms
Reply from 2404:6800:4009:804::200e: time=105ms
Reply from 2404:6800:4009:804::200e: time=73ms
Reply from 2404:6800:4009:804::200e: time=293ms
Reply from 2404:6800:4009:804::200e: time=155ms
Reply from 2404:6800:4009:804::200e: time=69ms
Reply from 2404:6800:4009:804::200e: time=108ms
Reply from 2404:6800:4009:804::200e: time=180ms
Reply from 2404:6800:4009:804::200e: time=105ms
Reply from 2404:6800:4009:804::200e: time=98ms
Reply from 2404:6800:4009:804::200e: time=77ms
Reply from 2404:6800:4009:804::200e: time=132ms
Reply from 2404:6800:4009:804::200e: time=65ms
Reply from 2404:6800:4009:804::200e: time=85ms
Reply from 2404:6800:4009:804::200e: time=392ms
Reply from 2404:6800:4009:804::200e: time=261ms
Reply from 2404:6800:4009:804::200e: time=99ms
Reply from 2404:6800:4009:804::200e: time=75ms
Reply from 2404:6800:4009:804::200e: time=65ms
Reply from 2404:6800:4009:804::200e: time=170ms
Reply from 2404:6800:4009:804::200e: time=126ms
Reply from 2404:6800:4009:804::200e: time=84ms
Reply from 2404:6800:4009:804::200e: time=115ms

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

## Route:

```
C:\Users\Dell>route print *157
=====
Interface List
13...c0 3e ba 28 d5 fb ....Realtek PCIe GbE Family Controller
 4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
 8...ac 12 03 50 5a 51 ....Microsoft Wi-Fi Direct Virtual Adapter
18...ae 12 03 50 5a 50 ....Microsoft Wi-Fi Direct Virtual Adapter #2
19...ac 12 03 50 5a 50 ....Intel(R) Wireless-AC 9462
10...ac 12 03 50 5a 54 ....Bluetooth Device (Personal Area Network)
 1.....Software Loopback Interface 1
=====

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

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

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

IPv6 Route Table
=====
Active Routes:
  If Metric Network Destination      Gateway
 19   71 ::/0                      fe80::e0e9:35ff:feb:f3b1
  1   331 ::1/128                  On-link
 19   71 2402:3a80:108c:b194::/64 On-link
 19   311 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8/128
                                On-link
 19   311 2402:3a80:108c:b194:859c:5139:1bea:9b8d/128
                                On-link
  4   281 fe80::/64                On-link
 19   311 fe80::/64                On-link
 19   311 fe80::1483:bd4:a1d2:d8a8/128
                                On-link
  4   281 fe80::550d:c0e0:6151:d3c8/128
                                On-link
  1   331 ff00::/8                 On-link
  4   281 ff00::/8                 On-link
 19   311 ff00::/8                 On-link

Persistent Routes:
  None
```

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

=====
IPv4 Route Table
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0          0.0.0.0    192.168.43.1  192.168.43.195   55
        127.0.0.0         255.0.0.0        On-link      127.0.0.1   331
      127.0.0.1         255.255.255.255        On-link      127.0.0.1   331
127.255.255.255         255.255.255.255        On-link      127.0.0.1   331
  192.168.43.0         255.255.255.0        On-link     192.168.43.195   311
192.168.43.195         255.255.255.255        On-link     192.168.43.195   311
192.168.43.255         255.255.255.255        On-link     192.168.43.195   311
192.168.56.0         255.255.255.0        On-link     192.168.56.1   281
192.168.56.1         255.255.255.255        On-link     192.168.56.1   281
192.168.56.255         255.255.255.255        On-link     192.168.56.1   281
  224.0.0.0          240.0.0.0        On-link      127.0.0.1   331
  224.0.0.0          240.0.0.0        On-link     192.168.56.1   281
  224.0.0.0          240.0.0.0        On-link     192.168.43.195   311
255.255.255.255         255.255.255.255        On-link      127.0.0.1   331
255.255.255.255         255.255.255.255        On-link     192.168.56.1   281
255.255.255.255         255.255.255.255        On-link     192.168.43.195   311

Persistent Routes:
  None

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

=====
IPv4 Route Table
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0          0.0.0.0    192.168.43.1  192.168.43.195   55
        127.0.0.0         255.0.0.0        On-link      127.0.0.1   331
      127.0.0.1         255.255.255.255        On-link      127.0.0.1   331
127.255.255.255         255.255.255.255        On-link      127.0.0.1   331
  192.168.43.0         255.255.255.0        On-link     192.168.43.195   311
192.168.43.195         255.255.255.255        On-link     192.168.43.195   311
192.168.43.255         255.255.255.255        On-link     192.168.43.195   311
192.168.56.0         255.255.255.0        On-link     192.168.56.1   281
192.168.56.1         255.255.255.255        On-link     192.168.56.1   281
192.168.56.255         255.255.255.255        On-link     192.168.56.1   281
  224.0.0.0          240.0.0.0        On-link      127.0.0.1   331
  224.0.0.0          240.0.0.0        On-link     192.168.56.1   281
  224.0.0.0          240.0.0.0        On-link     192.168.43.195   311
255.255.255.255         255.255.255.255        On-link      127.0.0.1   331
255.255.255.255         255.255.255.255        On-link     192.168.56.1   281
255.255.255.255         255.255.255.255        On-link     192.168.43.195   311

Persistent Routes:
  None

=====
IPv6 Route Table
Active Routes:
If Metric Network Destination      Gateway
19      71 ::/0           fe80::c0e9:35ff:febf:f3b:
1      331 ::1/128        On-link
19      71 2462:3a89:108c:b:94:1/64 On-link
19      311 2462:3a89:108c:b:94:1/89:bd0d:1d2:c8a8/128
19      311 2462:3a89:108c:b:94:859c:5139:1bea:9b8d/128
19      311 2462:3a89:108c:b:94:859c:5139:1bea:9b8d/128
19      231 fe80::/64        On-link
10      311 fe80::/64        On-link
```

## Traceroute:

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

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1   1 ms    <1 ms    <1 ms  192.168.43.1
 2  1546 ms   661 ms   665 ms  100.91.255.254
 3  *          *          *      Request timed out.
 4  626 ms   1934 ms   653 ms  10.174.173.81
 5  *          *          *      Request timed out.
 6  205 ms    78 ms    64 ms  192.168.100.13
 7  *          *          *      Request timed out.
 8  *          1601 ms   372 ms  10.174.173.65
 9  163 ms    76 ms    67 ms  118.185.245.1
10  100 ms    83 ms    224 ms  182.19.106.200
11  258 ms    217 ms   218 ms  ae11-100-xcr1.mar.cw.net [213.185.219.53]
12  181 ms    174 ms   231 ms  ae10-xcr1.ptl.cw.net [195.2.30.213]
13  269 ms    218 ms   216 ms  10gigabitethernet-2-2.par2.he.net [195.42.144.104]
14  784 ms   617 ms   728 ms  10ge12-2.core2.ash1.he.net [184.104.196.241]
15  *          *          *      Request timed out.
16  *          *          *      Request timed out.
17  *          *          *      Request timed out.
18  *          *          *      Request timed out.
19  *          *          *      Request timed out.
20  *          *          *      Request timed out.
21  *          *          *      Request timed out.
22  *          *          *      Request timed out.
23  *          *          *      Request timed out.
24  *          *          *      Request timed out.
25  *          *          *      Request timed out.
26  *          *          *      Request timed out.
27  *          *          *      Request timed out.
28  *          *          *      Request timed out.
29  *          *          *      Request timed out.
30  *          *          *      Request timed out.
```

Trace complete.

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

Tracing route to new-fp-shed.wg1.b.yahoo.com [2406:2000:e4:1605::9000]
over a maximum of 30 hops:

 1   1 ms    1 ms    2 ms  2402:3a80:108c:b194::be
 2  *          *          *      Request timed out.
 3  267 ms   45 ms   168 ms  fd00:0:17:1c::2
 4  *          *          *      Request timed out.
 5  73 ms    48 ms   121 ms  fd00:0:17:1c::2
 6  36 ms    43 ms   57 ms  fd00:0:16:38::1
 7  97 ms    38 ms   49 ms  fd00:0:16:3a::2
 8  482 ms   331 ms   217 ms  fd00:0:17:29::3
 9  49 ms    46 ms   99 ms  2400:5200:2c10:1::12
10  255 ms   83 ms   86 ms  2400:5200:1800:37::2
11  *          *          *      Request timed out.
12  *          522 ms   *      2403:e800:508:2c::2
13  193 ms   *          1646 ms  2406:2000:f01f:201::1
14  *          1108 ms   245 ms  2406:2000:e4:fc01::1
15  *          277 ms   236 ms  2406:2000:e4:f815::1
16  *          323 ms   218 ms  2406:2000:c4:c408::1
17  266 ms   190 ms   196 ms  2406:2000:e4:1605::9000
```

Trace complete.

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

Tracing route to www.google.com [2404:6800:4009:81e::2004]
over a maximum of 30 hops:

 1   1 ms    1 ms    <1 ms  2402:3a80:108c:b194::be
 2   *         *         *      Request timed out.
 3   80 ms    47 ms    49 ms  fd00:0:17:1c::2
 4   *         *         *      Request timed out.
 5   *         2094 ms   218 ms  fd00:0:17:1c::2
 6   262 ms   81 ms    106 ms  fd00:0:16:38::1
 7   126 ms   156 ms   72 ms  fd00:0:16:3a::2
 8   305 ms   *         3085 ms  fd00:0:17:29::3
 9   52 ms    41 ms    56 ms  2400:5200:2c10:1::12
10  533 ms   647 ms   145 ms  2400:5200:401:a::11
11  *         *         *      Request timed out.
12  78 ms    *         1440 ms  2404:6800:80dc::1
13  211 ms   74 ms    67 ms  2001:4860:0:1::43d8
14  *         *         *      Request timed out.
15  *         *         *      Request timed out.
16  98 ms    96 ms    83 ms  2001:4860:0:1::4fe1
17  142 ms   93 ms    121 ms  bom07s28-in-x04.1e100.net [2404:6800:4009:81e::2004]

Trace complete.
```

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

Tracing route to 192.168.1.1 over a maximum of 30 hops

 1   1 ns    <1 ms    <1 ms  192.168.43.1
 2   223 ms   190 ms   181 ms  100.91.255.254
 3   *         *         *      Request timed out.
 4   153 ms   216 ms   75 ms  10.172.173.81
 5   *         *         *      Request timed out.
 6   66 ms    65 ms    77 ms  192.168.109.13
 7   *         *         *      Request timed out.
 8   420 ns   917 ms   1097 ms  10.172.173.65
 9   *         *         *      Request timed out.
10  *         *         *      Request timed out.
11  *         *         *      Request timed out.
12  *         *         *      Request timed out.
13  *         *         *      Request timed out.
14  *         *         *      Request timed out.
15  *         *         *      Request timed out.
16  *         *         *      Request timed out.
17  *         *         *      Request timed out.
18  *         *         *      Request timed out.
19  *         *         *      Request timed out.
20  *         *         *      Request timed out.
21  *         *         *      Request timed out.
22  *         *         *      Request timed out.
23  *         *         *      Request timed out.
24  *         *         *      Request timed out.
25  *         *         *      Request timed out.
26  *         *         *      Request timed out.
27  *         *         *      Request timed out.
28  *         *         *      Request timed out.
29  *         *         *      Request timed out.
30  *         *         *      Request timed out.

Trace complete.
```

## Nslookup:

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

DNS request timed out.
    timeout was 2 seconds.
Non-authoritative answer:
google.com      nameserver = ns3.google.com
google.com      nameserver = ns4.google.com
google.com      nameserver = ns1.google.com
google.com      nameserver = ns2.google.com

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

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

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

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

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

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

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

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

## IP config:

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

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

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

Options:
  /?
  /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.
  /flushdns    Renew the IPv6 address for the specified adapter.
  /registerdns Purges the DNS Resolver cache.
  /refreshdns  Refreshes all DHCP leases and re-registers DNS names
  /displaydns  Display the contents of the DNS Resolver Cache.
  /showclassid Displays all the dhcp class IDs allowed for adapter.
  /setclassid   Modifies the dhcp class id.
  /showclassid6 Displays all the IPv6 DHCP class IDs allowed for adapter.
  /setclassid6  Modifies the IPv6 DHCP class id.

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

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

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

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

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

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

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

mtalk.google.com
-----
Record Name . . . . . : mtalk.google.com
Record Type . . . . . : 5
Time To Live . . . . . : 160
Data Length . . . . . : 9
Section . . . . . : Answer
CNAME Record . . . . . : mobile-gtalk.l.google.com

Record Name . . . . . : mobile_gtalk.l.google.com
Record Type . . . . . : 28
Time To Live . . . . . : 160
Data Length . . . . . : 16
Section . . . . . : Answer
AAA Record . . . . . : 2404:6800:4003:c00:.bc

mtalk.google.com
```

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

Windows IP Configuration

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

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . :
    IPv6 Address . . . . . : 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8
    Temporary IPv6 Address . . . . . : 2402:3a80:108c:b194:859c:5139:1bea:9b8d
    Link-local IPv6 Address . . . . . : fe80::1483:bd4:a1d2:d8a8%19
    Default Gateway . . . . . : fe80::e0e9:35ff:febf:f3b1%19

Ethernet adapter Bluetooth Network Connection:

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

```
C:\Users\Dell>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

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

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . :
    IPv6 Address . . . . . : 2402:3a80:108c:b194:1483:bd4:a1d2:d8a8
    Temporary IPv6 Address . . . . . : 2402:3a80:108c:b194:859c:5139:1bea:9b8d
    Link-local IPv6 Address . . . . . : fe80::1483:bd4:a1d2:d8a8%19
    IPv4 Address . . . . . : 192.168.43.195
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::e0e9:35ff:febf:f3b1%19
    192.168.43.1

Ethernet adapter Bluetooth Network Connection:

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

## Netstat:

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

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

Registered By Broadcast = 210
Registered By Name Server = 0

C:\Users\DELL>


```

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

Active Connections

Proto Local Address          Foreign Address        State
TCP   0.0.0.0:135             DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:245             DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:5040            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:7088            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49664            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49655            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49666            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49667            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49668            DESKTOP-PCFNB09:0    LISTENING
TCP   0.0.0.0:49685            DESKTOP-PCFNB09:0    LISTENING
TCP   127.0.0.1:18884          DESKTOP-PCFNB09:0    LISTENING
TCP   127.0.0.1:5170           DESKTOP-PCFNB09:5470 ESTABLISHED
TCP   127.0.0.1:54171          DESKTOP-PCFNB09:5470 ESTABLISHED
TCP   127.0.0.1:54172          DESKTOP-PCFNB09:5473 ESTABLISHED
TCP   127.0.0.1:54173          DESKTOP-PCFNB09:5472 ESTABLISHED
TCP   127.0.0.1:54174          DESKTOP-PCFNB09:5474 ESTABLISHED
TCP   127.0.0.1:54175          DESKTOP-PCFNB09:5475 ESTABLISHED
TCP   127.0.0.1:54176          DESKTOP-PCFNB09:5477 ESTABLISHED
TCP   127.0.0.1:54177          DESKTOP-PCFNB09:5476 ESTABLISHED
TCP   192.168.43.195:139       DESKTOP-PCFNB09:0    LISTENING
TCP   192.168.43.195:61262     a-0001:ffffb::1bea:9b8d LISTENING
TCP   192.168.56.1:139         DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:135                DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:445                DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:76980               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49664               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49665               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49666               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49667               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49668               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49685               DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:4969                DESKTOP-PCFNB09:0    LISTENING
TCP   [::]:49699               DESKTOP-PCFNB09:0    LISTENING
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51887 [64:ffffb::14:6:a2e] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51889 [64:ffffb::14:6:a2e] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51891 [64:ffffb::14:6:a2e] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:58745 sa-in-abc:5228 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63261 [64:ffffb::d69:12fe] https CLOSE_WAIT
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63263 [2666:380b:137:12f:30e:1bea:9b8d:265a] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63264 [64:ffffb::d69:12fe] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63265 [64:ffffb::cc4f:c5e] https ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63266 [2660:1901:1:c36::] https ESTABLISHED

C:\Users\DELL>netstat -n 5

Active Connections

Proto Local Address          Foreign Address        State
TCP   127.0.0.1:54170          127.0.0.1:54171 ESTABLISHED
TCP   127.0.0.1:54171          127.0.0.1:54170 ESTABLISHED
TCP   127.0.0.1:54172          127.0.0.1:54173 ESTABLISHED
TCP   127.0.0.1:54173          127.0.0.1:54172 ESTABLISHED
TCP   127.0.0.1:54174          127.0.0.1:54175 ESTABLISHED
TCP   127.0.0.1:54175          127.0.0.1:54174 ESTABLISHED
TCP   127.0.0.1:54176          127.0.0.1:54177 ESTABLISHED
TCP   127.0.0.1:54177          127.0.0.1:54176 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:50597 [2606:2800:147:120f:30::1bea:fc6:265a]:443 CLOSE_WAIT
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51887 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51888 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51899 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:58745 [2404:6800:4003:c00::bc]:5228 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63260 [2404:6800:4009:821::200a]:443 ESTABLISHED

Active Connections

Proto Local Address          Foreign Address        State
TCP   127.0.0.1:54170          127.0.0.1:54171 ESTABLISHED
TCP   127.0.0.1:54171          127.0.0.1:54170 ESTABLISHED
TCP   127.0.0.1:54172          127.0.0.1:54173 ESTABLISHED
TCP   127.0.0.1:54173          127.0.0.1:54172 ESTABLISHED
TCP   127.0.0.1:54174          127.0.0.1:54175 ESTABLISHED
TCP   127.0.0.1:54175          127.0.0.1:54174 ESTABLISHED
TCP   127.0.0.1:54176          127.0.0.1:54177 ESTABLISHED
TCP   127.0.0.1:54177          127.0.0.1:54176 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:50597 [2606:2800:147:120f:30::1bea:fc6:265a]:443 CLOSE_WAIT
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51887 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51888 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:51889 [64:ffffb::14:6:a2e]:443 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:58745 [2404:6800:4003:c00::bc]:5228 ESTABLISHED
TCP   [2402:3a80:108c:194:859c:5139:1bea:9b8d]:63260 [2404:6800:4009:821::200a]:443 ESTABLISHED
```

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

Active Connections

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

```
C:\Users\DELL>netstat

Active Connections

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

# UBUNTU

## Ping:

```
user@user-VirtualBox:~$ ping google.com
PING google.com (142.250.195.110) 56(84) bytes of data.
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=1 ttl=115 time=27.2 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=2 ttl=115 time=22.6 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=3 ttl=115 time=21.9 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=4 ttl=115 time=23.6 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=5 ttl=115 time=23.3 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=6 ttl=115 time=27.0 ms
```

```
user@user-VirtualBox:~$ ping -a google.com
PING google.com (142.250.195.110) 56(84) bytes of data.
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=1 ttl=115 time=24.0 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=2 ttl=115 time=25.2 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=3 ttl=115 time=25.0 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=4 ttl=115 time=22.1 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=5 ttl=115 time=23.8 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=6 ttl=115 time=22.8 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=7 ttl=115 time=21.9 ms
```

```
user@user-VirtualBox:~$ ping -v google.com
PING google.com (142.250.195.110) 56(84) bytes of data.
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=1 ttl=115 time=22.2 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=2 ttl=115 time=22.4 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=3 ttl=115 time=21.4 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=4 ttl=115 time=23.1 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=5 ttl=115 time=22.3 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=6 ttl=115 time=22.0 ms
```

```
user@user-VirtualBox:~$ ping -b google.com
PING google.com (142.250.195.110) 56(84) bytes of data.
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=1 ttl=115 time=22.2 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=2 ttl=115 time=21.6 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=3 ttl=115 time=22.3 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=4 ttl=115 time=22.0 ms
64 bytes from maa03s39-in-f14.1e100.net (142.250.195.110): icmp_seq=5 ttl=115 time=24.6 ms
```

## Route:

```
user@user-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3
user@user-VirtualBox:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3
user@user-VirtualBox:~$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref    Use Iface
user@user-VirtualBox:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
user@user-VirtualBox:~$
```

## Traceroute:

```
user@user-VirtualBox:~$ traceroute google.com
traceroute to google.com (142.250.195.110), 64 hops max
 1  10.0.2.2  0.321ms  0.269ms  0.213ms
 2  *  *  *
 3  *  *  *
 4  *  *  *
 5  *  *  *
 6  *  *
```

## Nslookup:

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

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.110
Name:   google.com
Address: 2404:6800:4007:824::200e
```

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

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

Authoritative answers can be found from:

```
user@user-VirtualBox:~$ nslookup -type=soa redhat.com
Server:      127.0.0.53
Address:     127.0.0.53#53

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

Authoritative answers can be found from:

## If config:

```
user@user-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::ff04:8b9d:ceb:69c6 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:eb:25:92 txqueuelen 1000 (Ethernet)
            RX packets 1058 bytes 1060445 (1.0 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 699 bytes 72991 (72.9 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 571 bytes 54064 (54.0 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 571 bytes 54064 (54.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
user@user-VirtualBox:~$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3     1500    1059     0     0 0       707     0     0 0       BMRU
lo         65536    572     0     0 0       572     0     0 0       LRU
```

```
user@user-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::ff04:8b9d:ceb:69c6 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:eb:25:92 txqueuelen 1000 (Ethernet)
            RX packets 1058 bytes 1060445 (1.0 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 701 bytes 73185 (73.1 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 572 bytes 54137 (54.1 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 572 bytes 54137 (54.1 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

## Netstat:

```
user@user-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 user-VirtualBox:36056   32.121.122.34.bc.g:http ESTABLISHED
tcp      0      1 user-VirtualBox:36058   32.121.122.34.bc.g:http SYN_SENT
tcp      0      1 user-VirtualBox:36060   32.121.122.34.bc.g:http SYN_SENT
udp      0      0 user-VirtualBox:bootpc _gateway:bootps    ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node  Path
unix  2      [ ]        DGRAM                    19356   /run/user/1000/systemd/notify
unix  2      [ ]        DGRAM                    15466   /run/systemd/notify
unix  2      [ ]        DGRAM                    15480   /run/systemd/journal
/syslog
unix  17     [ ]        DGRAM                    15489   /run/systemd/journal
/dev-log
unix  8      [ ]        DGRAM                    15491   /run/systemd/journal
/socket
unix  3      [ ]        STREAM     CONNECTED    17374   /run/systemd/journal
/stdout
unix  3      [ ]        STREAM     CONNECTED    22397   /tmp/dbus-5vaFeHxKbD
unix  3      [ ]        STREAM     CONNECTED    21356
unix  3      [ ]        STREAM     CONNECTED    19824
unix  3      [ ]        STREAM     CONNECTED    22330   /run/user/1000/bus
unix  3      [ ]        STREAM     CONNECTED    20931
unix  3      [ ]        STREAM     CONNECTED    19662
unix  3      [ ]        STREAM     CONNECTED    16658
unix  3      [ ]        STREAM     CONNECTED    17799
unix  3      [ ]        STREAM     CONNECTED    22395   /run/user/1000/bus
```

```

user@user-VirtualBox:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 10.0.2.15:68            10.0.2.2:67          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node    Path
unix    2      [ ]        DGRAM                    19356    /run/user/1000/systemd
md/notify
unix    3      [ ]        DGRAM                    15466    /run/systemd/notify
unix    2      [ ]        DGRAM                    15480    /run/systemd/journal
/syslog
unix   17     [ ]        DGRAM                    15489    /run/systemd/journal
/dev-log
unix   8      [ ]        DGRAM                    15491    /run/systemd/journal
/socket
unix   3      [ ]        STREAM     CONNECTED    17374    /run/systemd/journal
/stdout
unix   3      [ ]        STREAM     CONNECTED    22397    /tmp/dbus-5vaFeHxKbD
unix   3      [ ]        STREAM     CONNECTED    21356
unix   3      [ ]        STREAM     CONNECTED    19824
unix   3      [ ]        STREAM     CONNECTED    22330    /run/user/1000/bus
unix   3      [ ]        STREAM     CONNECTED    20931
unix   3      [ ]        STREAM     CONNECTED    19662
unix   3      [ ]        STREAM     CONNECTED    16658
unix   3      [ ]        STREAM     CONNECTED    17799
unix   3      [ ]        STREAM     CONNECTED    22395    /run/user/1000/bus
unix   3      [ ]        STREAM     CONNECTED    21156

```

```

user@user-VirtualBox:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      1 10.0.2.15:36074        34.122.121.32:80      SYN_SENT
tcp      0      1 10.0.2.15:36072        34.122.121.32:80      SYN_SENT
tcp      0      0 10.0.2.15:36070        34.122.121.32:80      ESTABLISHED
udp      0      0 10.0.2.15:68          10.0.2.2:67          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node    Path
unix    2      [ ]        DGRAM                    19356    /run/user/1000/systemd
md/notify
unix    3      [ ]        DGRAM                    15466    /run/systemd/notify
unix    2      [ ]        DGRAM                    15480    /run/systemd/journal
/syslog
unix   17     [ ]        DGRAM                    15489    /run/systemd/journal
/dev-log
unix   8      [ ]        DGRAM                    15491    /run/systemd/journal
/socket
unix   3      [ ]        STREAM     CONNECTED    17374    /run/systemd/journal
/stdout
unix   3      [ ]        STREAM     CONNECTED    22397    /tmp/dbus-5vaFeHxKbD
unix   3      [ ]        STREAM     CONNECTED    21356
unix   3      [ ]        STREAM     CONNECTED    19824
unix   3      [ ]        STREAM     CONNECTED    22330    /run/user/1000/bus
unix   3      [ ]        STREAM     CONNECTED    20931
unix   3      [ ]        STREAM     CONNECTED    19662
unix   3      [ ]        STREAM     CONNECTED    16658
unix   3      [ ]        STREAM     CONNECTED    17799
unix   3      [ ]        STREAM     CONNECTED    22395    /run/user/1000/bus

```

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

### **Nbstat:**

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the NetBIOS name. Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

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

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

Registered By Broadcast   = 210
Registered By Name Server = 0

C:\Users\Dell>
```

### **ARP:**

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses. Windows devices maintain an ARP cache, which contains the results of recent ARP queries.

You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific

host, you can append the remote host's IP address to the ARP -A command.

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

Interface: 192.168.56.1 --- 0x4
 Internet Address Physical Address      Type
 192.168.56.255   ff-ff-ff-ff-ff-ff    static
 224.0.0.22        01-00-5e-00-00-16    static
 224.0.0.251       01-00-5e-00-00-fb    static
 224.0.0.252       01-00-5e-00-00-fc    static
 239.255.255.250   01-00-5e-7f-ff-fa  static

Interface: 192.168.43.195 --- 0x13
 Internet Address Physical Address      Type
 192.168.43.1     e2-e9-35-bf-f3-b1    dynamic
 192.168.43.255   ff-ff-ff-ff-ff-ff    static
 224.0.0.22        01-00-5e-00-00-16    static
 224.0.0.251       01-00-5e-00-00-fb    static
 224.0.0.252       01-00-5e-00-00-fc    static
 239.255.255.250   01-00-5e-7f-ff-fa  static
 255.255.255.255  ff-ff-ff-ff-ff-ff  static

C:\Users\Dell>S
```

## PathPing:

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

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

```
C:\Users\Dell>pathping www.google.com

Tracing route to www.google.com [2404:6800:4009:81e::2004]
over a maximum of 30 hops:
  0  DESKTOP-PCFN09 [2402:3a80:108c:b194:859c:5139:1bea:9b8d]
  1  2402:3a80:108c:b194::be
  2  *
Computing statistics for 25 seconds...
          Source to Here  This Node/Link
Hop  RTT     Lost/Sent = Pct  Lost/Sent = Pct  Address
  0           1/ 100 =  1%          |          DESKTOP-PCFN09 [2402:3a80:108c:b194:859c:5139:1bea:9b8d]
  1  24ms    1/ 100 =  1%    0/ 100 =  0%  2402:3a80:108c:b194::be

Trace complete.
```

## Hostname:

The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know

which switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command. Typing Hostname at the command prompt returns the local computer name.

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

## Getmac:

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

```
C:\Users\Dell>getmac  
Physical Address      Transport Name  
===== =====  
C0-3E-BA-28-D5-FB  Media disconnected  
AC-12-03-50-5A-50  \Device\Tcpip_{F706C595-508A-4AF3-86FD-8A50CF8A9974}  
AC-12-03-50-5A-54  Media disconnected  
0A-00-27-00-00-04  \Device\Tcpip_{3CB6DBD7-45C8-4C86-B2B8-AB058476FBE7}
```

## 1. sudo apt-get install ansible

```
user@user-VirtualBox:~$ sudo apt-get install ansible
[sudo] password for user:
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 235 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
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-jinja2 all
```

## 2. ansible --version

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

# Linux, Apache, MySQL, PHP (LAMP)

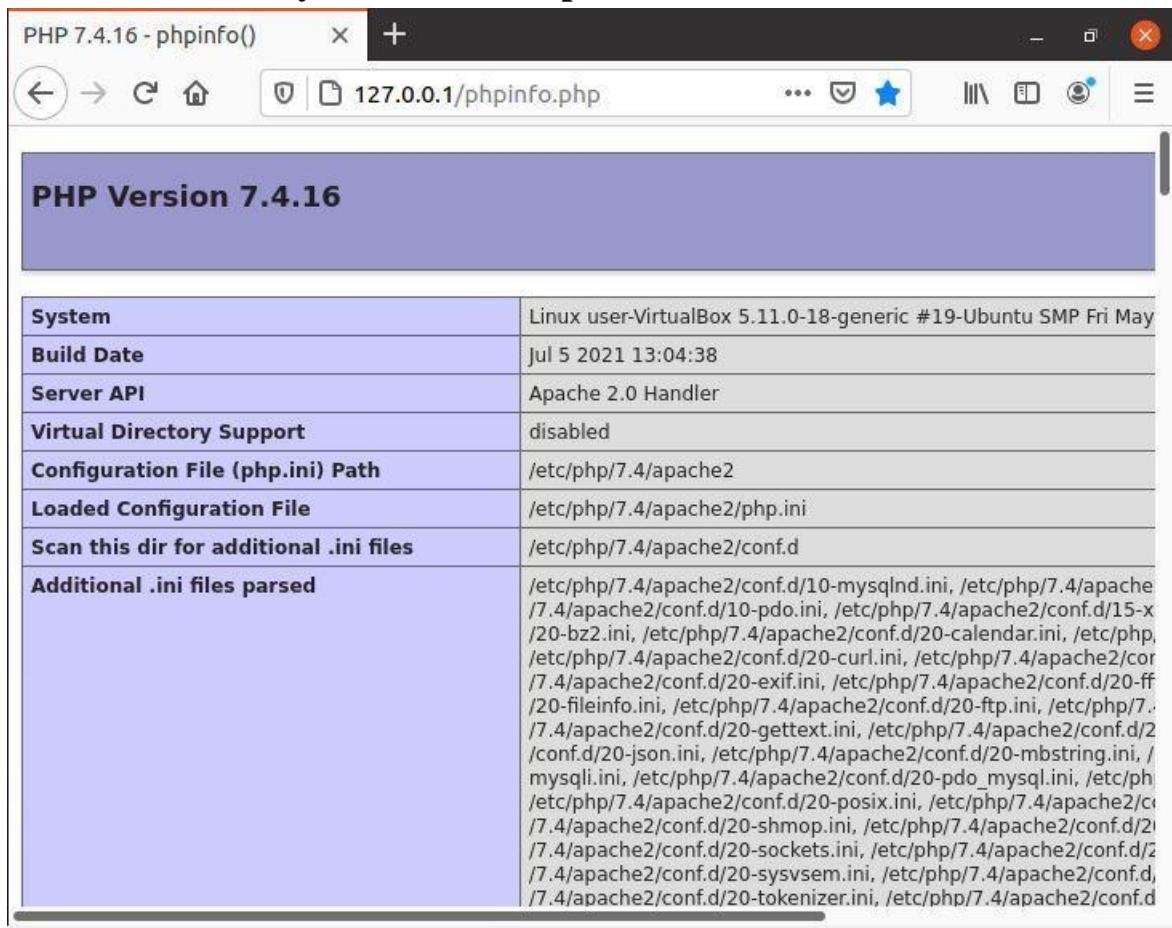
## 1. Installation of Apache

```
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 systemctl status apache2
```



The screenshot shows a web browser window with the title "PHP 7.4.16 - phpinfo()". The address bar indicates the URL is "127.0.0.1/phpinfo.php". The main content area displays the "PHP Version 7.4.16" section, followed by a table of PHP configuration details.

| System                                  | Linux user-VirtualBox 5.11.0-18-generic #19-Ubuntu SMP Fri May                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Build Date                              | Jul 5 2021 13:04:38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Server API                              | Apache 2.0 Handler                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Virtual Directory Support               | disabled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Configuration File (php.ini) Path       | /etc/php/7.4/apache2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Loaded Configuration File               | /etc/php/7.4/apache2/php.ini                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Scan this dir for additional .ini files | /etc/php/7.4/apache2/conf.d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Additional .ini files parsed            | /etc/php/7.4/apache2/conf.d/10-mysqli.ini, /etc/php/7.4/apache2/conf.d/10-pdo.ini, /etc/php/7.4/apache2/conf.d/15-x20-bz2.ini, /etc/php/7.4/apache2/conf.d/20-calendar.ini, /etc/php/7.4/apache2/conf.d/20-curl.ini, /etc/php/7.4/apache2/conf.d/20-exif.ini, /etc/php/7.4/apache2/conf.d/20-ff20-finfo.ini, /etc/php/7.4/apache2/conf.d/20-ftp.ini, /etc/php/7.4/apache2/conf.d/20-gettext.ini, /etc/php/7.4/apache2/conf.d/20-json.ini, /etc/php/7.4/apache2/conf.d/20-mbstring.ini, /etc/php/7.4/apache2/conf.d/20-pdo_mysql.ini, /etc/php/7.4/apache2/conf.d/20-posix.ini, /etc/php/7.4/apache2/conf.d/20-shmop.ini, /etc/php/7.4/apache2/conf.d/20-sockets.ini, /etc/php/7.4/apache2/conf.d/20-sysvsem.ini, /etc/php/7.4/apache2/conf.d/20-tokenizer.ini, /etc/php/7.4/apache2/conf.d/20-zip.ini |

## 2. Installation of MariaDB

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

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

Check mariadb Installation

```
sudo systemctl status mysql
```

```
user@user-VirtualBox:~$ sudo apt-get install mariadb-server mariadb-client
E: dpkg was interrupted, you must manually run 'sudo dpkg --configure -a' to correct the problem.
user@user-VirtualBox:~$ sudo apt-get install mariadb-server mariadb-client
E: dpkg was interrupted, you must manually run 'sudo dpkg --configure -a' to correct the problem.
user@user-VirtualBox:~$ sudo dpkg --configure -a
Setting up man-db (2.9.4-2) ...
Building database of manual pages ...
man-db.service is a disabled or a static unit not running, not starting it.
Processing triggers for libc-bin (2.33-0ubuntu5) ...
user@user-VirtualBox:~$ sudo apt-get install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mariadb-client is already the newest version (1:10.5.12-0ubuntu0.21.04.1).
mariadb-server is already the newest version (1:10.5.12-0ubuntu0.21.04.1).
0 upgraded, 0 newly installed, 0 to remove and 236 not upgraded.
user@user-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariADB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres
   Active: active (running) since Wed 2021-09-29 16:02:10 IST; 4min 17s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
 Main PID: 780 (mariadb)
   Status: "Taking your SQL requests now..."
    Tasks: 10 (limit: 4635)
   Memory: 94.3M
```

### 3. Install PHP

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

Restart apache2

```
sudo systemctl restart apache2
```

Check Installation by

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

```
user@user-VirtualBox:~$ sudo apt install php libapache2-mod-php php-ocpache php
-cli php-gd php-curl php-mysql
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'php7.4-ocpache' instead of 'php-ocpache'
libapache2-mod-php is already the newest version (2:7.4+76ubuntu1).
php is already the newest version (2:7.4+76ubuntu1).
php-cli is already the newest version (2:7.4+76ubuntu1).
php-curl is already the newest version (2:7.4+76ubuntu1).
php-gd is already the newest version (2:7.4+76ubuntu1).
php-mysql is already the newest version (2:7.4+76ubuntu1).
php7.4-ocpache is already the newest version (7.4.16-1ubuntu2.1).
0 upgraded, 0 newly installed, 0 to remove and 236 not upgraded.
user@user-VirtualBox:~$ sudo systemctl restart apache2
user@user-VirtualBox:~$
```

#### 4. Install phpmyadmin

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

Restart apache2

```
sudo systemctl restart apache2
```

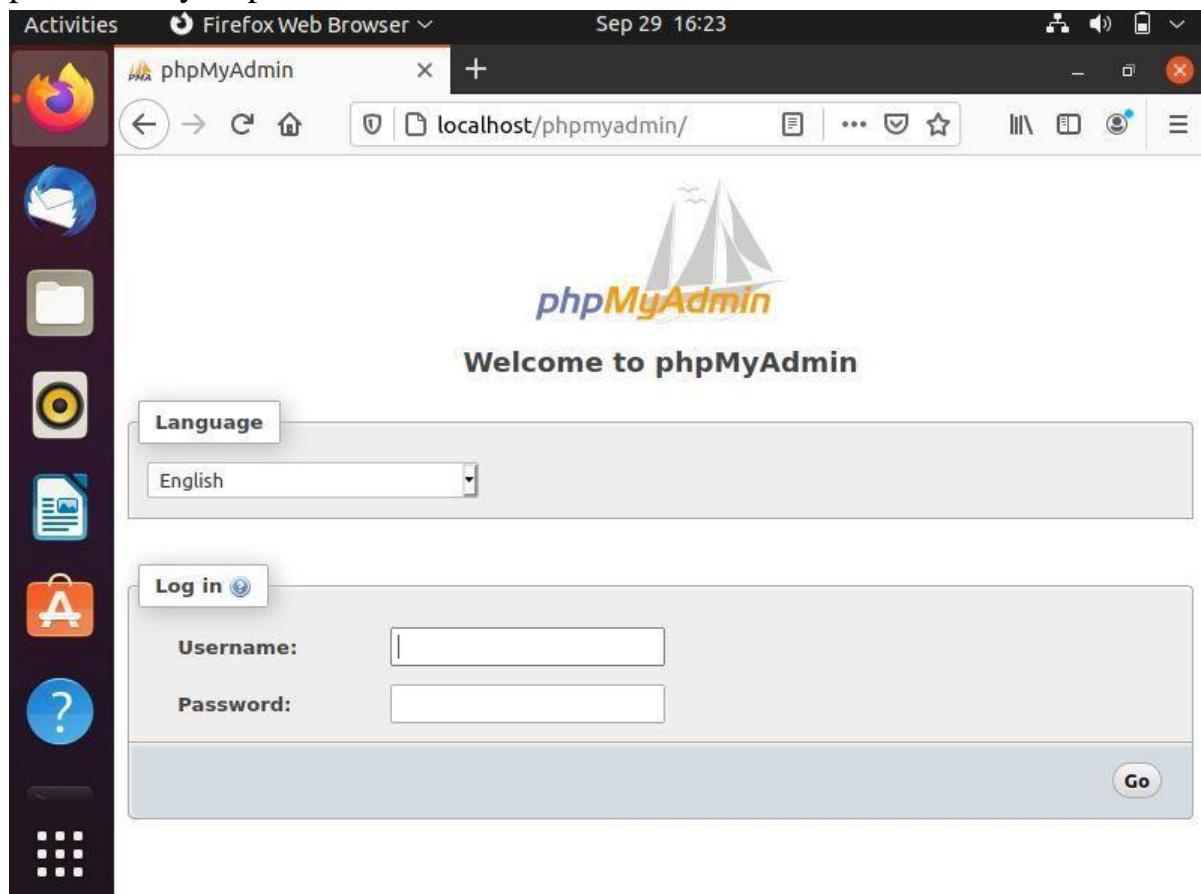
check phpmyadmin

Open a browser

<http://localhost/phpmyadmin>

username : root

password : yourpassword



localhost / localhost | p X

localhost/phpmyadmin/index.

4 IN Databases SQL i@ Status User accounts Export Import

@ Change password

Server connection collation @: uE\_Bmb4\_unicode\_ci

@ Language @ English

@ Theme: pmah e

• Font size: 8

@ More settings.

### Console

localhost / localhost | p X



4 .1J Databases SQL i@ Status .J User accounts Export Import #

o Server: Localhost via UNIX socket  
o Server type: MariaDB  
+ Server connection: SSL is not being used  
e Server version: 10.3.12-MariaDB-Ubuntu0.21.04.1 - Ubuntu 21.04  
Protocol version: 10  
e User: admin@localhost  
e Server charset: UTF-8 Unicode (utf8mb4)

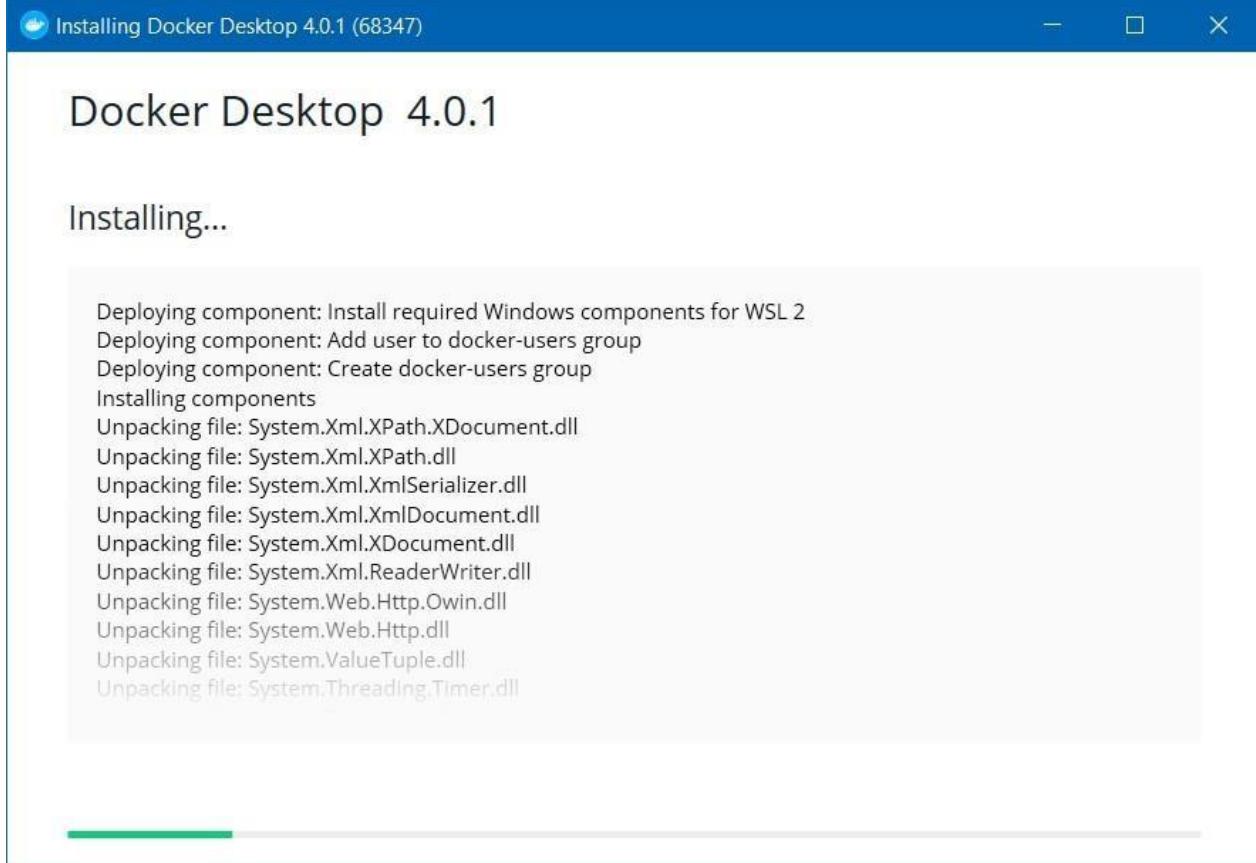
e Apache/2.4.46 (Ubuntu)  
o Database client version: libmysql -mysqlnd 7.4.16  
e PHP extension: +Y dli curl mbstring  
• PHP version: 7.4.16

## **Step-1**

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

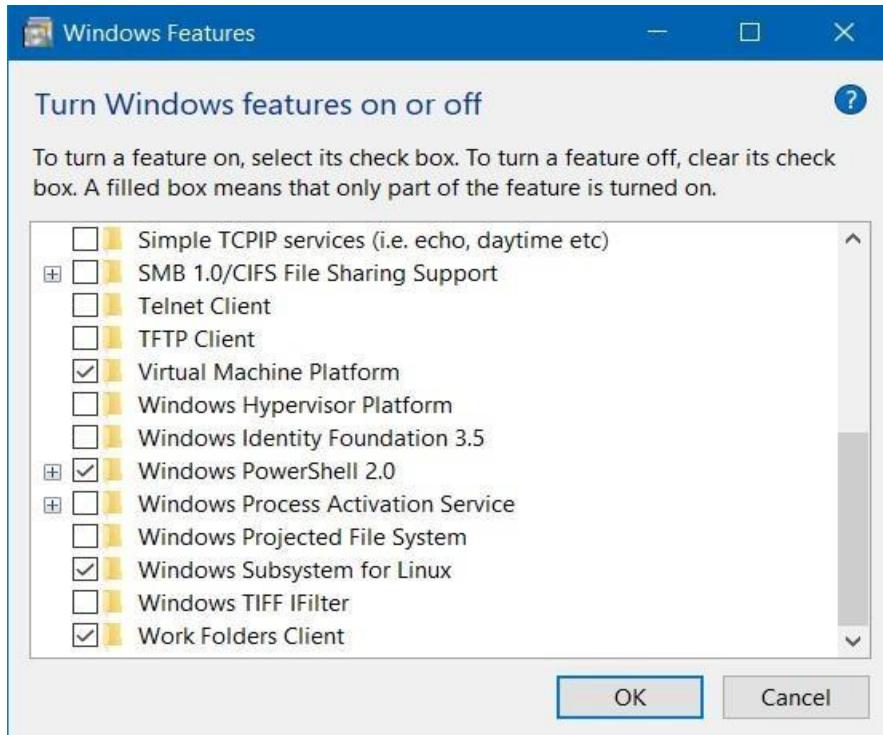
## **Step-2**

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



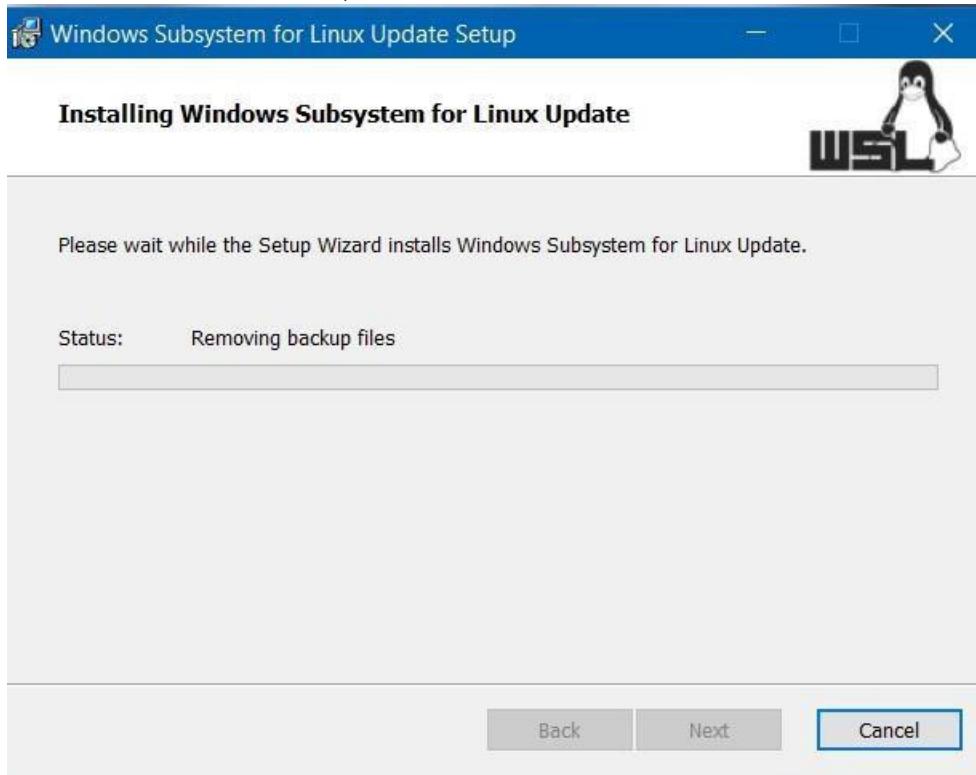
## **Step-3**

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



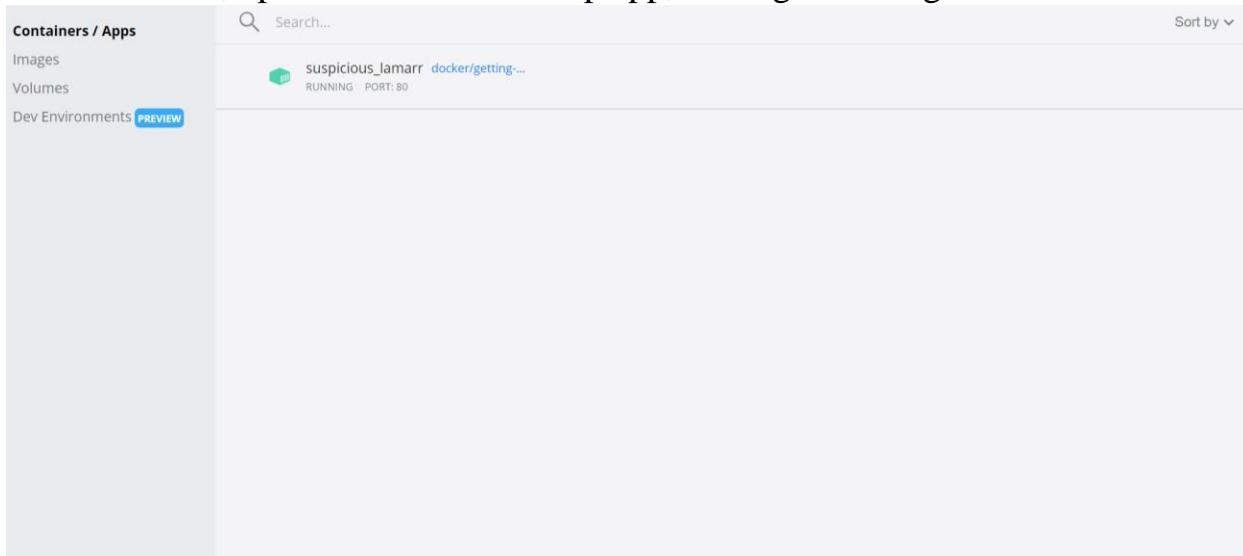
#### Step-4

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-5

Once installed, open the docker desktop app, and sign-in using the dockerID



## Step-6

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

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

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

C:\Windows\system32>
```

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. It shows the user attempting to run a Docker container and then pulling the 'ubuntu' image. The terminal output is displayed in white text on a dark background.

Containers / Apps

**Images**

Volumes

Dev Environments PREVIEW

**Images on disk**

2 images Total size: 100.76 MB IN USE UNUSED

Clean up...

**LOCAL** REMOTE REPOSITORIES

Search  In Use only

| NAME ↑                 | TAG                   | IMAGE ID     | CREATED      | SIZE         |          |
|------------------------|-----------------------|--------------|--------------|--------------|----------|
| docker/getting-started | <small>IN USE</small> | latest       | 083d7564d904 | 4 months ago | 27.99 MB |
| ubuntu                 | latest                | 597ce1600cf4 | 1 day ago    | 72.78 MB     |          |

**Q.** Analyze network packet stream using wireshark. Perform basic network service tests using nc.

`sudo apt-get install wireshark`

```
user@user-VirtualBox:~$ sudo apt-get install wireshark
[sudo] password for user:
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 libqt5multimediasupport5
 libqt5multimediacore5 libqt5multimediawidgets5 libqt5networks5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiretap11 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 libqt5multimediasupport5
 libqt5multimediacore5 libqt5multimediawidgets5 libqt5networks5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiretap11 libwsutil12 libxcb-xinerama0 libxcb-xinput0
 qt5-gtk-platformtheme qttranslations5-l10n wireshark wireshark-common
 wireshark-qt
0 upgraded, 32 newly installed, 0 to remove and 261 not upgraded.
Need to get 34.0 MB of archives.
After this operation, 170 MB of additional disk space will be used.
```

**Sudo dpkg-reconfigure wireshark-common**

```
user@user-VirtualBox:~$ sudo dpkg-reconfigure wireshark-common
user@user-VirtualBox:~$ █
```



## Capture

...using this FilCer: era n e p u e

All interfaces shown -

- DispalyPort AUX channel monitor capture- dpauxmon
- Random packeL generator: randpkC
- sysLemd Journal ExportL: sdjournalf
- SSH remoLe capture: sshdump
- UDP Listener remoEe capture: udpdump

## Learn

user's Gulde • Wiki • Questions and Answers • Malting Lists

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

"+ Ready to add or capture No Packets Profile: Default

File EdiL View Go Capture Analyze Estatistics Telephony Wireless Tools Help

App s y ie Cr /

| INo. | .Time        | source       | Destination  | Protocol | Length |
|------|--------------|--------------|--------------|----------|--------|
| 700  | 3.904189589  | 13.33.146.49 | 10.0.2.15    | TCP      | 1402   |
| 701  | 3.904221965  | 10.0.2.15    | 13.33.146.49 | TCP      | 54     |
| 702  | 3.907674902  | 13.33.146.49 | 10.0.2.15    | TCP      | 1325   |
| 703  | 3.90777B5214 | 1B.B.2.15    | 13.33.146.49 | TCP      | 54     |
| 704  | 3.941174357  | 1B.B.2.15    | 13.33.146.49 | TCP      | 54     |

r Frame 1 : 62 bytes on wire (496 b1ts), 6Z bytes captured (496 b1ts) on interface Linux cooked naptime v1

> Internet Protocol Version 4, Src: 13.33.179.27, Dst: 1B.B.2.15

> USs MonitorinQ Ethernet trailer, source Port: B

```
L...*
00D0 BB BB BB B1 Bg B6 52 54 BB 12 35 B2 BB BB 0B BB RT 5
0010 45 BB Bg 2c 7B 1d gg go 4B B6 36 64 Bd 21 b3 1b E , x @6d !
0020 Ba BB B2 8f B1 bb d3 g4 82 BB aB B1 41 98 b7 b3 A
0838 68 IZ ff ff 5b 46 88 8B BZ 04 OB BB F
```

enpos3, any, and L...pture in progress: Packets: 704 Displayed: 704 (100.0%) Profile: Default

# Netcat

```
user@user-VirtualBox:~$ nc -z -v 10.0.2.15 20-80
nc: connect to 10.0.2.15 port 20 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 21 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 22 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 23 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 24 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 25 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 26 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 27 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 28 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 29 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 30 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 31 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 32 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 33 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 34 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 35 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 36 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 37 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 38 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 39 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 40 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 41 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 42 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 43 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 44 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 45 (tcp) failed: Connection refused
```

**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 name
read 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
sreya
enter your college name
amal jyothi college
```

```
Details you entered
Name:sreya
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 ];  
then
```

```
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
```

OUTPUT:

```
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:2.50000000000000000000000000000000
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 6.80000000000000000000000
```

**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
```