

Networking and System Administration Lab Record

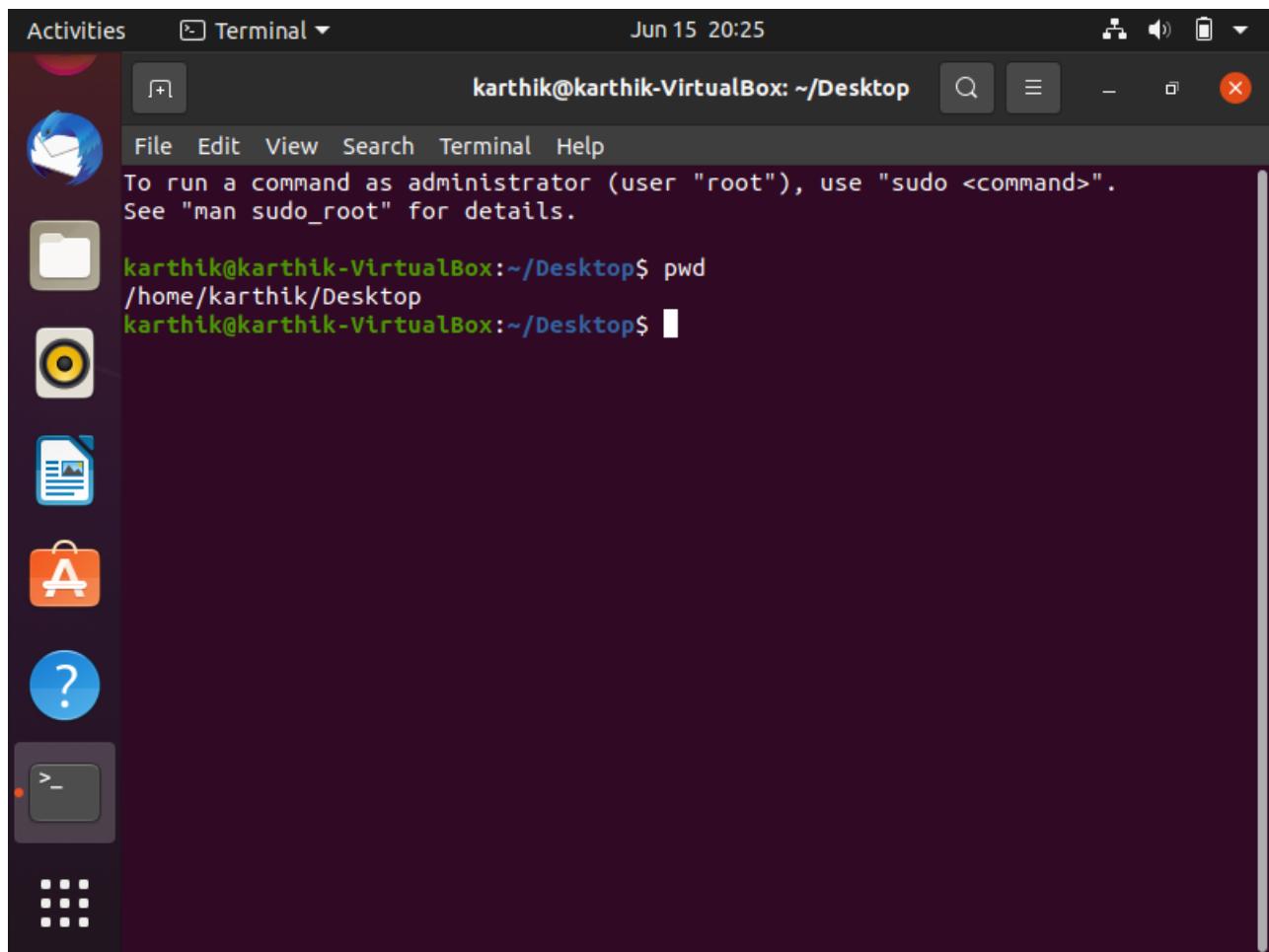
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Roll No: 06**

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1)pwd

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

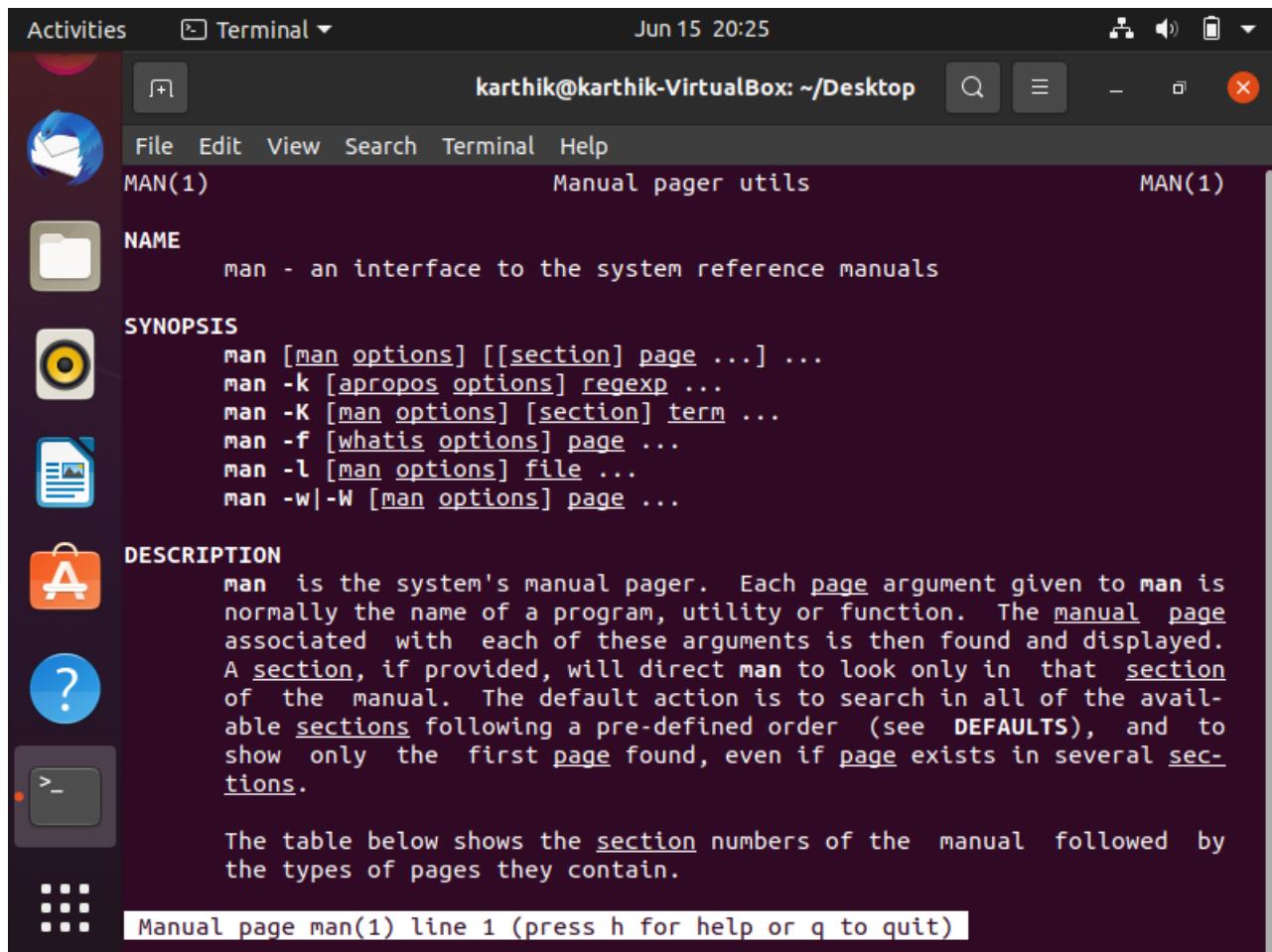


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the command "pwd" entered, which outputs the path "/home/karthik/Desktop". The desktop background is dark, and there are several icons in the dock on the left side.

```
Activities Terminal Jun 15 20:25
karthik@karthik-VirtualBox: ~/Desktop
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
karthik@karthik-VirtualBox:~/Desktop$ pwd
/home/karthik/Desktop
karthik@karthik-VirtualBox:~/Desktop$
```

2)man

It can easily learn how to use them right from Linux's shell by using the man command.



The screenshot shows a terminal window titled "Terminal" with the command "man(1)" entered. The output is as follows:

```
File Edit View Search Terminal Help
MAN(1) Manual pager utils MAN(1)

NAME
    man - an interface to the system reference manuals

SYNOPSIS
    man [man options] [[section] page ...] ...
    man -k [apropos options] regexp ...
    man -K [man options] [section] term ...
    man -f [whatis options] page ...
    man -l [man options] file ...
    man -w|-W [man options] page ...

DESCRIPTION
    man is the system's manual pager. Each page argument given to man is
    normally the name of a program, utility or function. The manual page
    associated with each of these arguments is then found and displayed.
    A section, if provided, will direct man to look only in that section
    of the manual. The default action is to search in all of the available
    sections following a pre-defined order (see DEFAULTS), and to
    show only the first page found, even if page exists in several sections.

The table below shows the section numbers of the manual followed by
the types of pages they contain.

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

Activities Terminal ▾ Jun 15 20:26

karthik@karthik-VirtualBox: ~/Desktop

TAIL(1) User Commands TAIL(1)

NAME

tail - output the last part of files

SYNOPSIS

tail [OPTION]... [FILE]...

DESCRIPTION

Print the last 10 lines of each FILE to standard output. With more than one FILE, precede each with a header giving the file name.

With no FILE, or when FILE is -, read standard input.

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

-c, --bytes=[+]NUM

output the last NUM bytes; or use -c +NUM to output starting with byte NUM of each file

-f, --follow[={name|descriptor}]

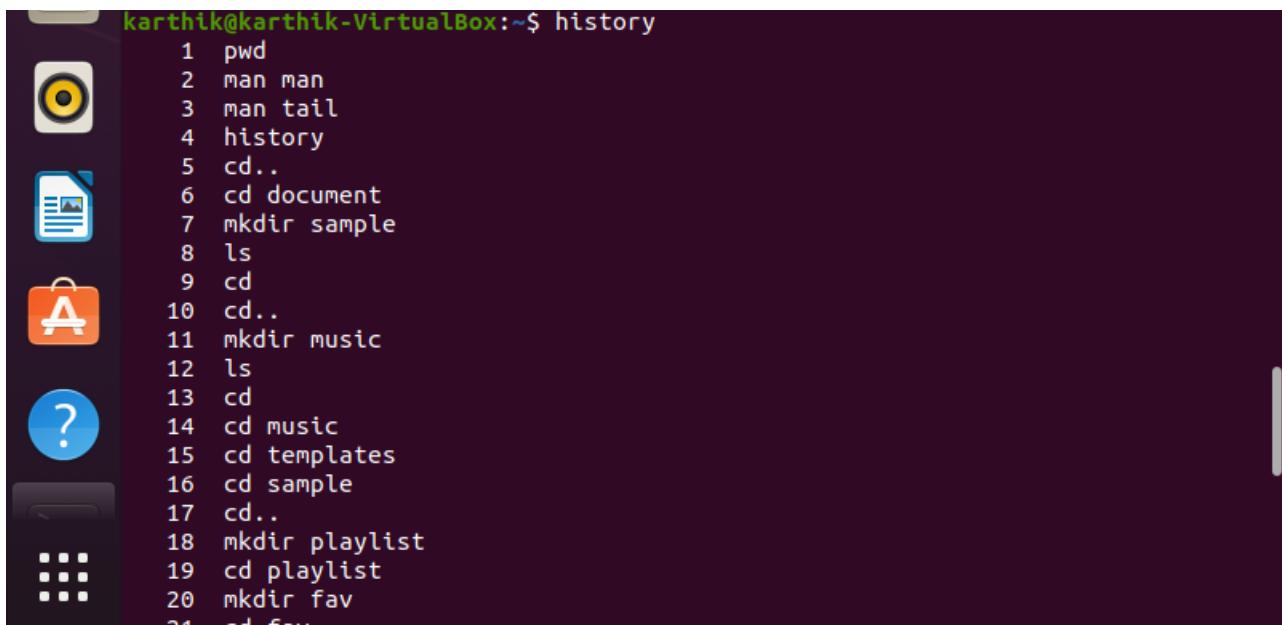
output appended data as the file grows;

an absent option argument means 'descriptor'

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

3) 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

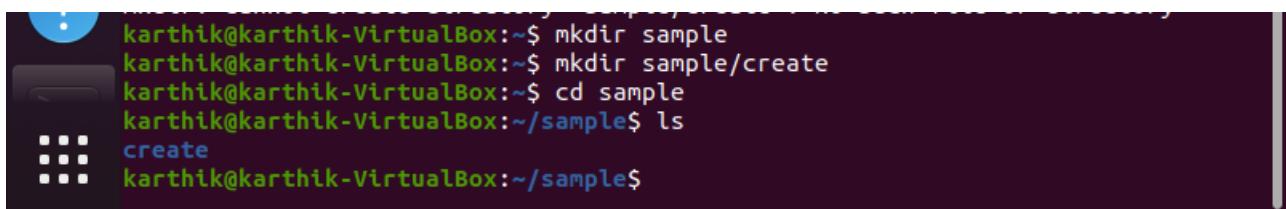


```
karthik@karthik-VirtualBox:~$ history
1  pwd
2  man man
3  man tail
4  history
5  cd..
6  cd document
7  mkdir sample
8  ls
9  cd
10 cd..
11 mkdir music
12 ls
13 cd
14 cd music
15 cd templates
16 cd sample
17 cd..
18 mkdir playlist
19 cd playlist
20 mkdir fav
21 cd fav
```

4) cd

To navigate through the Linux files and directories, use the cd .

- 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



```
karthik@karthik-VirtualBox:~$ mkdir sample
karthik@karthik-VirtualBox:~$ mkdir sample/create
karthik@karthik-VirtualBox:~$ cd sample
karthik@karthik-VirtualBox:~/sample$ ls
create
karthik@karthik-VirtualBox:~/sample$
```



```
karthik@karthik-VirtualBox:~/music$ mkdir playlist
karthik@karthik-VirtualBox:~/music$ cd playlist
karthik@karthik-VirtualBox:~/music/playlist$ mkdir fav
karthik@karthik-VirtualBox:~/music/playlist$ cd fav
karthik@karthik-VirtualBox:~/music/playlist/fav$ cd..
cd..: command not found
karthik@karthik-VirtualBox:~/music/playlist/fav$ cd ..
karthik@karthik-VirtualBox:~/music/playlist$
```

5) Mkdir

Use mkdir command to make a new directory — if you type mkdir Music it will create a directory called

Music. • To generate a new directory inside another directory, use this Linux basic command mkdir Music/Newfile • use the p (parents) option to create a directory in between two existing directories. For example, mkdir -p Music/2020/Newfile will create the new “2020” file.



```
karthik@karthik-VirtualBox:~/Desktop$ mkdir sample
karthik@karthik-VirtualBox:~/Desktop$ ls
sample
karthik@karthik-VirtualBox:~/Desktop$ cd
karthik@karthik-VirtualBox:~$ cd..
cd..: command not found
karthik@karthik-VirtualBox:~$ mkdir music
karthik@karthik-VirtualBox:~$ ls
Desktop  Downloads  Music      Public      Videos
Documents  music      Pictures  Templates
karthik@karthik-VirtualBox:~$
```

6) rmdir

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



```
karthik@karthik-VirtualBox:~/sample$ cd ..
karthik@karthik-VirtualBox:~$ rmdir sample
rmdir: failed to remove 'sample': Directory not empty
karthik@karthik-VirtualBox:~$ mkdir hey
karthik@karthik-VirtualBox:~$ rmdir hey
karthik@karthik-VirtualBox:~$
```

7)touch

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

- As an example, enter touch /home/username/Documents/Web.html to create an HTML file entitled Web under the Documents directory



```
karthik@karthik-VirtualBox:~/sample$ cd sample
karthik@karthik-VirtualBox:~/sample$ touch file1.txt
karthik@karthik-VirtualBox:~/sample$ touch new.txt
karthik@karthik-VirtualBox:~/sample$ ls
create file1.txt new.txt
karthik@karthik-VirtualBox:~/sample$ touch new2.txt new3.txt
karthik@karthik-VirtualBox:~/sample$ ls
create file1.txt new2.txt new3.txt new.txt
karthik@karthik-VirtualBox:~/sample$
```

8)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.

- Note: Be very careful with this command and double-check which directory you are in. This will delete everything and there is no undo.
- To remove a file use rm filename



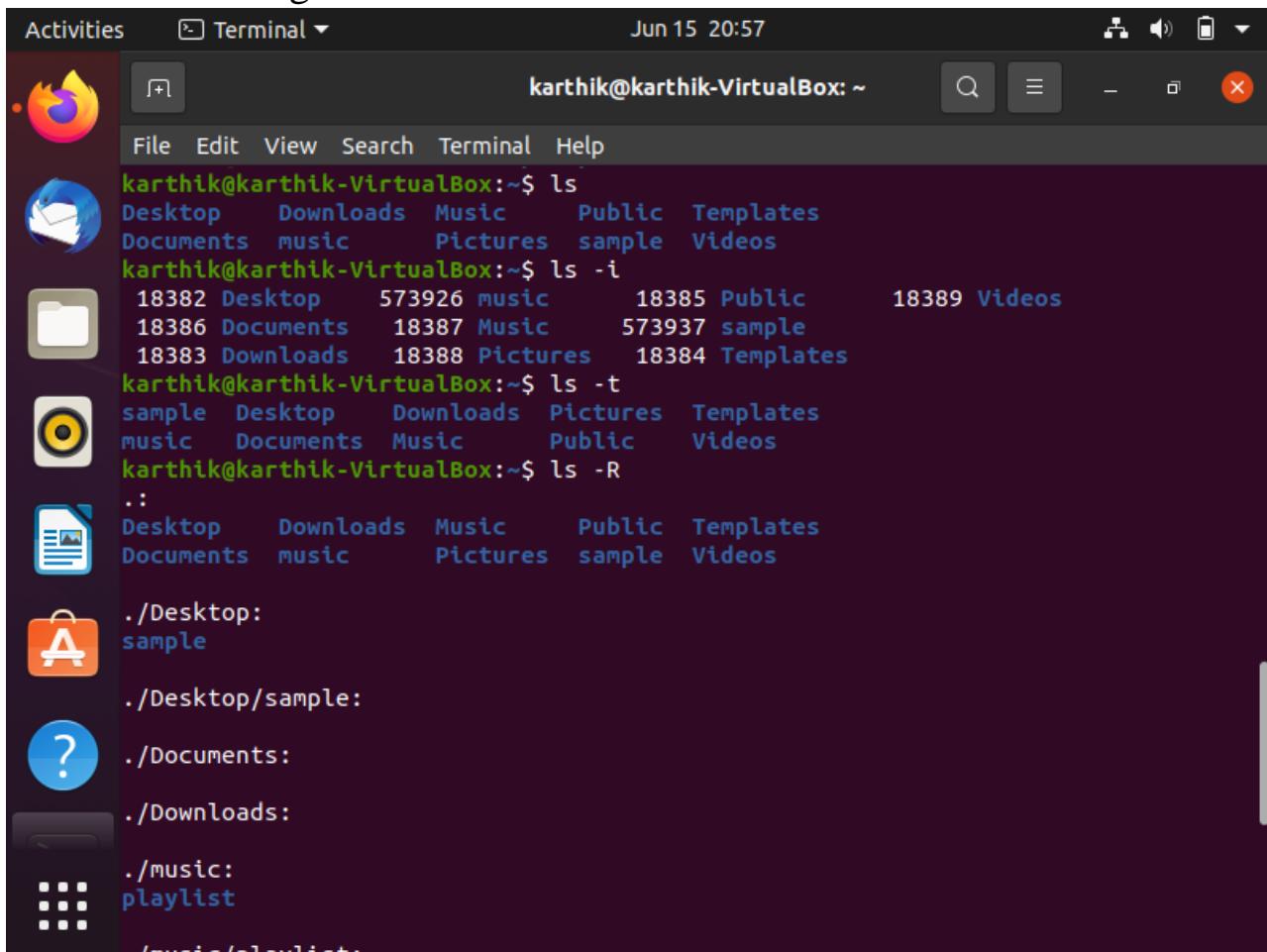
```
karthik@karthik-VirtualBox:~/sample$ ls
create file1.txt new2.txt new3.txt new.txt
karthik@karthik-VirtualBox:~/sample$ rm new3.txt
karthik@karthik-VirtualBox:~/sample$ ls
create file1.txt new2.txt new.txt
karthik@karthik-VirtualBox:~/sample$
```

9) 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.

- If you want to see the content of other directories, type ls and then the directory's path. For example, enter ls /home/username/Documents to view the content of Documents.
- There are variations you can use with the ls command:

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



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

```

Activities Terminal Jun 15 20:57
karthik@karthik-VirtualBox:~$ ls
Desktop Downloads Music Public Templates
Documents music Pictures sample Videos
18382 Desktop 573926 music 18385 Public 18389 Videos
18386 Documents 18387 Music 573937 sample
18383 Downloads 18388 Pictures 18384 Templates
karthik@karthik-VirtualBox:~$ ls -t
sample Desktop Downloads Pictures Templates
music Documents Music Public Videos
karthik@karthik-VirtualBox:~$ ls -R
.:
Desktop Downloads Music Public Templates
Documents music Pictures sample Videos

./Desktop:
sample

./Desktop/sample:
.

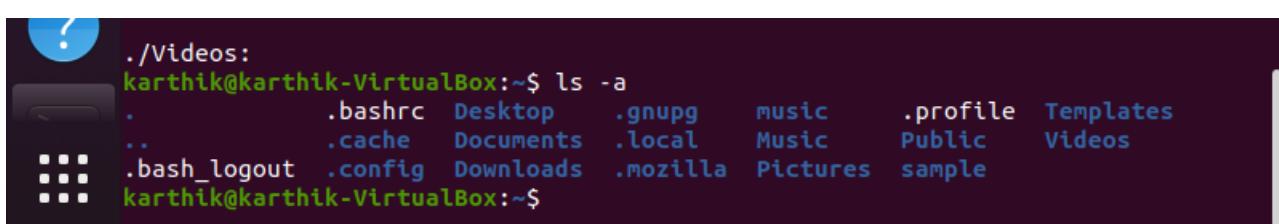
./Documents:
.

./Downloads:
.

./music:
playlist

/music/playlist.

```



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

```

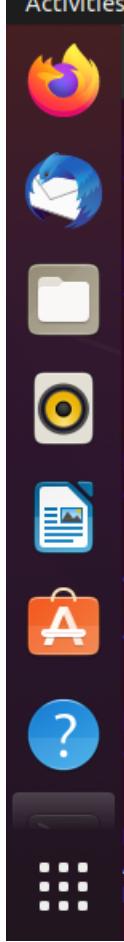
./Videos:
karthik@karthik-VirtualBox:~$ ls -a
. .bashrc Desktop .gnupg music .profile Templates
.. .cache Documents .local Music Public Videos
.bash_logout .config Downloads .mozilla Pictures sample
karthik@karthik-VirtualBox:~$

```

10)cat

- cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout .
 - To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.
 - Here are other ways to use the cat command:
 - cat > filename creates a new file
 - cat filename1 filename2>filename3 joins two files (1 and 2) and stores the output of them in a new file
- (3)
- to convert a file to upper or lower case use, cat filename | tr a-z A-Z >output.txt
 - cat >>myfile insert data to a file

Activities Terminal ▾ Jun 15 21:27

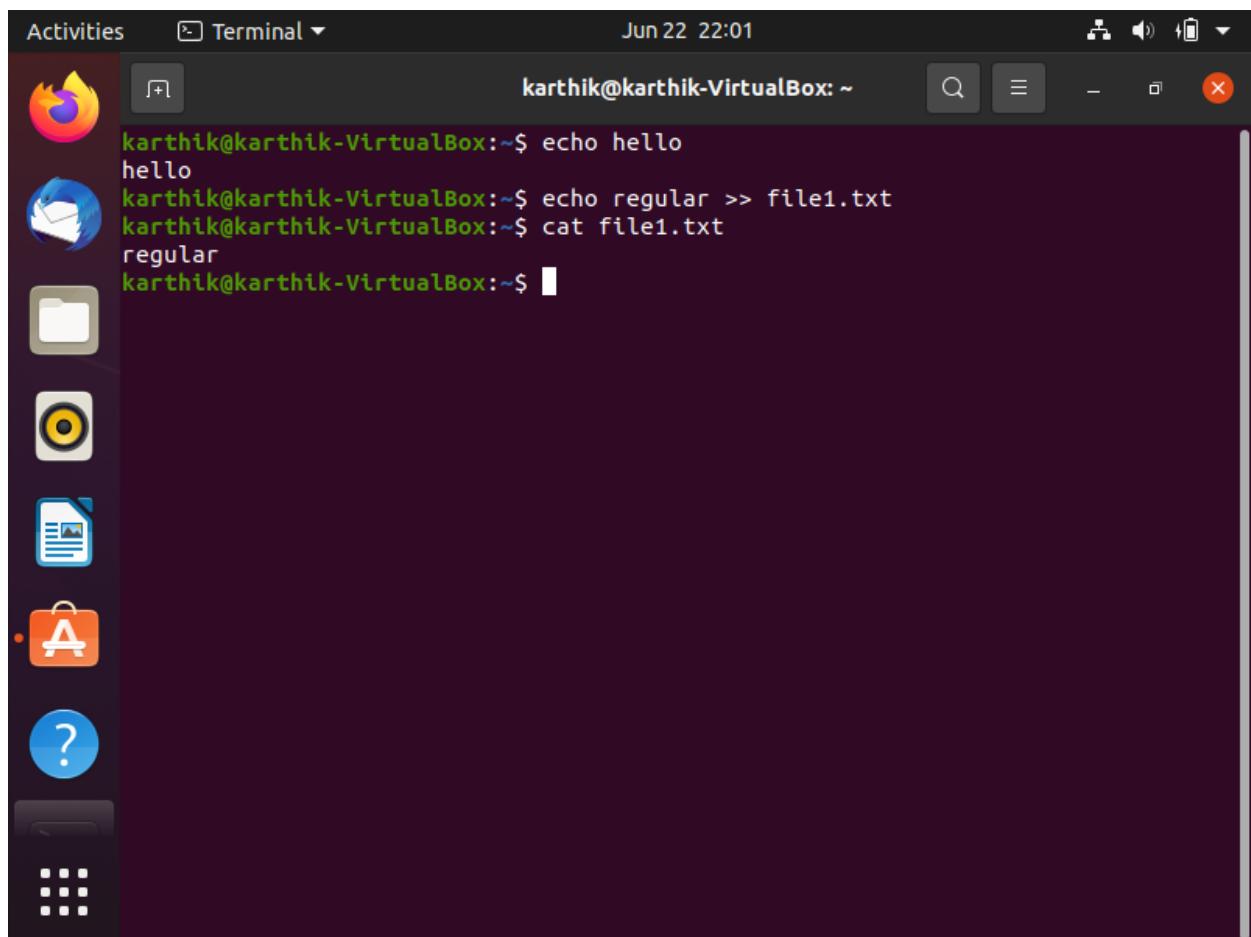


```
karthik@karthik-VirtualBox:~/Desktop/hello$ cat > file1.txt
karthik
amal jyothi
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file.txt
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file1.txt
karthik
amal jyothi
karthik@karthik-VirtualBox:~/Desktop/hello$ cat > file2.txt
regular mca
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file2.txt
regular mca
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file1.txt file2.txt
karthik
amal jyothi
regular mca
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file3.txt
cat: file3.txt: No such file or directory
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file3.txt
cat: file3.txt: No such file or directory
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file1.txt file2.txt>file3.txt
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file3.txt
karthik
amal jyothi
regular mca
karthik@karthik-VirtualBox:~/Desktop/hello$ cat file3.txt | tr a-z A-Z
KARTHIK
AMAL JYOTHI
REGULAR MCA
karthik@karthik-VirtualBox:~/Desktop/hello$
```

Basic Linux Commands

1. echo

echo command in linux is used to display line of text/string that are passed as an argument . This is a built in command that is mostly used in shell scripts and batch files to output status text to the screen or a file. echo is one of the most commonly and widely used built-in command for Linux bash and C shells, that typically used in scripting language and batch files to display a line of text/string on standard output or a file. The echo command writes text to standard output (stdout). The syntax of using the echo command is pretty straightforward: ... Some common usages of the echo command are piping shell variable to other commands, writing text to stdout in a shell script, and redirecting text to a file.



The image shows a screenshot of an Ubuntu desktop environment. On the left, there's a dock with icons for various applications: a browser (Firefox), a mail client (Evolution), a file manager (Nautilus), a terminal (Terminal), a system monitor (System Monitor), a file viewer (File Viewer), a text editor (gedit), a help center (Help Center), and a dash icon. The main window is a terminal window titled "Terminal". The terminal shows the following command-line session:

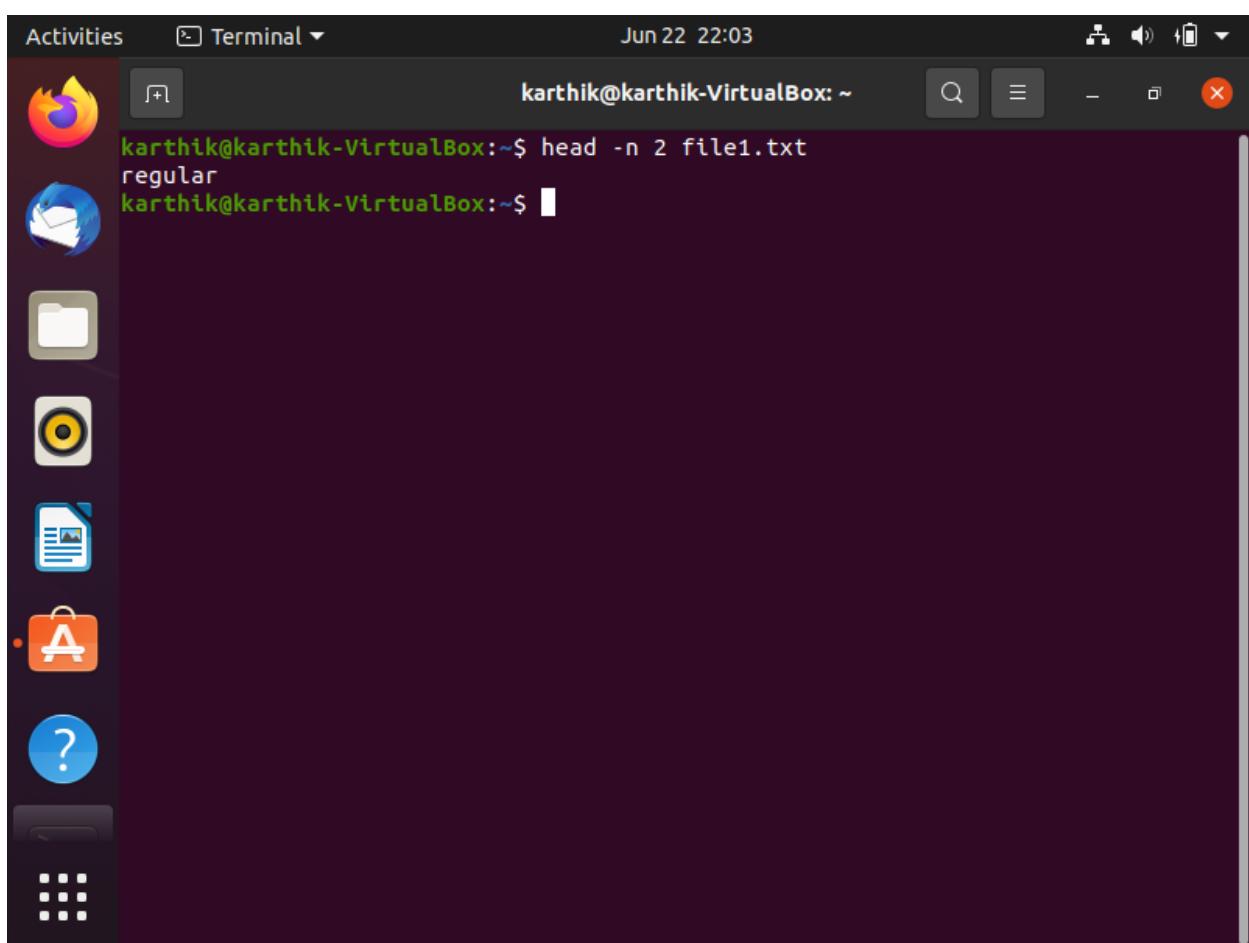
```
karthik@karthik-VirtualBox:~$ echo hello
hello
karthik@karthik-VirtualBox:~$ echo regular >> file1.txt
karthik@karthik-VirtualBox:~$ cat file1.txt
regular
karthik@karthik-VirtualBox:~$
```

2. head

The head command is a command-line utility for outputting the first part of files given to it via standard input. It writes results to standard output. By default head returns the first ten lines of each file that it is given. head is used to print the first ten lines (by default) or any other amount specified of a file or files. cat , on the other hand, is used to read a file sequentially and print it to the standard output (that is, it prints out the entire contents of the file).

Enter the head command, followed by the file of which you'd like to view: head /etc/passwd

To change the number of lines displayed, use the -n option: head -n 5 /etc/passwd

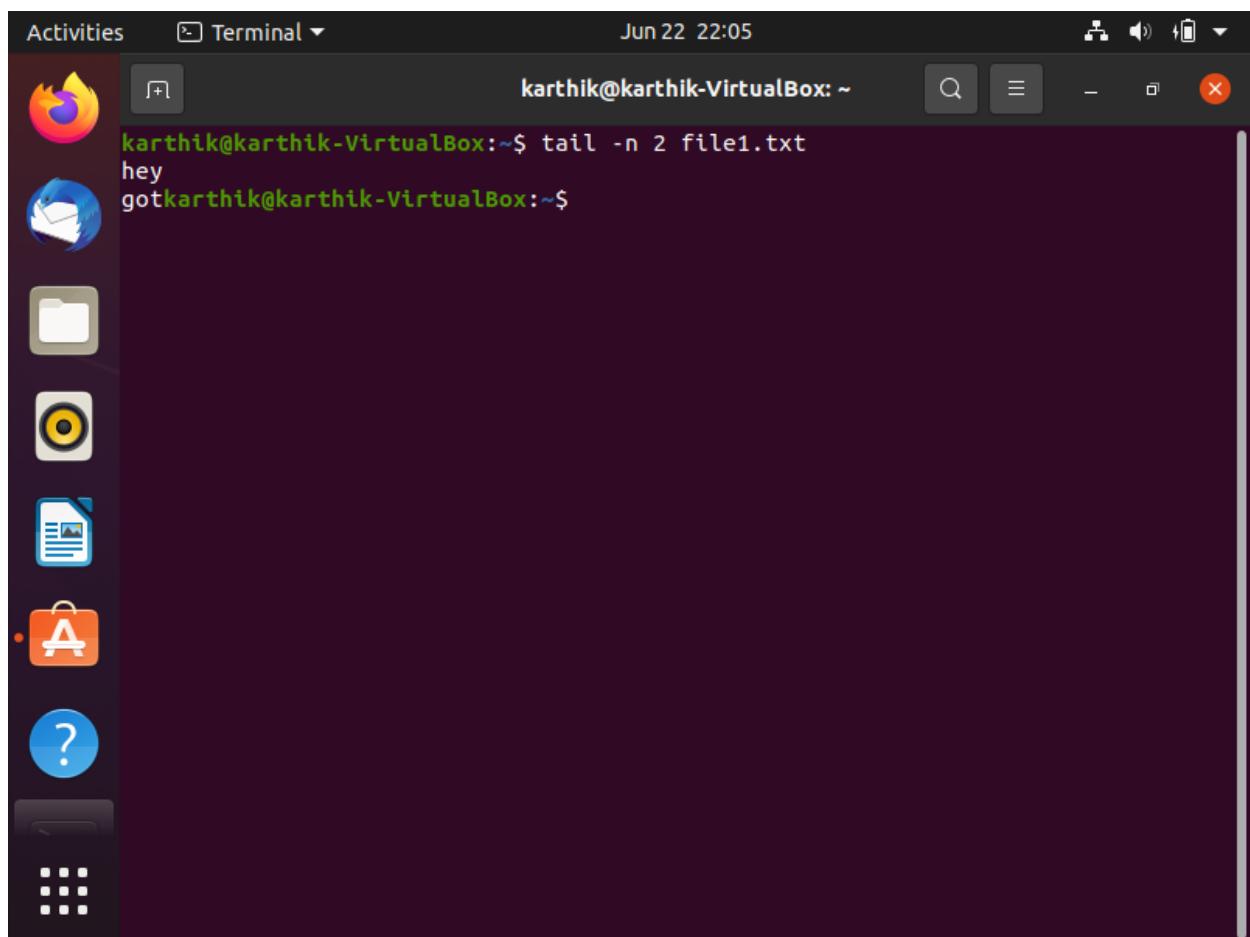
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the command "head -n 2 file1.txt" entered. The output shows the first two lines of the file "file1.txt", which is labeled "regular". The desktop interface includes a dock with icons for various applications like a browser, file manager, and system tools. The terminal window is the active application.

```
Activities Terminal Jun 22 22:03
karthik@karthik-VirtualBox:~$ head -n 2 file1.txt
regular
karthik@karthik-VirtualBox:~$
```

3. tail

The tail command, as the name implies, print the last N number of data of the given input. By default it prints the last 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name. tail has two special command line option -f and -F (follow) that allows a file to be monitored. Instead of just displaying the last few lines and exiting, tail displays the lines and then monitors the file. As new lines are added to the file by another process, tail updates the display. Enter the tail command, followed by the file you'd like to view: tail /etc/passwd

To change the number of lines displayed, use the -n option: tail -n 5 /etc/passwd



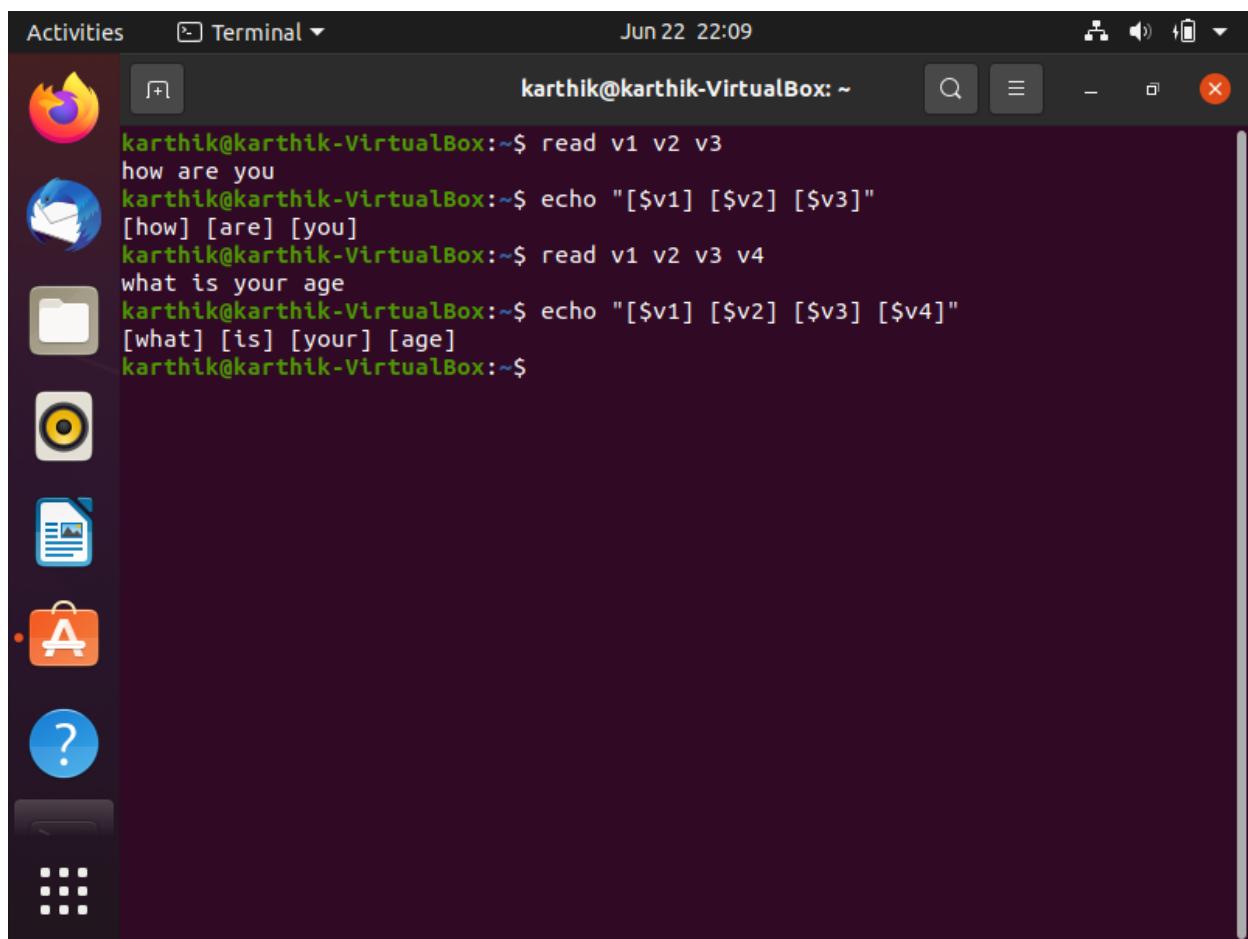
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled 'Terminal' and shows the command 'tail -n 2 file1.txt' being run. The output of the command is 'hey' and 'got'. The desktop interface includes a dock on the left with icons for various applications like a browser, file manager, and system tools. The top bar shows the date and time as 'Jun 22 22:05' and the user as 'karthik@karthik-VirtualBox:~\$'. The overall theme is dark.

```
Activities Terminal Jun 22 22:05
karthik@karthik-VirtualBox:~$ tail -n 2 file1.txt
hey
got
karthik@karthik-VirtualBox:~$
```

4. read

read command in Linux system is used to read from a file descriptor. Basically, this command read up the total number of bytes from the specified file descriptor into the buffer. If the number or count is zero then this command may detect the errors. But on success, it returns the number of bytes read.

Read is a bash builtin command that reads the contents of a line into a variable. It allows for word splitting that is tied to the special shell variable IFS. It is primarily used for catching user input but can be used to implement functions taking input from standard input.

A screenshot of an Ubuntu desktop environment. On the left, there's a dock with icons for the Dash, Home, Applications, and Help. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

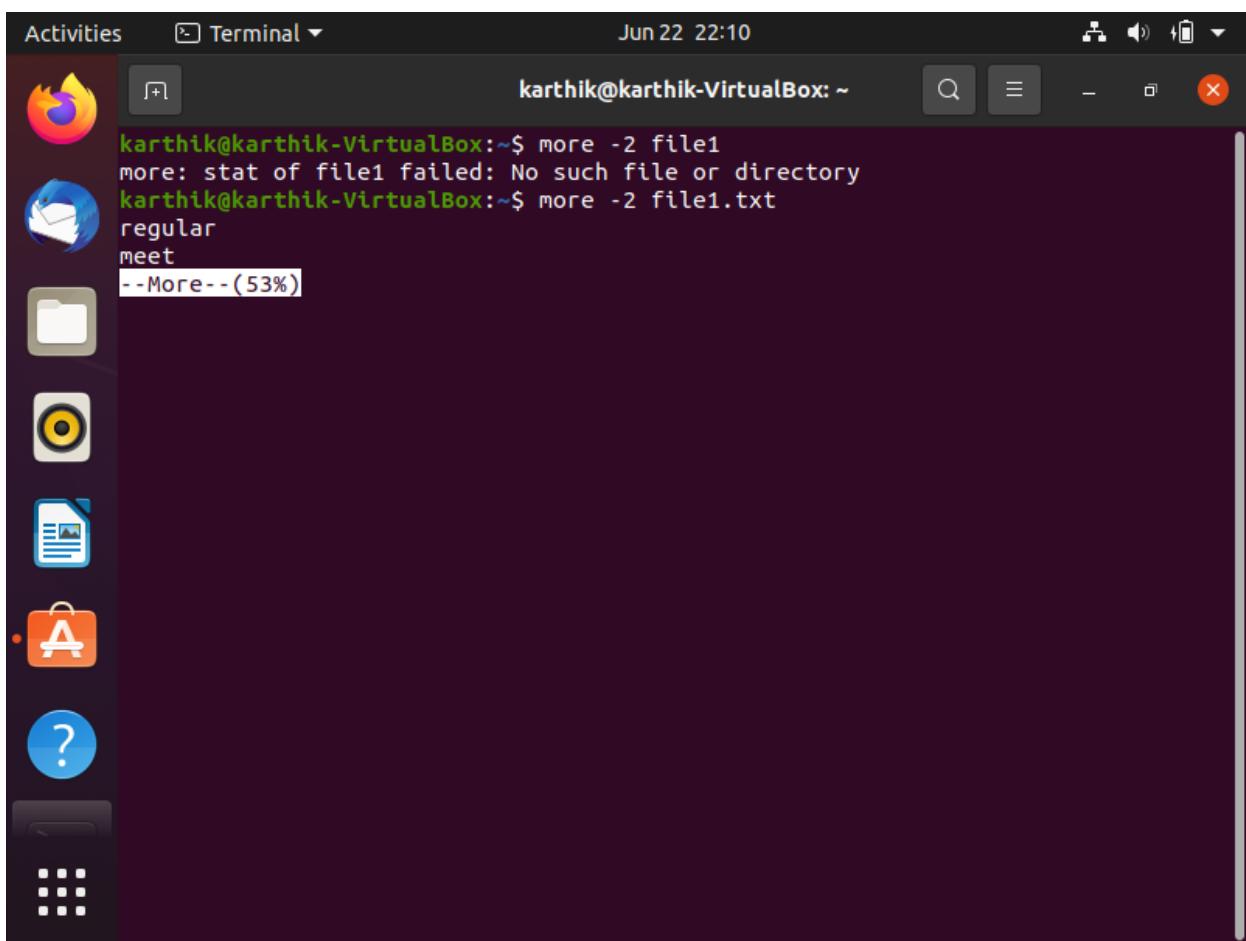
```
Activities Terminal Jun 22 22:09
karthik@karthik-VirtualBox:~$ read v1 v2 v3
how are you
karthik@karthik-VirtualBox:~$ echo "[${v1}] [${v2}] [${v3}]"
[how] [are] [you]
karthik@karthik-VirtualBox:~$ read v1 v2 v3 v4
what is your age
karthik@karthik-VirtualBox:~$ echo "[${v1}] [${v2}] [${v3}] [${v4}]"
[what] [is] [your] [age]
karthik@karthik-VirtualBox:~$
```

5. more

more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page. The syntax along with options and command is as follows. Another application of more is to use it with some other command after a pipe. When the output is large, we can use more command to see output one by one.

more [-options] [-num] [+pattern] [+linenum] [file_name]

- [-options]: any option that you want to use in order to change the way the file is displayed. Choose any one from the followings: (-d, -l, -f, -p, -c, -s, -u)
- [-num]: type the number of lines that you want to display per screen.
- [+pattern]: replace the pattern with any string that you want to find in the text file.
- [+linenum]: use the line number from where you want to start displaying the text content.
- [file_name]: name of the file containing the text that you want to display on the screen.



6. less

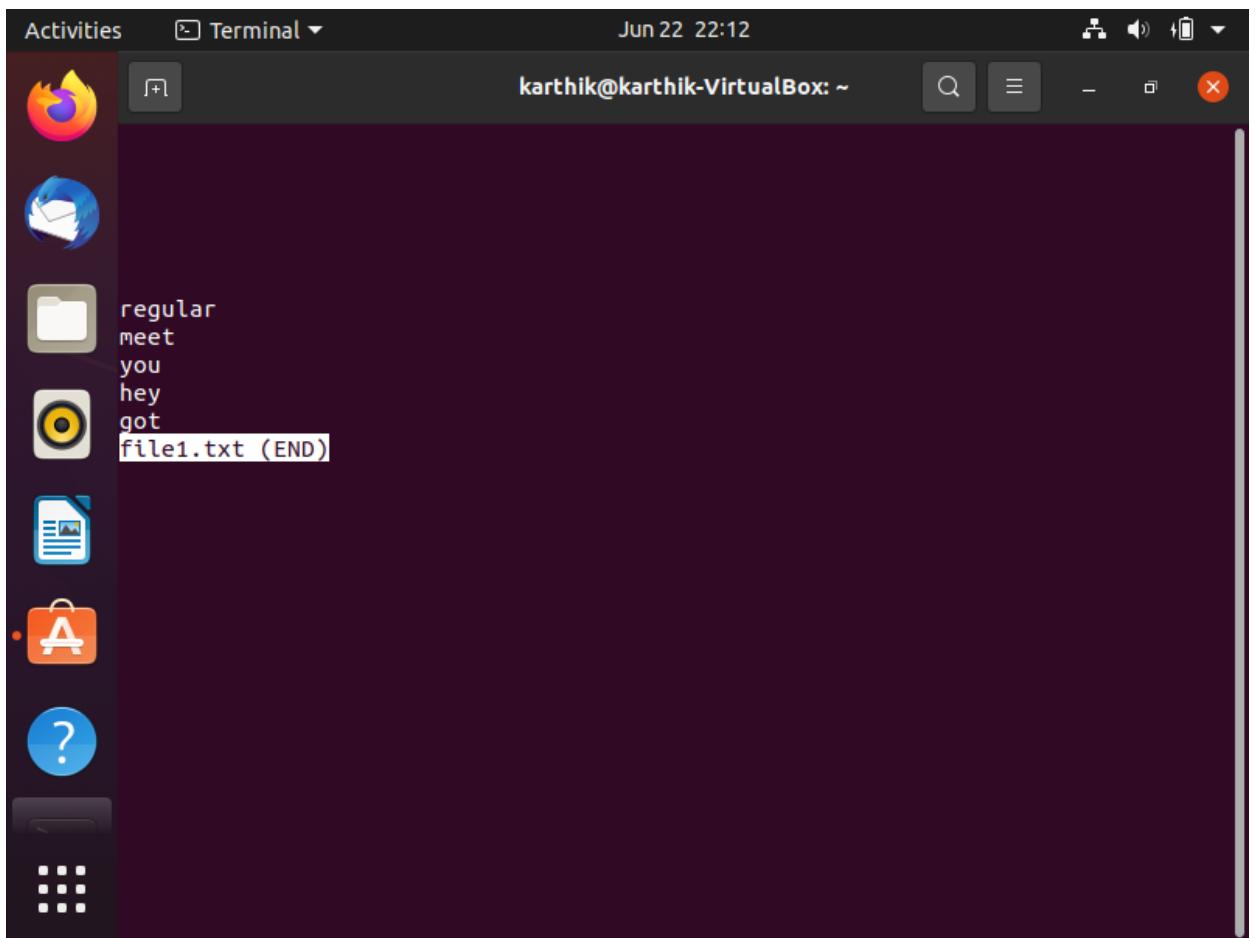
Less command is linux utility which can be used to read contents of text file one page(one screen) per time. It has faster access because if file is large, it don't access complete file, but access it page by page.

For example, if it's a large file and you are reading it using any text editor, then the complete file will be loaded to main memory, but less command don't load entire file, but load it part by part, which makes it faster.

mostly used Options :

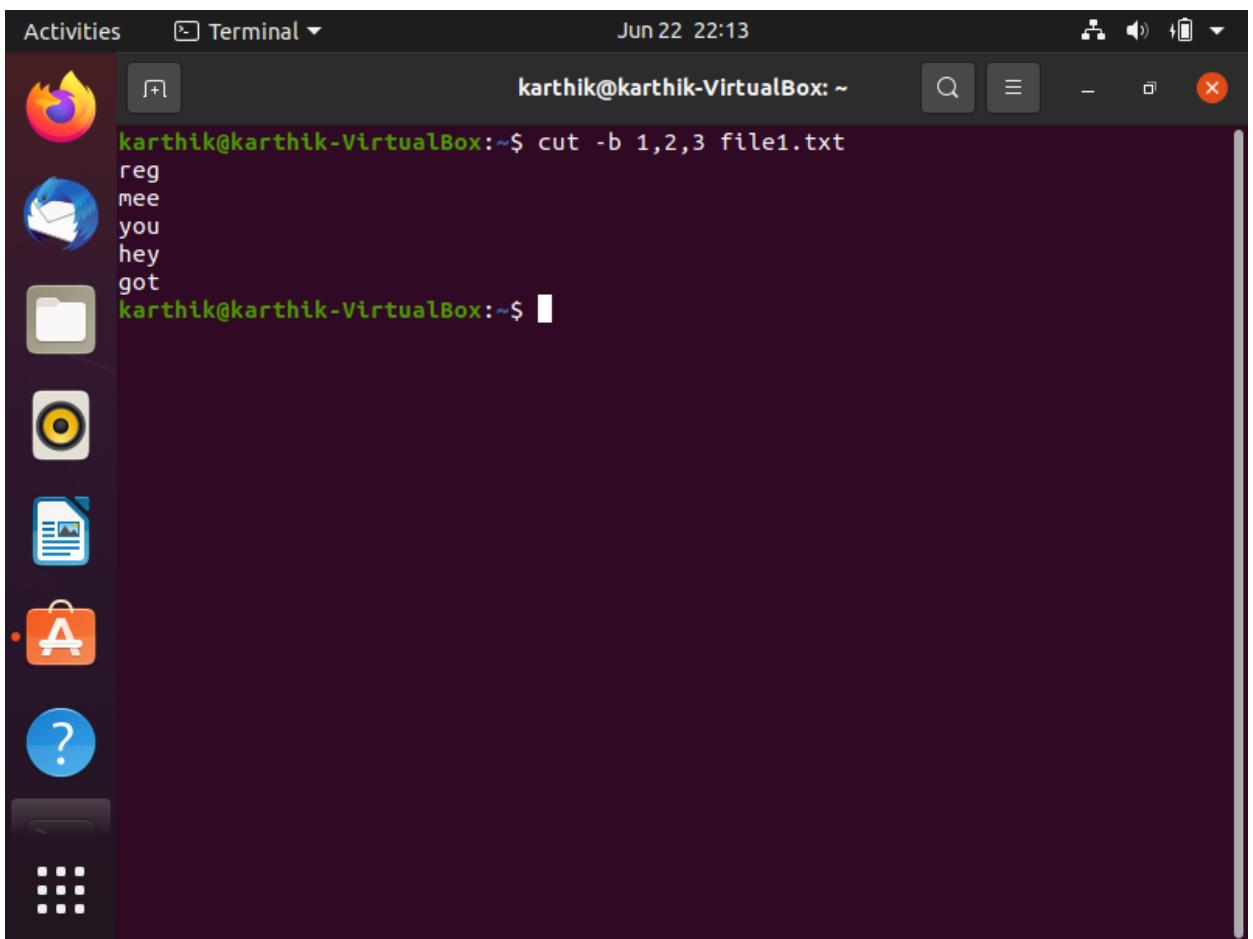
-E : causes less to automatically exit the first time it reaches end of file.

- -f : forces non-regular file to open.
- -F : causes less to exit if entire file can be displayed on first screen
- -g : highlight the string which was found by last search command
- -G : suppresses all highlighting of strings found by search commands
- -i : cause searches to ignore case
- -n : suppresses line numbers
- -p pattern : it tells less to start at the first occurrence of pattern in the file
- -s : causes consecutive blank lines to be squeezed into a single blank line



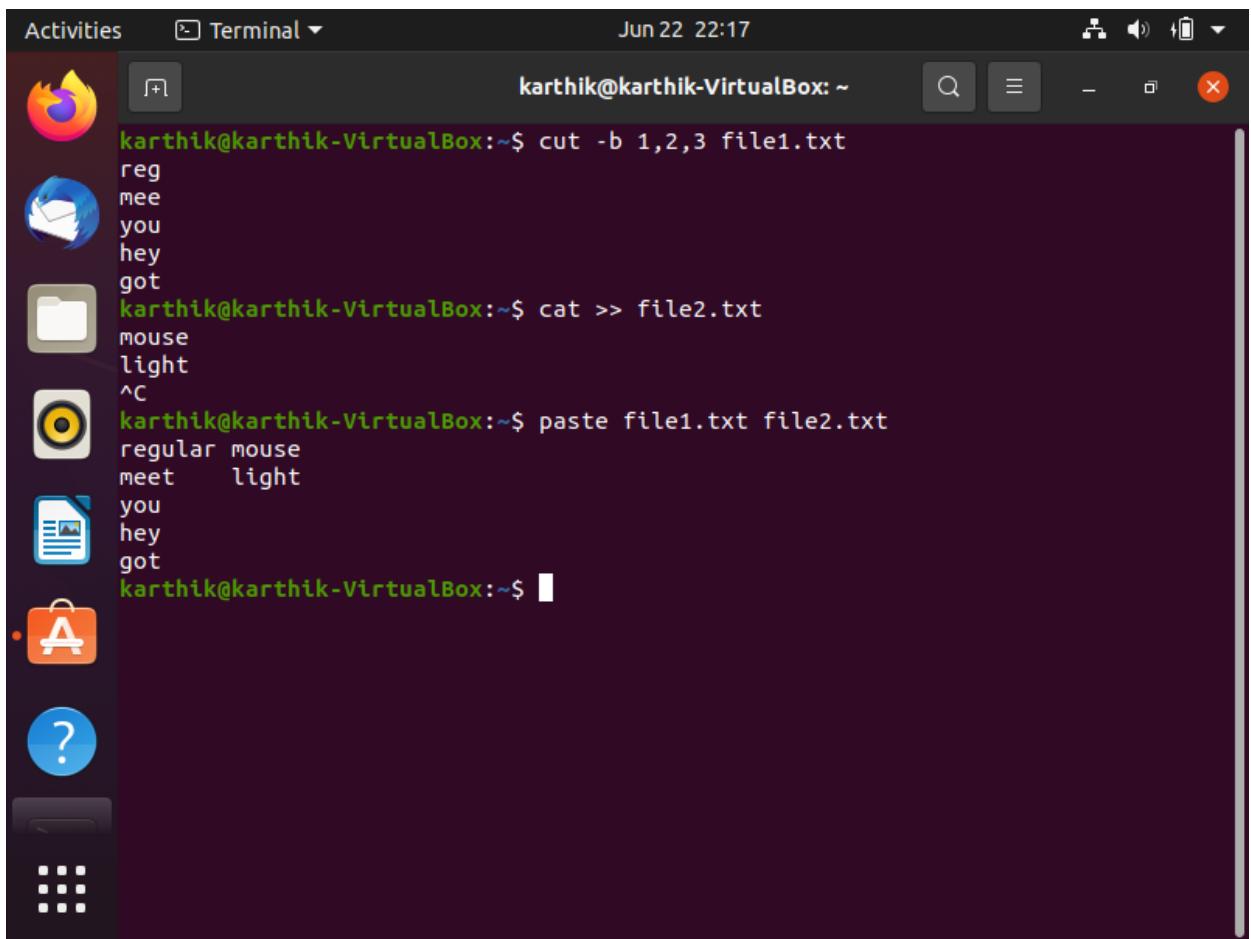
7. cut

The cut command in linux is a command 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. Basically the cut command slices a line and extracts the text. It is necessary to specify option with command otherwise it gives error. If more than one file name is provided then data from each file is not preceded by its file name.



8. paste

Paste is a command that allows you to insert data from the clipboard into an application. The Paste command is most commonly used to copy text from one area to another. For example, you can copy a paragraph from a text document and paste it into an email message.

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

```
cut -b 1,2,3 file1.txt
reg
mee
you
hey
got
cat >> file2.txt
mouse
light
^C
paste file1.txt file2.txt
regular mouse
meet    light
you
hey
got
```

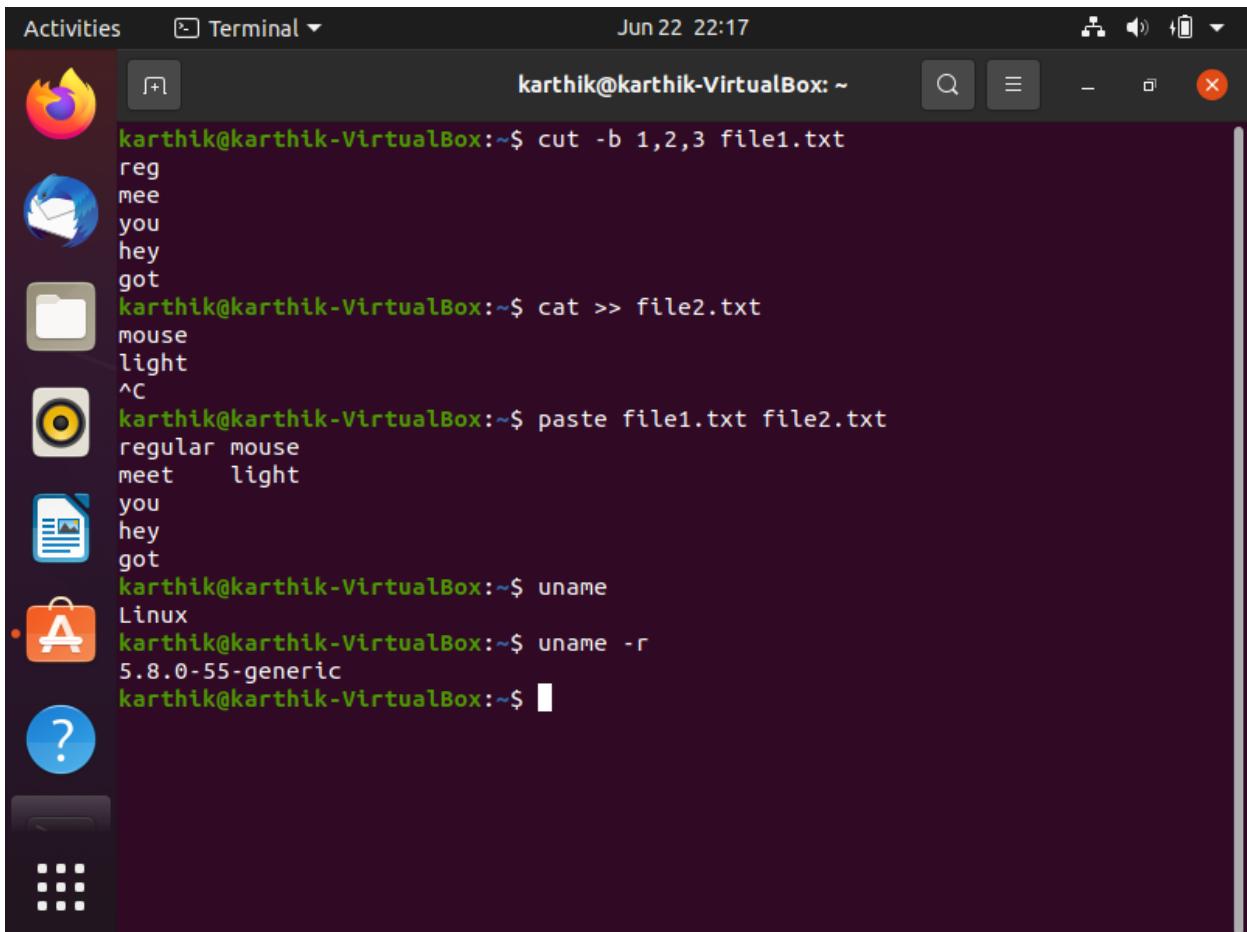
The terminal window is part of a desktop interface with a dark theme. To the left of the terminal is a vertical dock containing icons for various applications: a browser, an email client, a file manager, a terminal, a file viewer, a text editor, a help icon, and a system settings icon.

9. uname

Uname command is used to display basic information about the operating system and hardware. With options, Uname prints kernel details, and system architecture. Uname is the short name for 'UNIX'

name'. Uname command works on all Linux and Unix like operating systems. uname is a command-line utility that prints basic information about the operating system name and system hardware.

The uname() function returns a string naming the current system in the character array sysname. The arrays release and version further identify the operating system. The array machine contains a name that identifies the hardware that the system is running on.

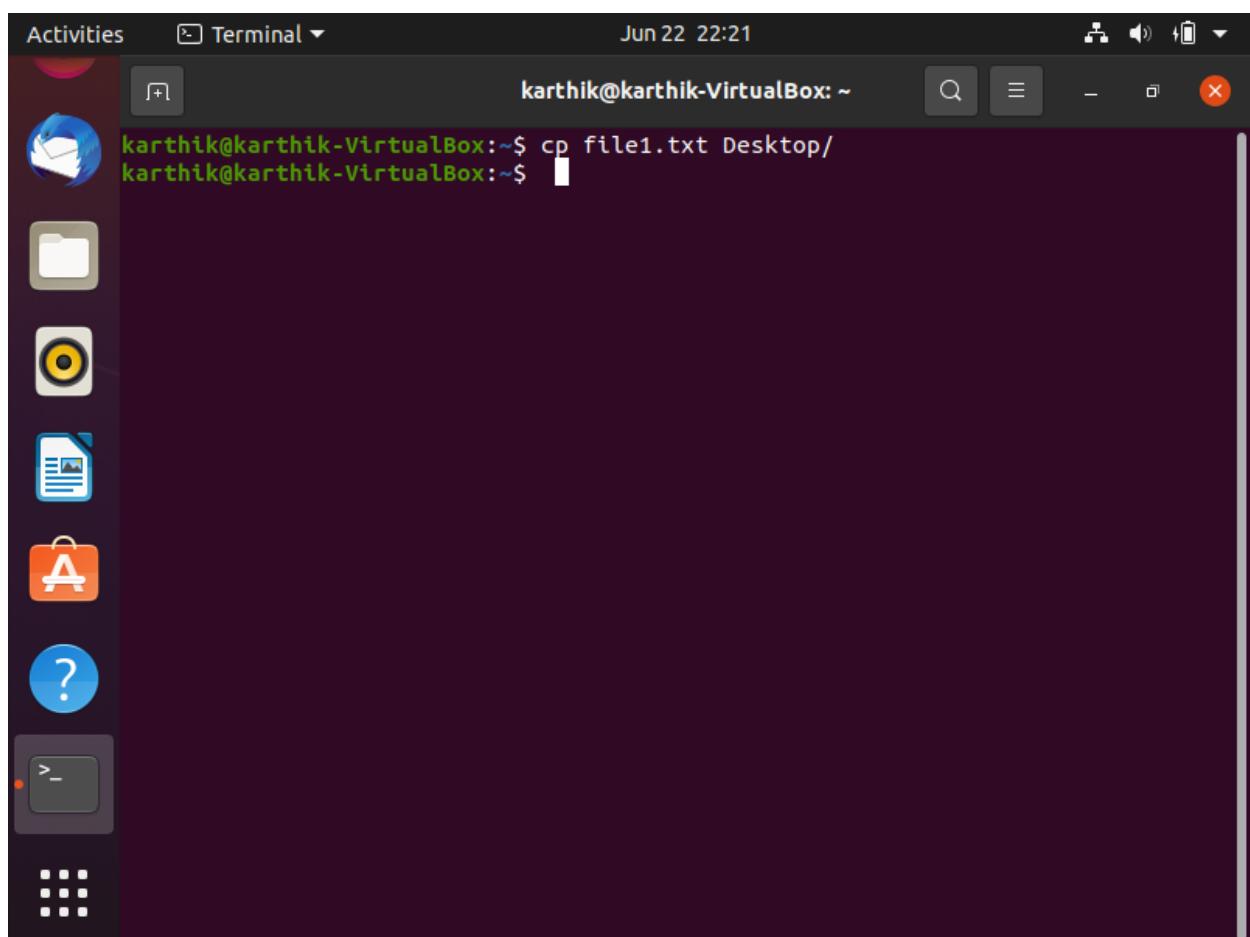
A screenshot of an Ubuntu desktop environment. On the left, there's a dock with icons for the Dash, Home, Applications, and Help. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

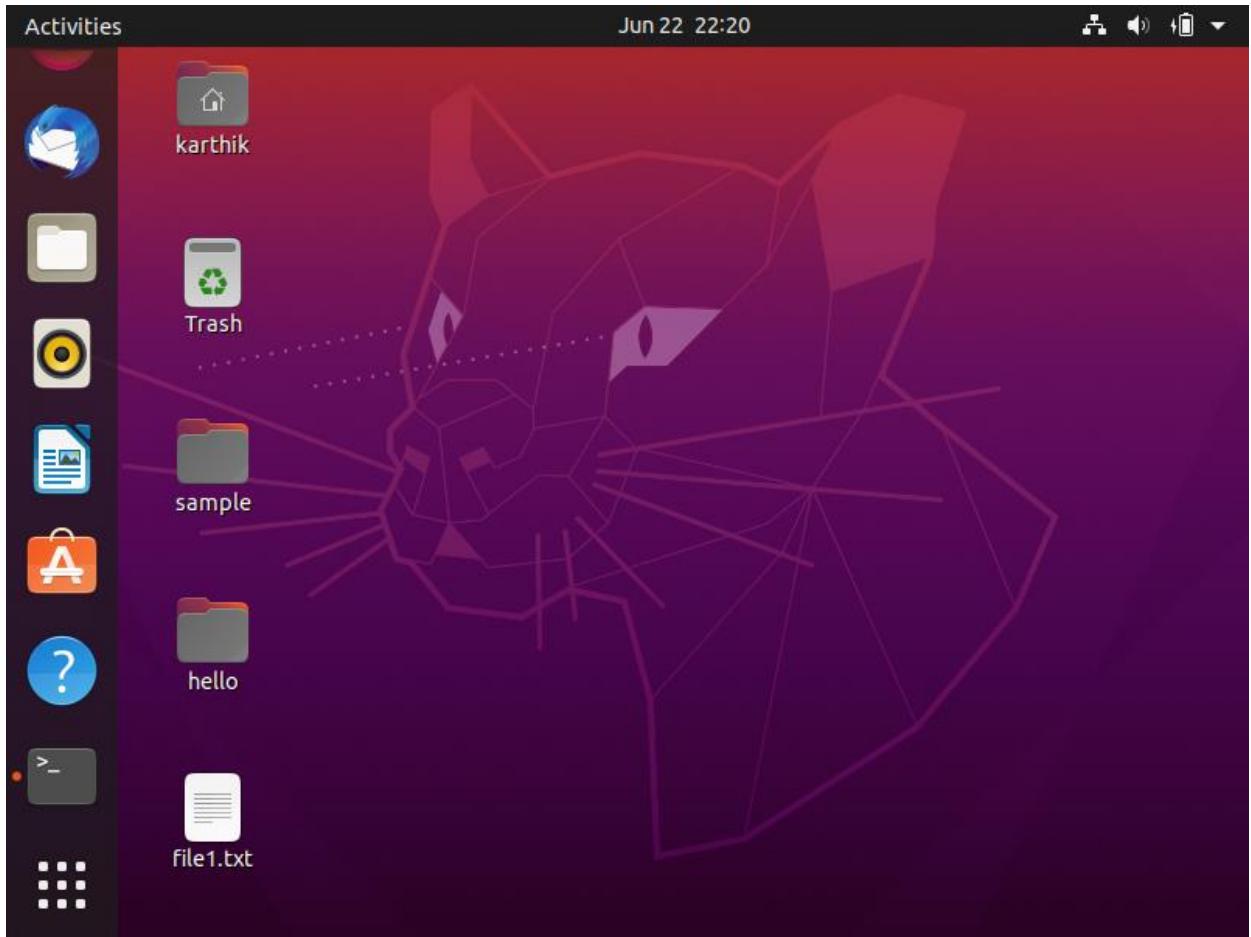
```
Activities Terminal Jun 22 22:17
karthik@karthik-VirtualBox:~$ cut -b 1,2,3 file1.txt
reg
mee
you
hey
got
karthik@karthik-VirtualBox:~$ cat >> file2.txt
mouse
light
^C
karthik@karthik-VirtualBox:~$ paste file1.txt file2.txt
regular mouse
meet    light
you
hey
got
karthik@karthik-VirtualBox:~$ uname
Linux
karthik@karthik-VirtualBox:~$ uname -r
5.8.0-55-generic
karthik@karthik-VirtualBox:~$
```

10. cp

cp stands for copy. This command is used to copy files or group of files or directory. It creates an exact image of a file on a disk with different file name. cp command require at least two filenames in its arguments. Third syntax is used to copy multiple Sources(files) to Directory.

'cp' means copy. 'cp' command is used to copy a file or a directory. To copy a file into the same directory syntax will be, cp <existing file name> <new file name>



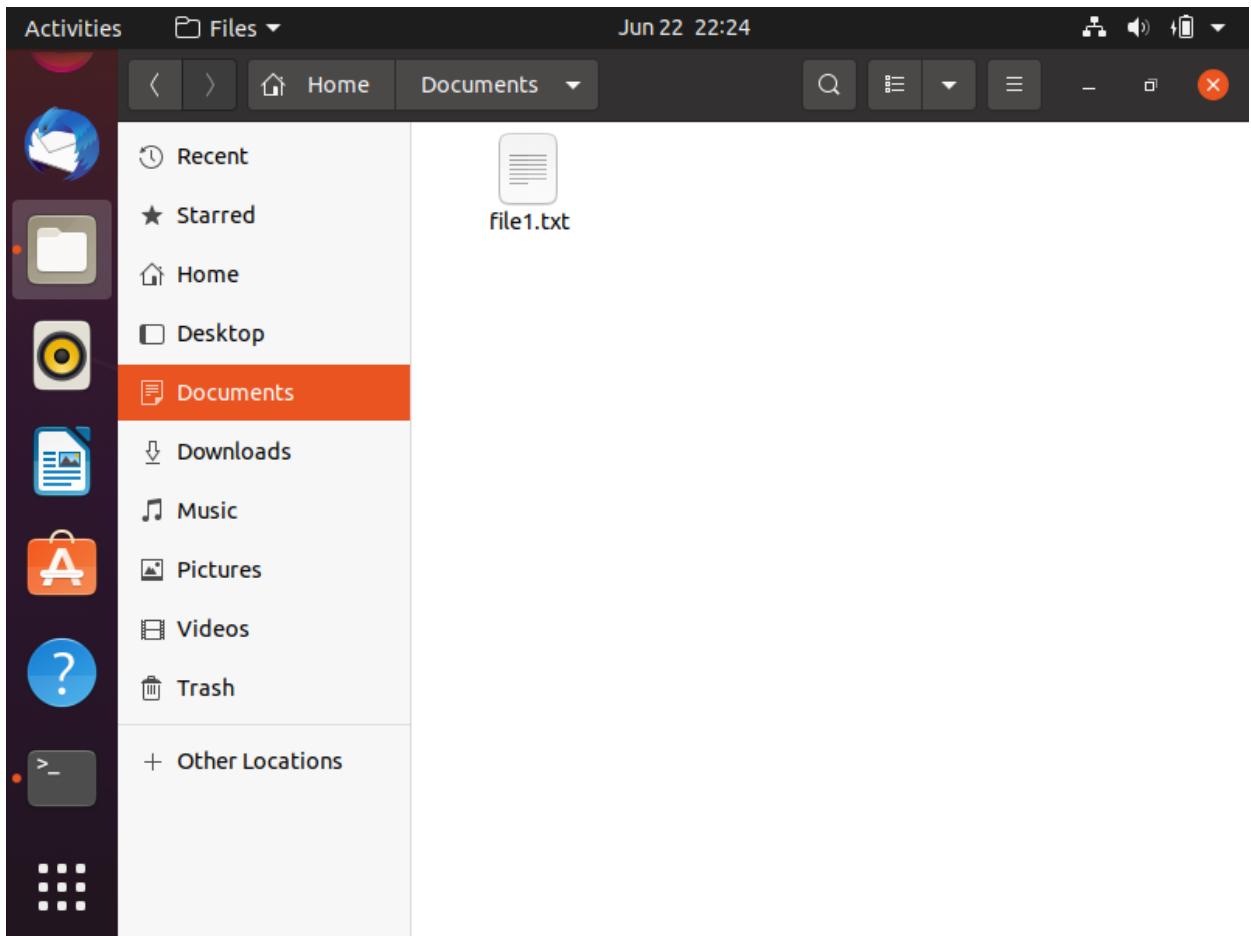


11. locate

To use locate, open a terminal and type locate followed by the file name you are looking for. In this example, I'm searching for files that contain the word 'sunny' in their name. Locate can also tell you how many times a search keyword is matched in the database.

Command. locate is a Unix utility which serves to find files on filesystems. It searches through a prebuilt database of files generated by the updatedb command or by a daemon and compressed using incremental encoding. It operates significantly faster than find , but requires regular updating of the database.

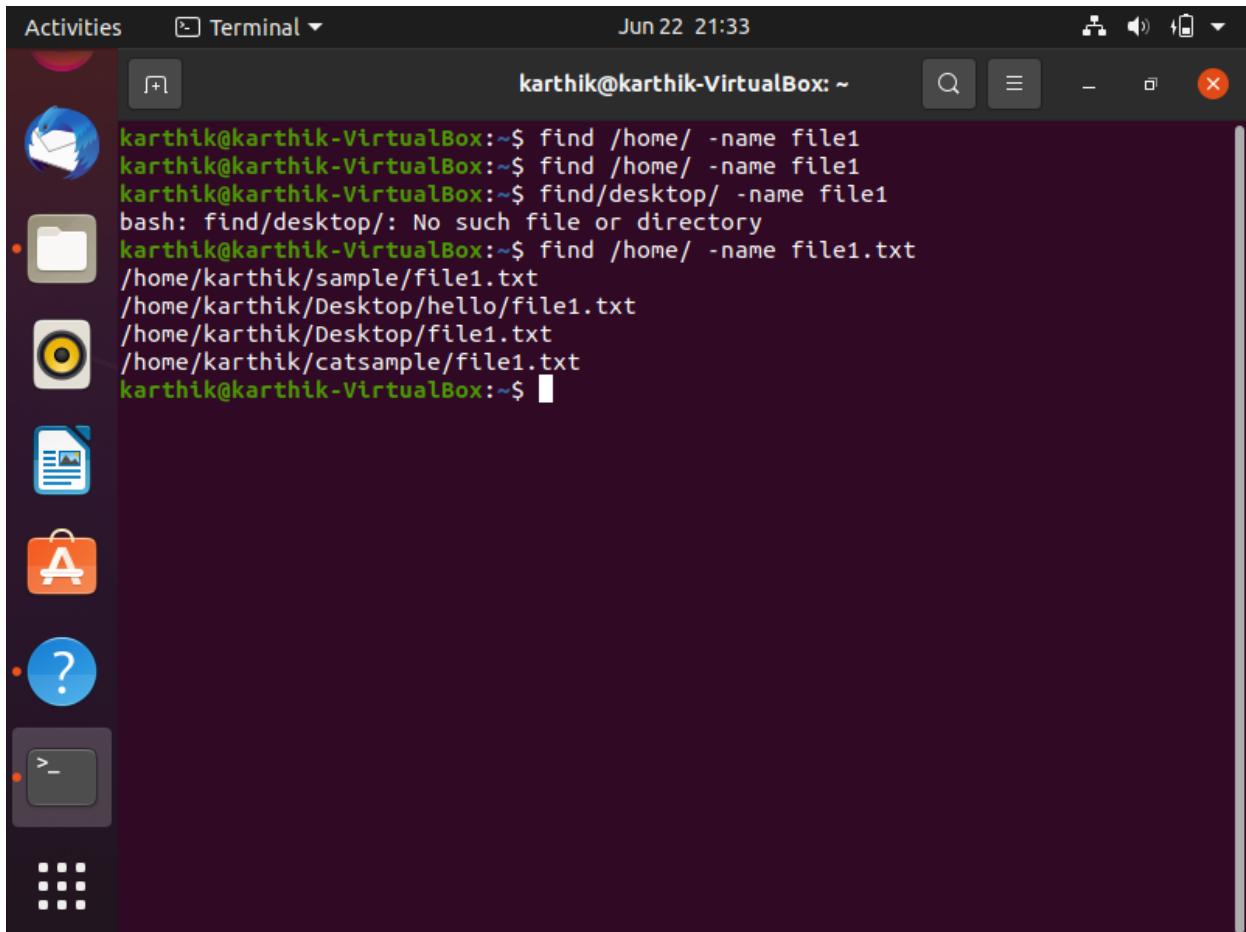
Try using this command: sudo apt-get install locate . – ...



For the future: if you're looking for a program and don't know the package, install apt-file: sudo apt-get install apt-file and search for the program using apt-file: apt-file search /usr/bin/locate .

12. find

The `find` command is one of the most powerful tools in the Linux system administrators arsenal. It searches for files and directories in a directory hierarchy based on a user given expression and can perform user-specified action on each matched file.

A screenshot of an Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Applications, Help, and a terminal. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

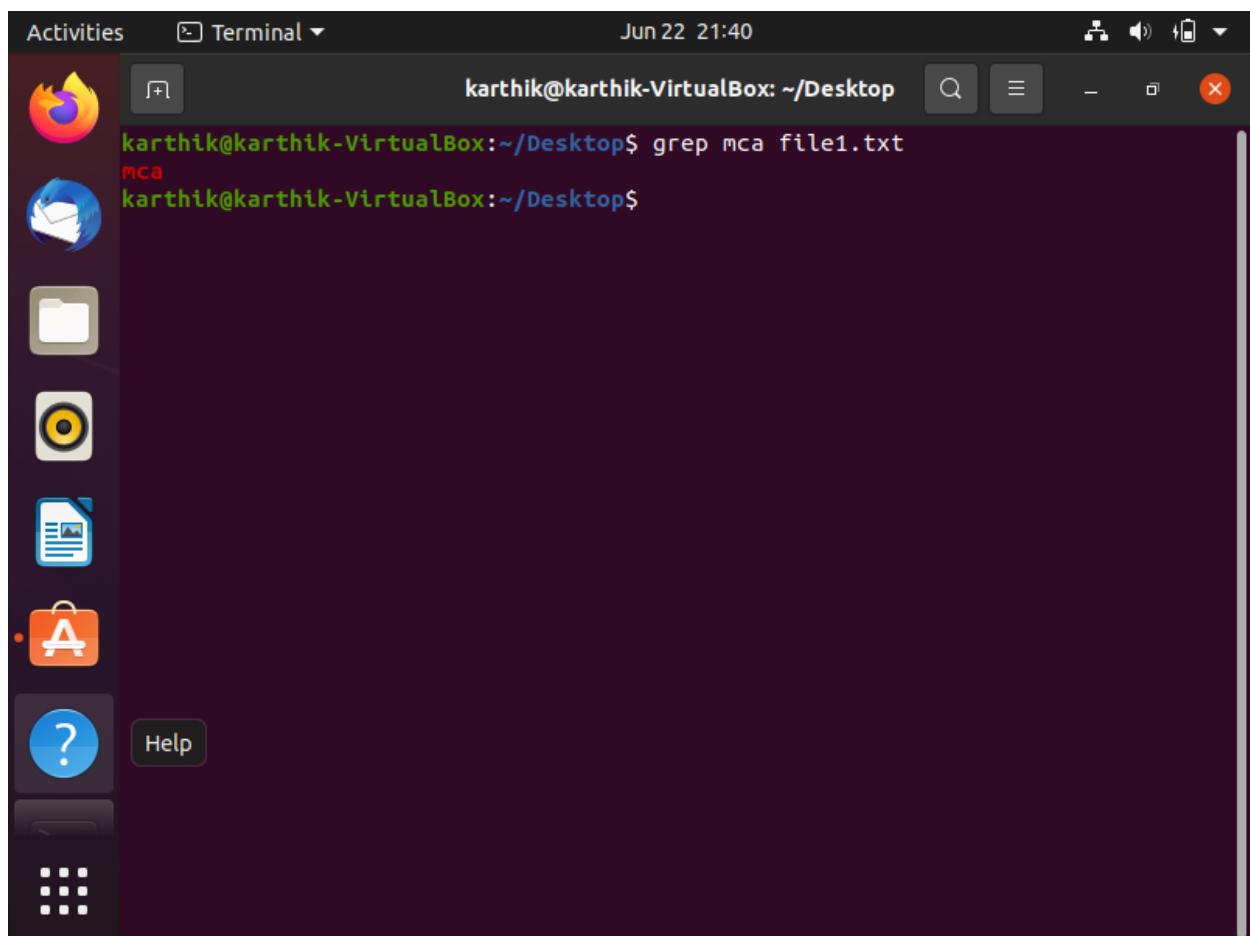
```
Activities Terminal Jun 22 21:33
karthik@karthik-VirtualBox:~$ find /home/ -name file1
karthik@karthik-VirtualBox:~$ find /home/ -name file1
karthik@karthik-VirtualBox:~$ find/desktop/ -name file1
bash: find/desktop/: No such file or directory
karthik@karthik-VirtualBox:~$ find /home/ -name file1.txt
/home/karthik/sample/file1.txt
/home/karthik/Desktop/hello/file1.txt
/home/karthik/Desktop/file1.txt
/home/karthik/catsample/file1.txt
karthik@karthik-VirtualBox:~$
```

13. grep

To search multiple files with the `grep` command, insert the filenames you want to search, separated with a space character. The terminal prints the name of every file that contains the matching lines, and the actual lines that include the required string of characters. You can append as many filenames as needed.

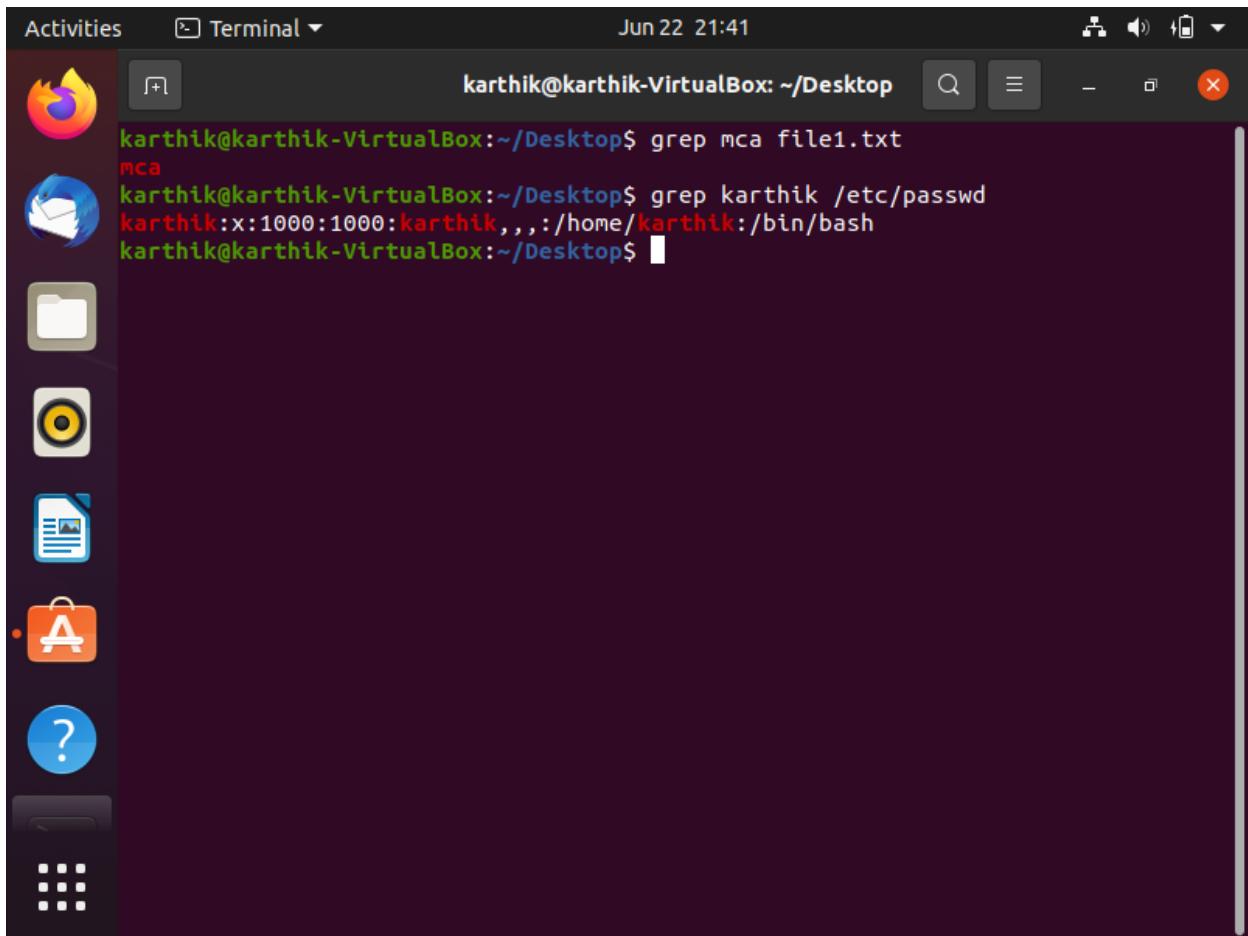
To use the grep command in Linux

- Grep Command Syntax: grep [options] PATTERN [FILE...] ... •
Examples of using 'grep'
- grep foo /file/name. ...
- grep -i "foo" /file/name. ...
- grep 'error 123' /file/name. ...
- grep -r "192.168.1.5" /etc/ ...
- grep -w "foo" /file/name. ...
- egrep -w 'word1|word2' /file/name.



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled 'Terminal' and has the command 'grep mca file1.txt' entered, with the output 'mca' displayed below it. The terminal window is part of the Unity interface, which includes a dock with various icons like a browser, file manager, and system settings. The desktop background is dark, and the overall aesthetic is that of a standard Linux desktop from around 2010-2012.

```
karthik@karthik-VirtualBox:~/Desktop$ grep mca file1.txt
mca
karthik@karthik-VirtualBox:~/Desktop$
```

A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for various applications: a browser, file manager, system settings, dash, and others. The main area shows a terminal window titled 'Terminal' with the command 'grep mca file1.txt' running. The output of the command is shown, which includes the string 'mca'. Below this, another command 'grep karthik /etc/passwd' is run, and its output shows a user entry for 'karthik'.

```
karthik@karthik-VirtualBox:~/Desktop$ grep mca file1.txt
mca
karthik@karthik-VirtualBox:~/Desktop$ grep karthik /etc/passwd
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash
karthik@karthik-VirtualBox:~/Desktop$
```

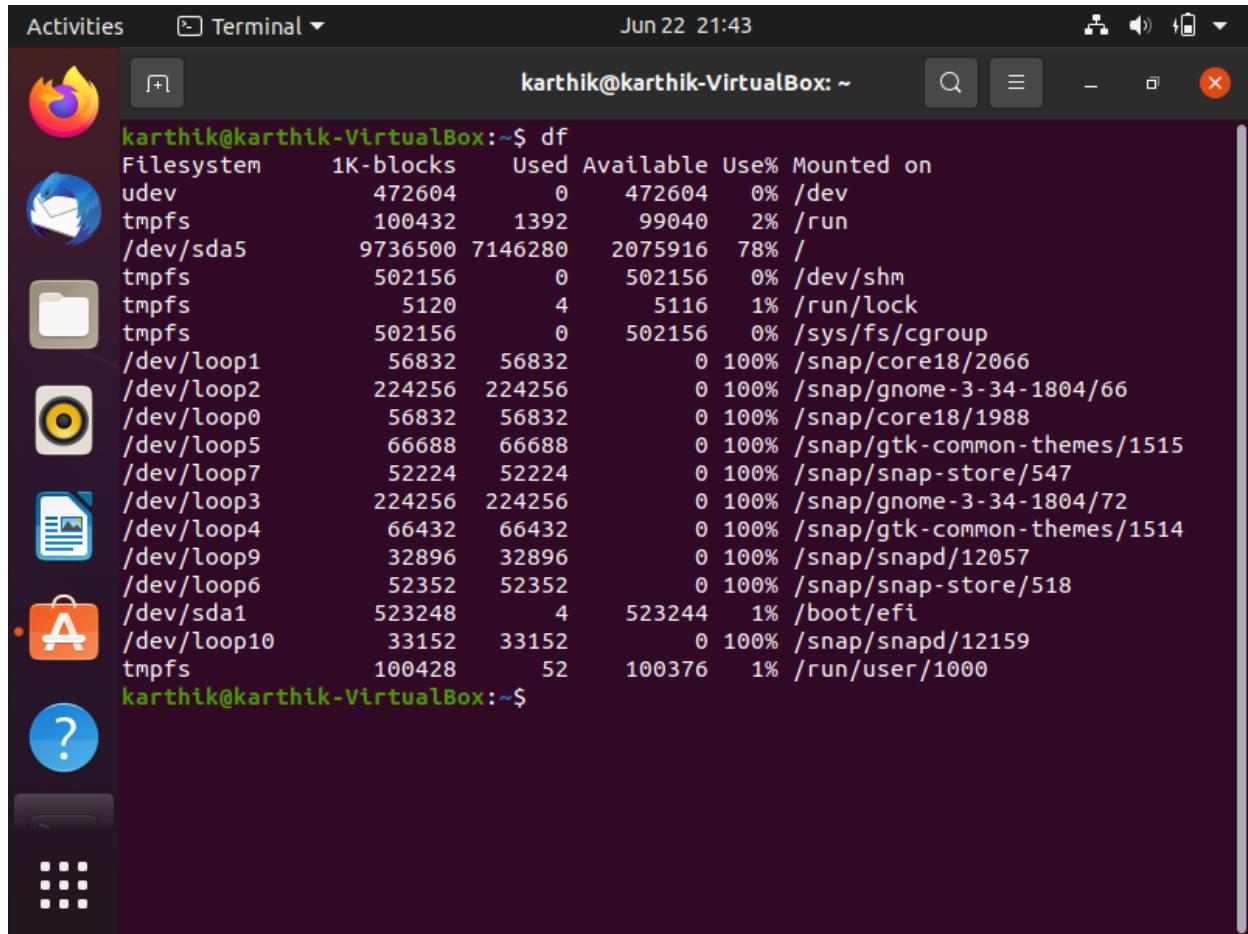
14. df

The df command (short for disk free), is used to display information related to file systems about total space and available space. If no file name is given, it displays the space available on all currently mounted file systems.

df (abbreviation for disk free) is a standard Unix command used to display the amount of available disk space for file systems on which the invoking user has appropriate read access. df is typically implemented using the statfs or statvfs system calls.

To view disk space usage run the df command. This will print a table of information to standard output. This can be useful to discover the

amount of free space available on a system or filesystems. Use% - the percentage that the filesystem is in use.



A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Terminal" and the user is "karthik@karthik-VirtualBox: ~". The terminal displays the output of the "df" command, which shows disk usage statistics. The output includes columns for Filesystem, 1K-blocks, Used, Available, Use%, and Mounted on. The terminal window has a dark background with light-colored text. The desktop environment includes icons for various applications like a browser, file manager, and terminal.

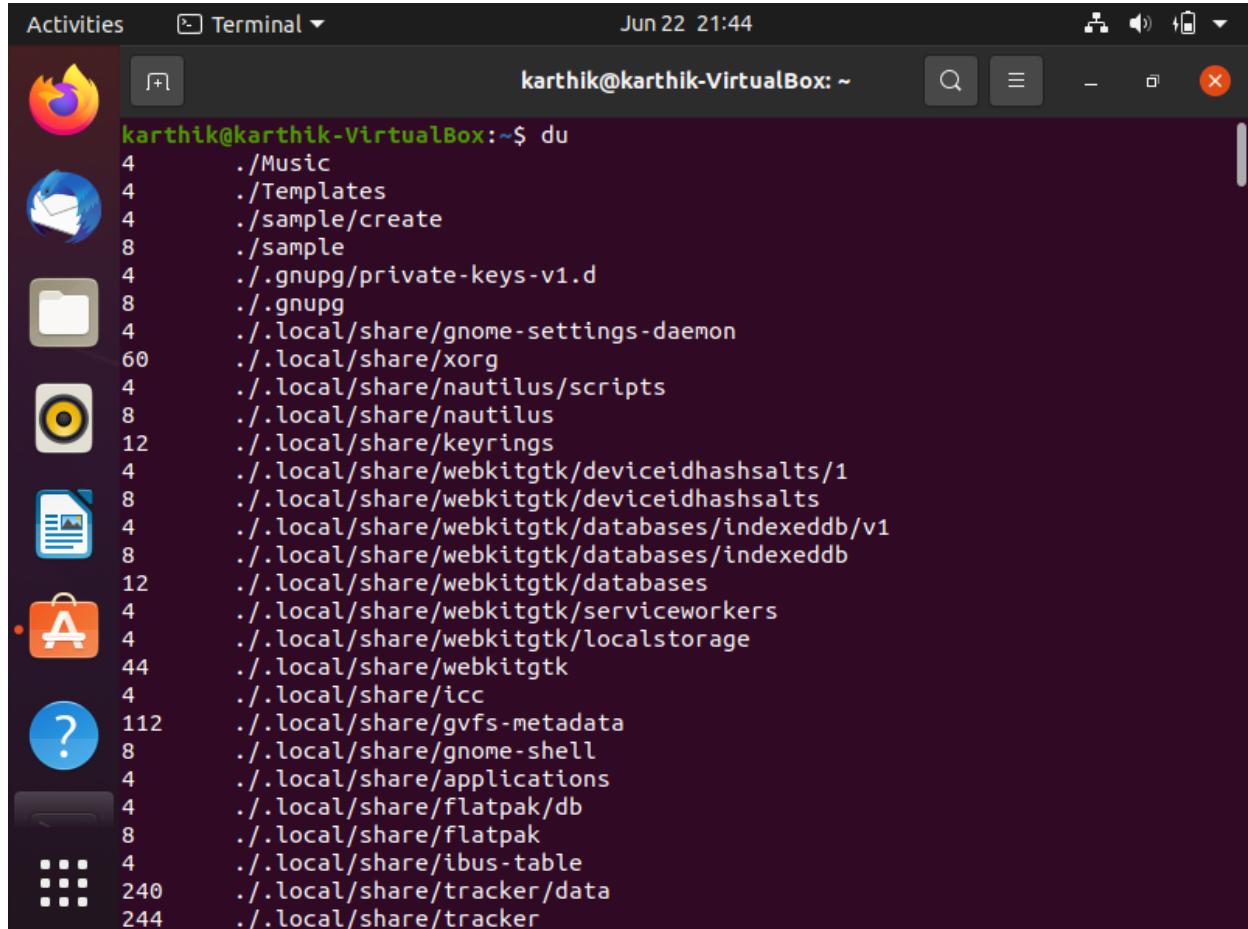
```
karthik@karthik-VirtualBox:~$ df
Filesystem      1K-blocks    Used   Available  Use% Mounted on
udev              472604      0   472604     0% /dev
tmpfs             100432  1392    99040     2% /run
/dev/sda5       9736500 7146280  2075916    78% /
tmpfs             502156      0   502156     0% /dev/shm
tmpfs               5120      4    5116     1% /run/lock
tmpfs             502156      0   502156     0% /sys/fs/cgroup
/dev/loop1        56832  56832      0 100% /snap/core18/2066
/dev/loop2        224256 224256      0 100% /snap/gnome-3-34-1804/66
/dev/loop0        56832  56832      0 100% /snap/core18/1988
/dev/loop5        66688  66688      0 100% /snap/gtk-common-themes/1515
/dev/loop7        52224  52224      0 100% /snap/snap-store/547
/dev/loop3        224256 224256      0 100% /snap/gnome-3-34-1804/72
/dev/loop4        66432  66432      0 100% /snap/gtk-common-themes/1514
/dev/loop9        32896  32896      0 100% /snap/snapd/12057
/dev/loop6        52352  52352      0 100% /snap/snap-store/518
/dev/sda1        523248      4  523244     1% /boot/efi
/dev/loop10       33152  33152      0 100% /snap/snapd/12159
tmpfs             100428     52  100376     1% /run/user/1000
karthik@karthik-VirtualBox:~$
```

15. du

The du command is a standard Linux/Unix command that allows a user to gain disk usage information quickly. It is best applied to specific directories and allows many variations for customizing the output to meet your needs.

With no arguments, 'du' reports the disk space for the current directory. Normally the disk space is printed in units of 1024 bytes, but this can be overridden. Options -a --all Show counts for all files, not just directories.

As you may have seen that the du command in Linux outputs all the sizes of all the files. But if all you want to see is the summarized output, then you can use the -s option which stands for a summary. I'm also combining it with the -h option to view human-readable info.



A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and contains the command 'du' followed by a list of file sizes and paths. The paths listed include '/.Music', '/.Templates', '/sample/create', '/sample', '/.gnupg/private-keys-v1.d', '/.gnupg', '/.local/share/gnome-settings-daemon', '/.local/share/xorg', '/.local/share/nutilus/scripts', '/.local/share/nutilus', '/.local/share/keyrings', '/.local/share/webkitgtk/deviceidhashsalts/1', '/.local/share/webkitgtk/deviceidhashsalts', '/.local/share/webkitgtk/databases/indexeddb/v1', '/.local/share/webkitgtk/databases/indexeddb', '/.local/share/webkitgtk/databases', '/.local/share/webkitgtk/serviceworkers', '/.local/share/webkitgtk/localstorage', '/.local/share/webkitgtk', '/.local/share/icc', '/.local/share/gvfs-metadata', '/.local/share/gnome-shell', '/.local/share/applications', '/.local/share/flatpak/db', '/.local/share/flatpak', '/.local/share/ibus-table', '/.local/share/tracker/data', and '/.local/share/tracker'. The terminal window is titled 'Terminal' and shows the date and time as 'Jun 22 21:44'. The desktop environment includes icons for various applications like a browser, file manager, and system settings.

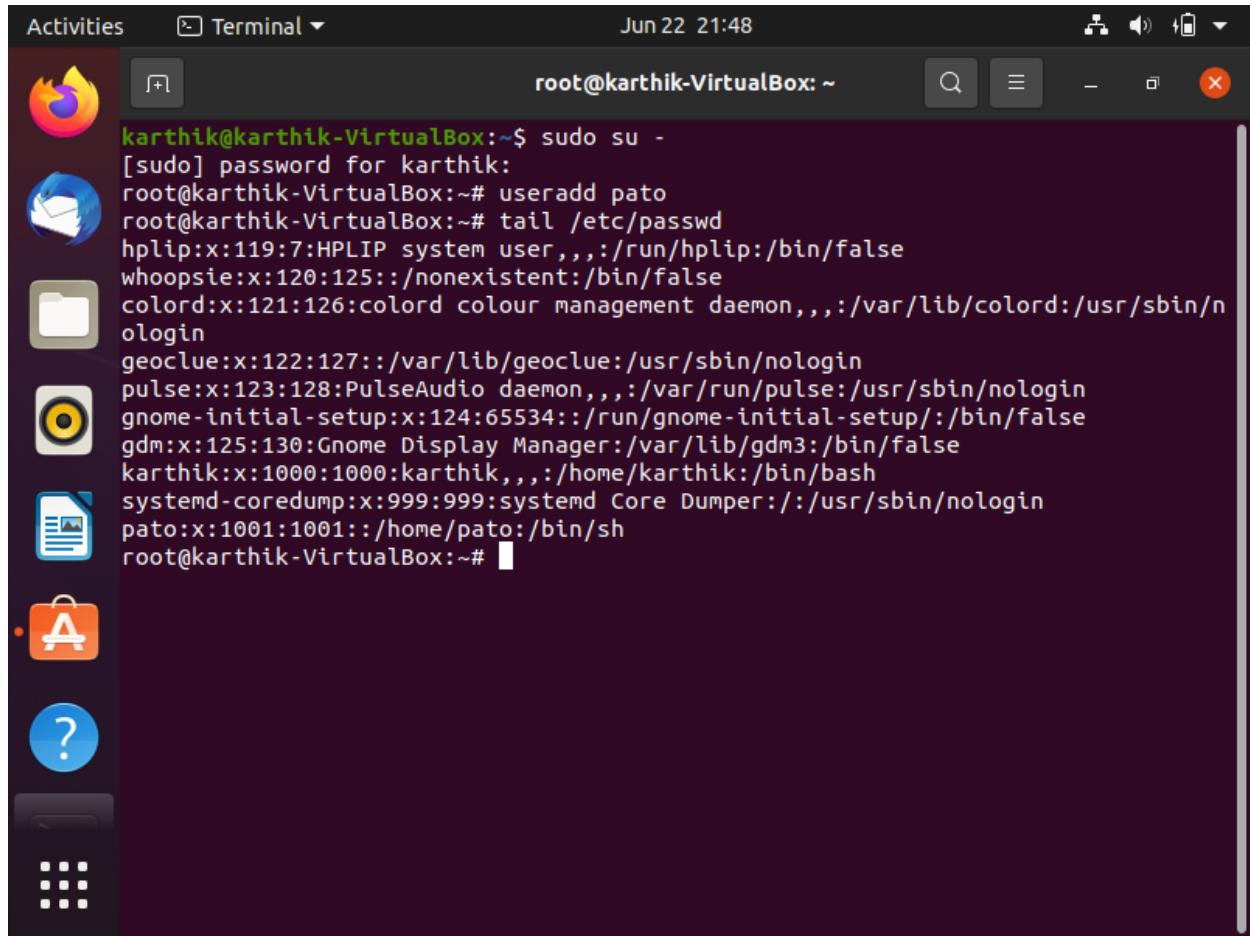
```
karthik@karthik-VirtualBox:~$ du
4      ./Music
4      ./Templates
4      ./sample/create
8      ./sample
4      ./gnupg/private-keys-v1.d
8      ./gnupg
4      ./local/share/gnome-settings-daemon
60     ./local/share/xorg
4      ./local/share/nutilus/scripts
8      ./local/share/nutilus
12    ./local/share/keyrings
4      ./local/share/webkitgtk/deviceidhashsalts/1
8      ./local/share/webkitgtk/deviceidhashsalts
4      ./local/share/webkitgtk/databases/indexeddb/v1
8      ./local/share/webkitgtk/databases/indexeddb
12    ./local/share/webkitgtk/databases
4      ./local/share/webkitgtk/serviceworkers
4      ./local/share/webkitgtk/localstorage
44    ./local/share/webkitgtk
4      ./local/share/icc
112   ./local/share/gvfs-metadata
8      ./local/share/gnome-shell
4      ./local/share/applications
4      ./local/share/flatpak/db
8      ./local/share/flatpak
4      ./local/share/ibus-table
240   ./local/share/tracker/data
244   ./local/share/tracker
```

16. useradd

Only root or users with sudo privileges can use the useradd command to create new user accounts. When invoked, useradd creates a new user account according to the options specified on the command line and the default values set in the /etc/default/useradd file.

In Linux, a 'useradd' command is a low-level utility that is used for adding/creating user accounts in Linux and other Unix-like operating

systems. The 'adduser' is much similar to useradd command, because it is just a symbolic link to it.



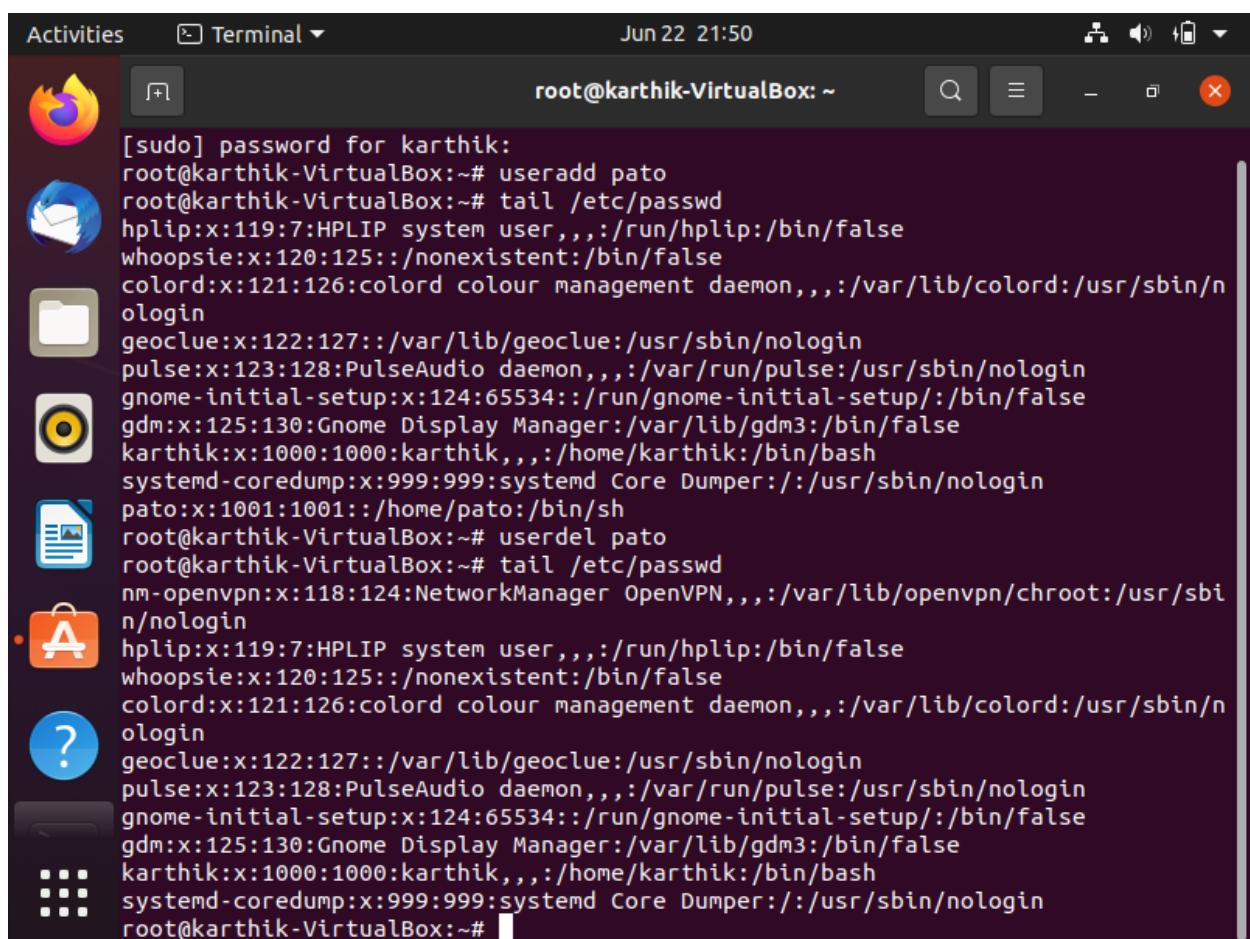
A screenshot of an Ubuntu desktop environment. On the left, there's a dock with icons for the Dash, Home, Applications, Help, and a grid of other applications. The main area shows a terminal window titled "Terminal". The terminal window has a dark background and contains the following text:

```
karthik@karthik-VirtualBox:~$ sudo su -  
[sudo] password for karthik:  
root@karthik-VirtualBox:~# useradd pato  
root@karthik-VirtualBox:~# tail /etc/passwd  
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false  
whoopsie:x:120:125::/nonexistent:/bin/false  
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin  
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin  
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin  
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false  
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false  
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash  
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin  
pato:x:1001:1001::/home/pato:/bin/sh  
root@karthik-VirtualBox:~#
```

17. userdel

userdel command in Linux system is used to delete a user account and related files. This command basically modifies the system account files, deleting all the entries which refer to the username LOGIN. It is a low-level utility for removing the users.

Another option is to use the -f (--force) option that tells userdel to forcefully remove the user account, even if the user is still logged in or if there are running processes that belong to the user.

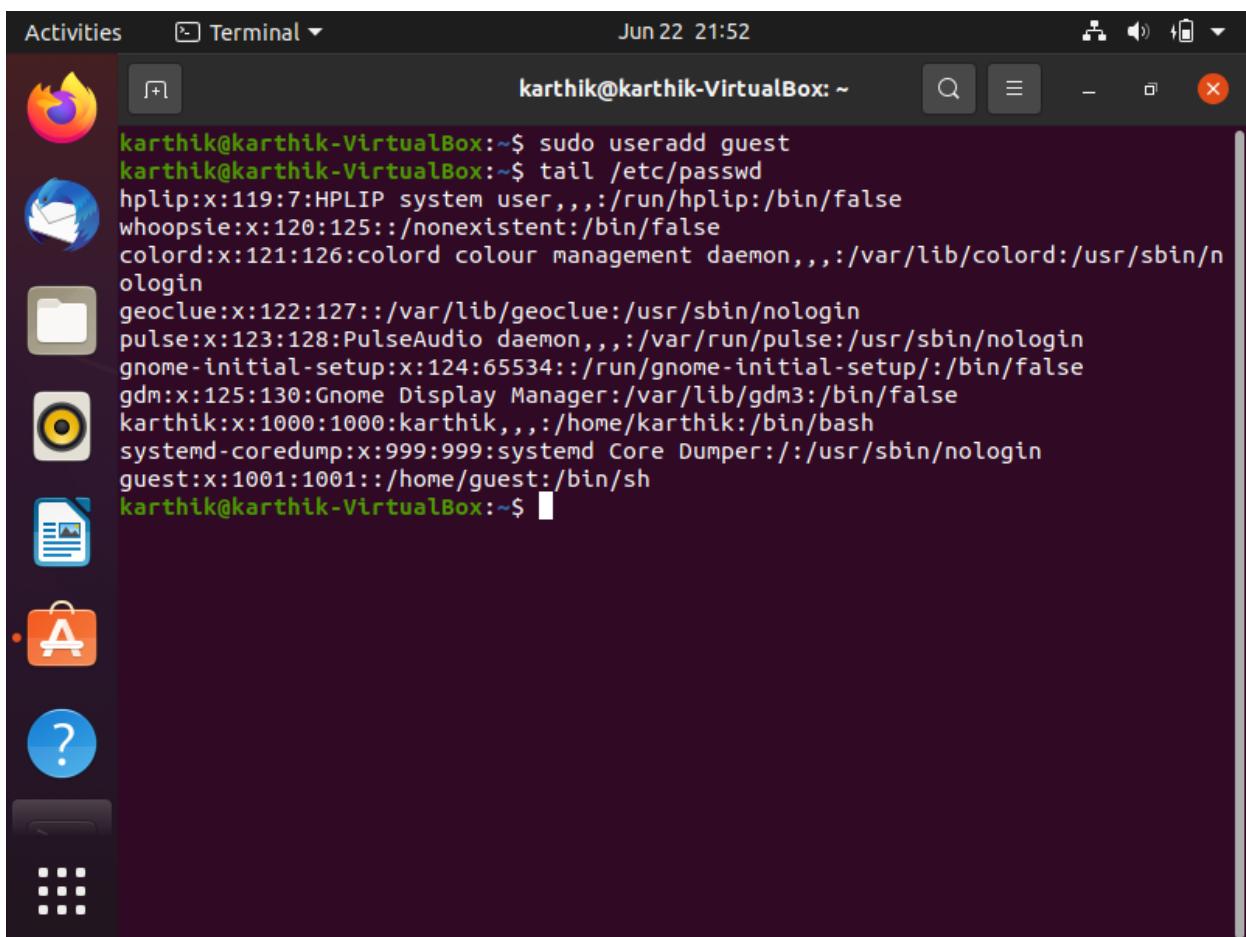


```
[sudo] password for karthik:  
root@karthik-VirtualBox:~# useradd pato  
root@karthik-VirtualBox:~# tail /etc/passwd  
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false  
whoopsie:x:120:125::/nonexistent:/bin/false  
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin  
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin  
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin  
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false  
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false  
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash  
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin  
pato:x:1001:1001::/home/pato:/bin/sh  
root@karthik-VirtualBox:~# userdel pato  
root@karthik-VirtualBox:~# tail /etc/passwd  
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin  
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false  
whoopsie:x:120:125::/nonexistent:/bin/false  
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin  
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin  
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin  
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false  
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false  
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash  
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin  
root@karthik-VirtualBox:~# ]
```

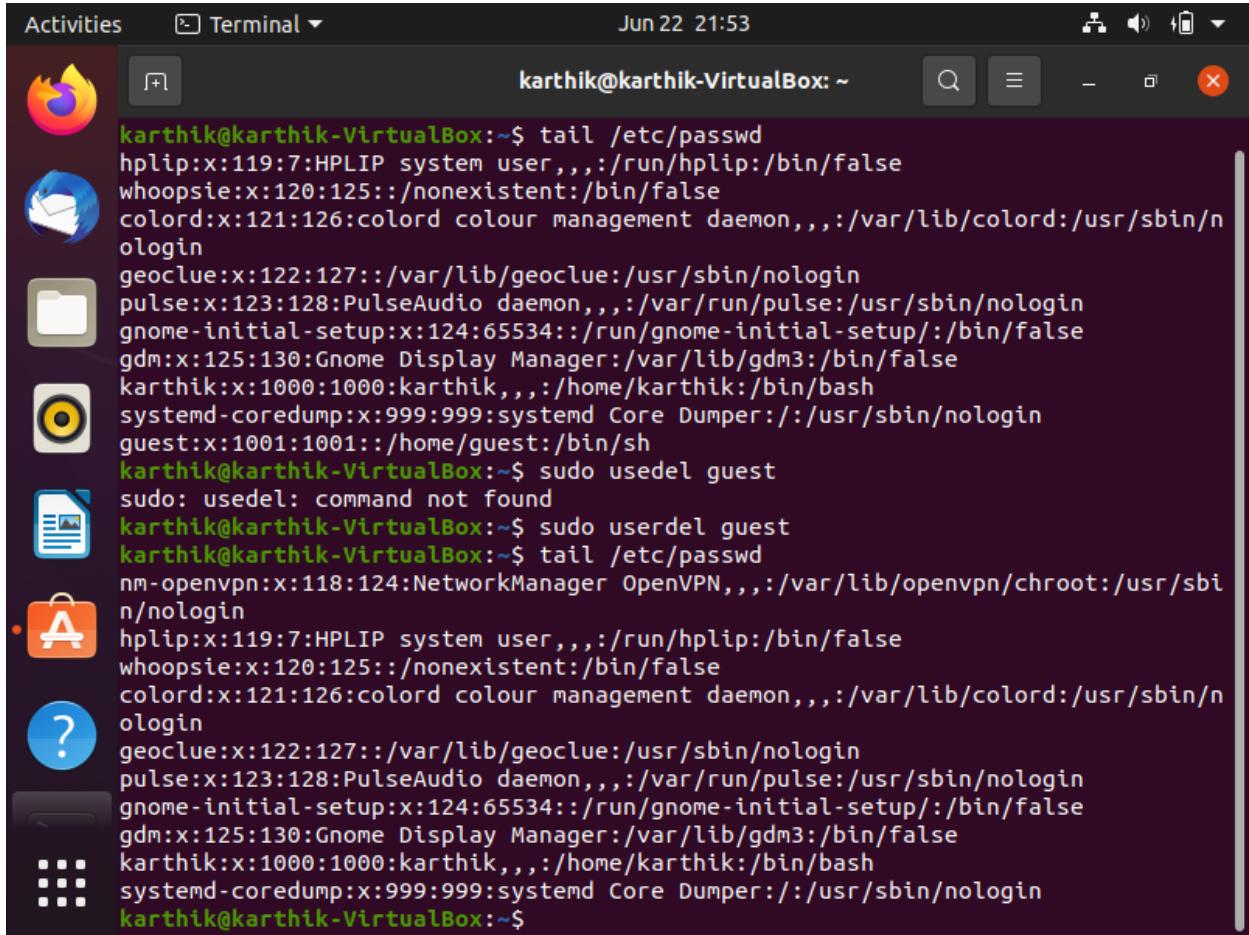
18. sudo

The sudo command allows you to run programs with the security privileges of another user (by default, as the superuser). It prompts you for your personal password and confirms your request to execute a command by checking a file, called sudoers , which the system administrator configures

Use the visudo command to edit the configuration file: sudo visudo. This will open /etc/sudoers for editing. To add a user and grant full sudo privileges, add the following line: [username] ALL=(ALL:ALL) ALL. Save and exit the file.

A screenshot of an Ubuntu desktop environment. On the left, there's a dock with icons for the Dash, Home, Applications, Help, and a terminal. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

```
karthik@karthik-VirtualBox:~$ sudo useradd guest
karthik@karthik-VirtualBox:~$ tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:::/usr/sbin/nologin
guest:x:1001:1001::/home/guest:/bin/sh
karthik@karthik-VirtualBox:~$
```



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

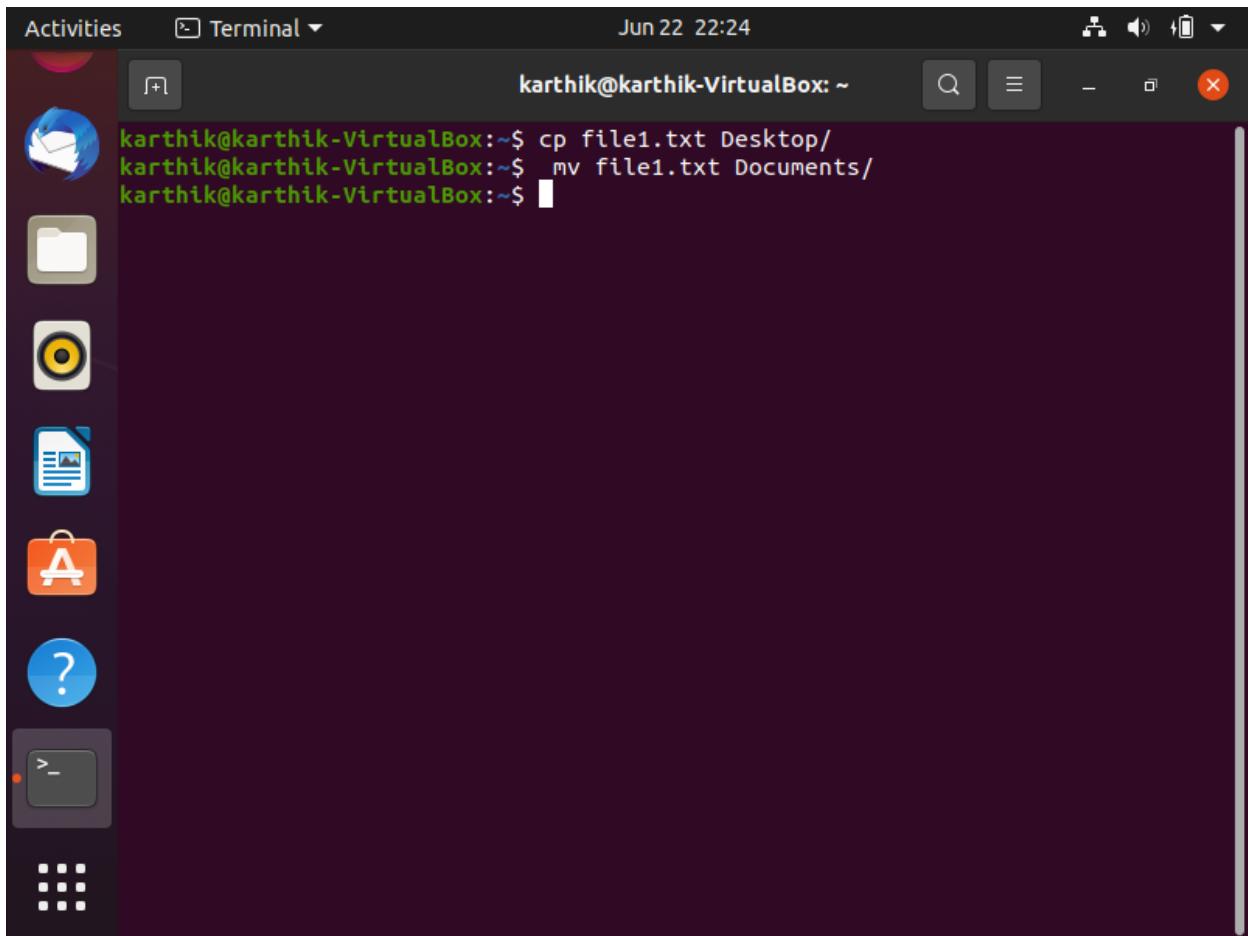
```
karthik@karthik-VirtualBox:~$ tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
guest:x:1001:1001::/home/guest:/bin/sh
karthik@karthik-VirtualBox:~$ sudo usedel guest
sudo: usedel: command not found
karthik@karthik-VirtualBox:~$ sudo userdel guest
karthik@karthik-VirtualBox:~$ tail /etc/passwd
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
karthik:x:1000:1000:karthik,,,:/home/karthik:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
karthik@karthik-VirtualBox:~$
```

19. mv

mv stands for move. mv is used to move one or more files or directories from one place to another in a file system like UNIX. It has two distinct functions:

- (i) It renames a file or folder.
- (ii) It moves a group of files to a different directory.

No additional space is consumed on a disk during renaming. This command normally works silently means no prompt for confirmation.

A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Help, and a terminal window. The main window is a terminal titled "Terminal" with the command line "karthik@karthik-VirtualBox: ~". The terminal shows the following commands being run:

```
karthik@karthik-VirtualBox:~$ cp file1.txt Desktop/
karthik@karthik-VirtualBox:~$ mv file1.txt Documents/
karthik@karthik-VirtualBox:~$
```

20. passwd

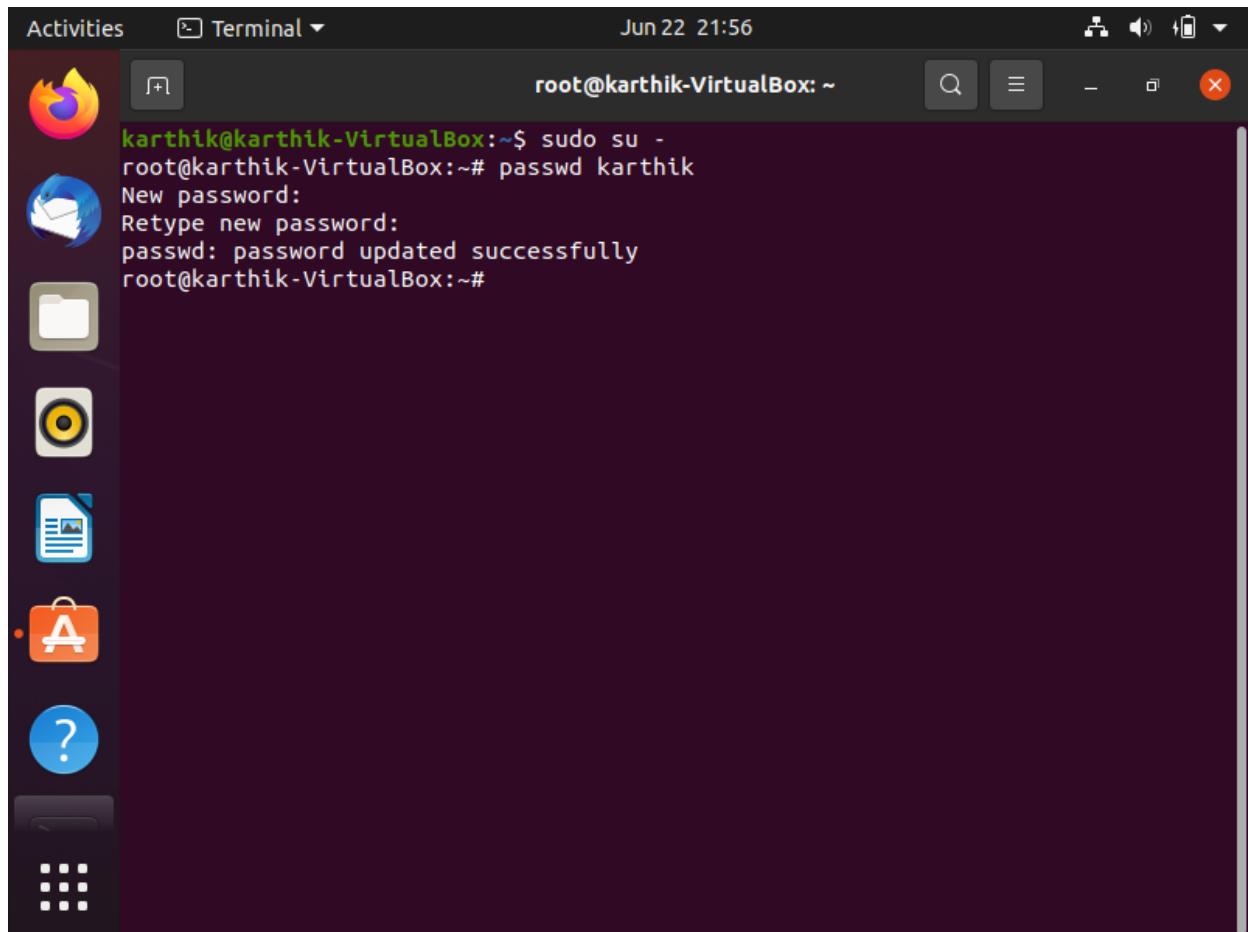
The `passwd` command changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account. `passwd` also changes the account or associated password validity period.

Creates a password definition, without a password value, that prompts users for a password while a script is running. To display password status information of a user , use `-S` option in `passwd` command.

`-d, --delete`: This option deletes the user password and makes the account password-less. `-e, --expire`: This option immediately expires the account password and forces the user to change password on

their next login. -h, --help: Display help related to the passwd command.

The passwd command sets and changes passwords for users. Use this command to change your own password or another user's password. You can also use the passwd command to change the full name (gecos) associated with your login name and the shell you use as an interface to the operating system.

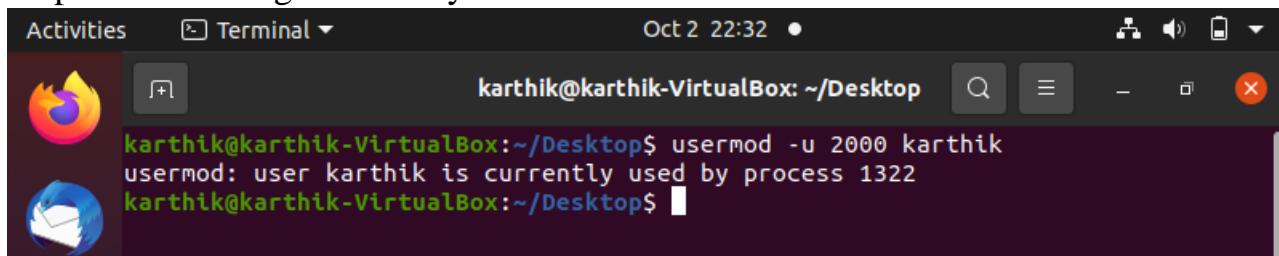
A screenshot of an Ubuntu desktop environment. On the left, there is a vertical dock with icons for various applications: a browser, file manager, terminal, dash, system settings, and help. The main window is a terminal window titled "Terminal". The title bar shows the date and time as "Jun 22 21:56" and the current user as "root@karthik-VirtualBox: ~". The terminal window contains the following text:

```
karthik@karthik-VirtualBox:~$ sudo su -
root@karthik-VirtualBox:~# passwd karthik
New password:
Retype new password:
passwd: password updated successfully
root@karthik-VirtualBox:~#
```

BASIC LINUX COMMANDS

1. usermod

- usermod command is used to change the properties of a user in Linux through the command line.
- After creating a user we have to sometimes change their attributes like password or login directory.



```
Activities Terminal Oct 2 22:32
karthik@karthik-VirtualBox:~/Desktop$ usermod -u 2000 karthik
usermod: user karthik is currently used by process 1322
karthik@karthik-VirtualBox:~/Desktop$
```

2. groupadd

- groupadd command creates a new group account using the values specified on the command line and the default values from the system.
- It can be handled by superuser or root user.



```
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amrutha1
[sudo] password for karthik:
groupadd: group 'amrutha1' already exists
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amrutha2
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amrutha3
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amrutha4
groupadd: group 'amrutha4' already exists
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amritha4
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd amritha5
karthik@karthik-VirtualBox:~/Desktop$ compgen -g amrutha
amrutha1
amrutha4
amrutha2
amrutha3
karthik@karthik-VirtualBox:~/Desktop$
```

3. groups

- It prints the groups a user is in.
- Groups make it easy to manage users with the same security and access privileges.



```
karthik@karthik-VirtualBox:~/Desktop$ groups karthik
karthik : karthik adm cdrom sudo dip plugdev lpadmin lxd sambashare
karthik@karthik-VirtualBox:~/Desktop$
```



4. groupdel

- groupdel command modifies the system account files, deleting all entries that refer to group and it is handled by super or root user.



```
karthik@karthik-VirtualBox:~/Desktop$ sudo groupdel amrutha2
karthik@karthik-VirtualBox:~/Desktop$ compgen -g amrutha
amrutha1
amrutha4
amrutha3
karthik@karthik-VirtualBox:~/Desktop$
```



5. groupmod

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



```
sudo groupmod -n new_groups amrutha3
karthik@karthik-VirtualBox:~/Desktop$ compgen -g karthik
karthik
karthik@karthik-VirtualBox:~/Desktop$ compgen -g amrutha
amrutha1
amrutha4
karthik@karthik-VirtualBox:~/Desktop$ compgen -g new_groups
new_groups
karthik@karthik-VirtualBox:~/Desktop$
```



6. chmod

- Stands for change mode
- To change directory permissions of file or directory in Linux.



```
karthik@karthik-VirtualBox:~/Desktop$ chmod +rwx file1
chmod: cannot access 'file1': No such file or directory
karthik@karthik-VirtualBox:~/Desktop$ chmod +rwx file1.txt
karthik@karthik-VirtualBox:~/Desktop$ chown karthik file1.txt
```

7. chown

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



```
karthik@karthik-VirtualBox:~/Desktop$ chmod +rwx file1.txt
karthik@karthik-VirtualBox:~/Desktop$ chown karthik file1.txt
karthik@karthik-VirtualBox:~/Desktop$ id karthik
uid=1000(karthik) gid=1000(karthik) groups=1000(karthik),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),131(lxd),132(sambashare)
```

8. id

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



```
karthik@karthik-VirtualBox:~/Desktop$ chown karthik file1.txt
karthik@karthik-VirtualBox:~/Desktop$ id karthik
uid=1000(karthik) gid=1000(karthik) groups=1000(karthik),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),120(lpadmin),131(lxd),132(sambashare)
```

9. ps

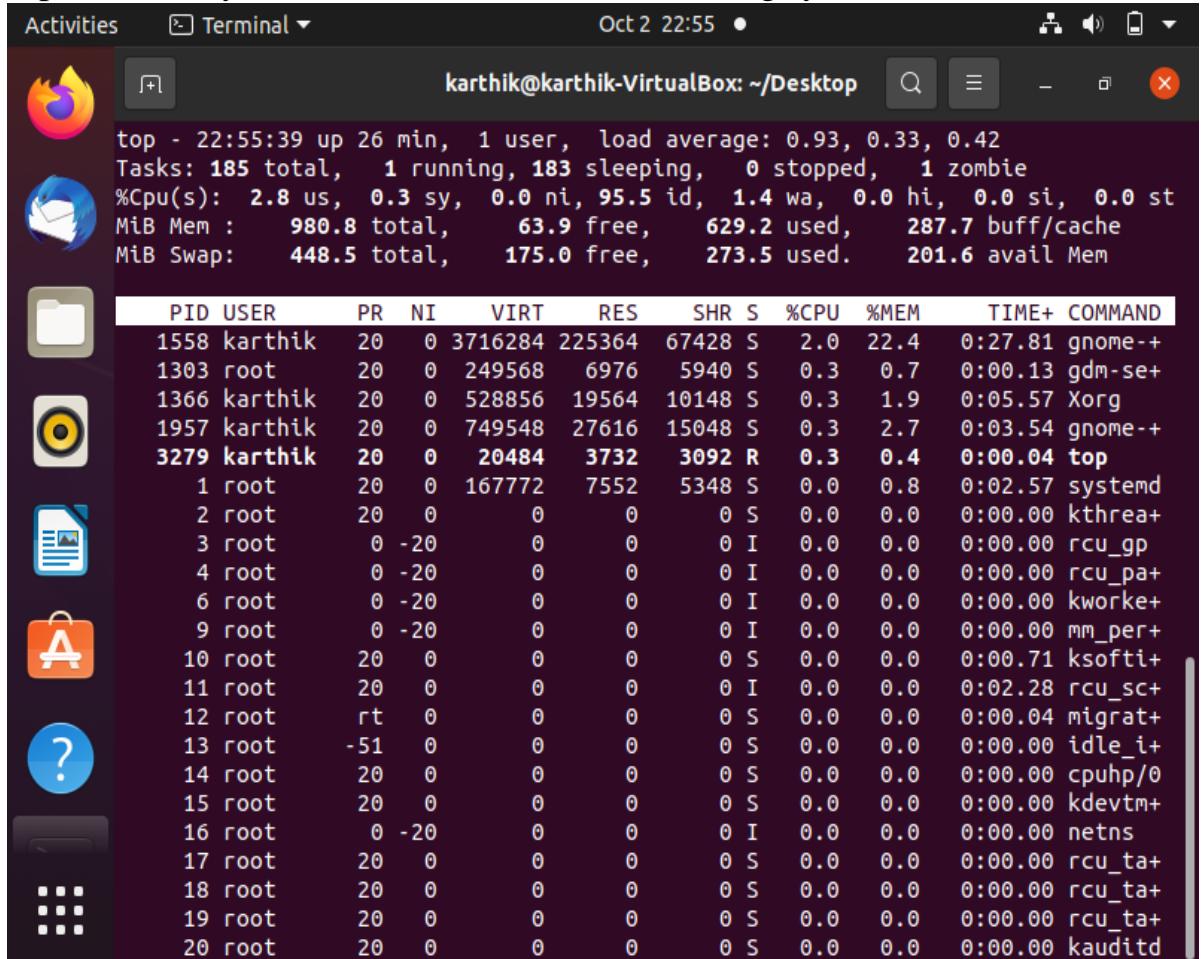
- Stands for Process Status.
- It is a command line utility that is used to display or view information related to the processes running in a Linux system.



```
karthik@karthik-VirtualBox:~/Desktop$ ps -a
  PID TTY      TIME CMD
 1366 tty2    00:00:04 Xorg
 1429 tty2    00:00:00 gnome-session-b
 3218 pts/0    00:00:00 ps
karthik@karthik-VirtualBox:~/Desktop$
```

10. top • top command is used to show the Linux processes.

- It provides a dynamic real-time view of the running system

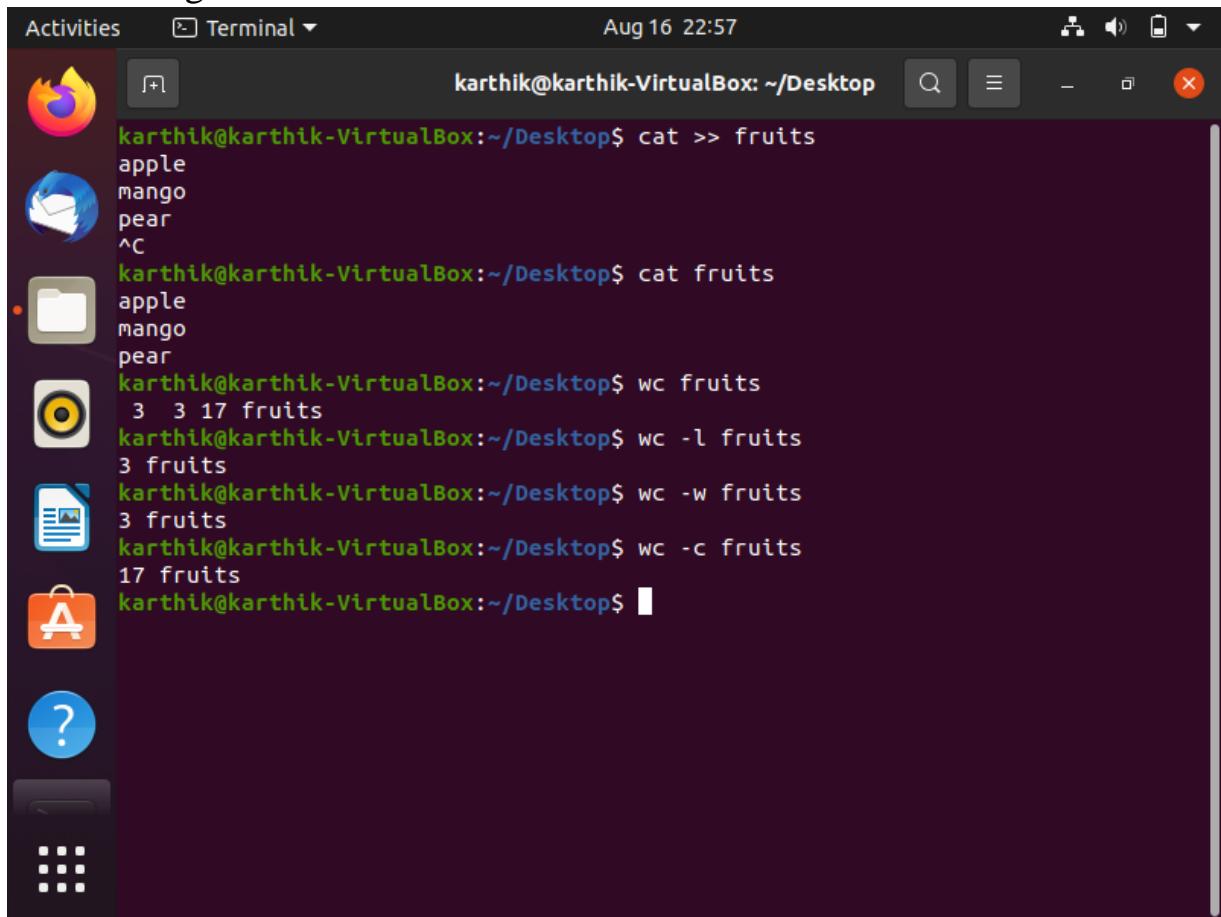


The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the command being run is "top". The output of the top command is displayed, showing system statistics and a list of running processes. The terminal window is part of a desktop interface with a sidebar containing icons for various applications like a browser, file manager, and system tools.

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1558	karthik	20	0	3716284	225364	67428	S	2.0	22.4	0:27.81	gnome-
1303	root	20	0	249568	6976	5940	S	0.3	0.7	0:00.13	gdm-se+
1366	karthik	20	0	528856	19564	10148	S	0.3	1.9	0:05.57	Xorg
1957	karthik	20	0	749548	27616	15048	S	0.3	2.7	0:03.54	gnome-+
3279	karthik	20	0	20484	3732	3092	R	0.3	0.4	0:00.04	top
1	root	20	0	167772	7552	5348	S	0.0	0.8	0:02.57	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthrea+
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	rcu_pa+
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker+
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_per+
10	root	20	0	0	0	0	S	0.0	0.0	0:00.71	ksoftti+
11	root	20	0	0	0	0	I	0.0	0.0	0:02.28	rcu_sc+
12	root	rt	0	0	0	0	S	0.0	0.0	0:00.04	migrat+
13	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_i+
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtm+
16	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	netns
17	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_ta+
18	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_ta+
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_ta+
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kauditid

BASIC LINUX COMMANDS PART-4

1. **wc** **wc** stands for **word count**. As the name implies, it is mainly 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.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the date and time are "Aug 16 22:57". The terminal content shows the following session:

```
karthik@karthik-VirtualBox:~/Desktop$ cat >> fruits
apple
mango
pear
^C
karthik@karthik-VirtualBox:~/Desktop$ cat fruits
apple
mango
pear
karthik@karthik-VirtualBox:~/Desktop$ wc fruits
3 3 17 fruits
karthik@karthik-VirtualBox:~/Desktop$ wc -l fruits
3 fruits
karthik@karthik-VirtualBox:~/Desktop$ wc -w fruits
3 fruits
karthik@karthik-VirtualBox:~/Desktop$ wc -c fruits
17 fruits
karthik@karthik-VirtualBox:~/Desktop$
```

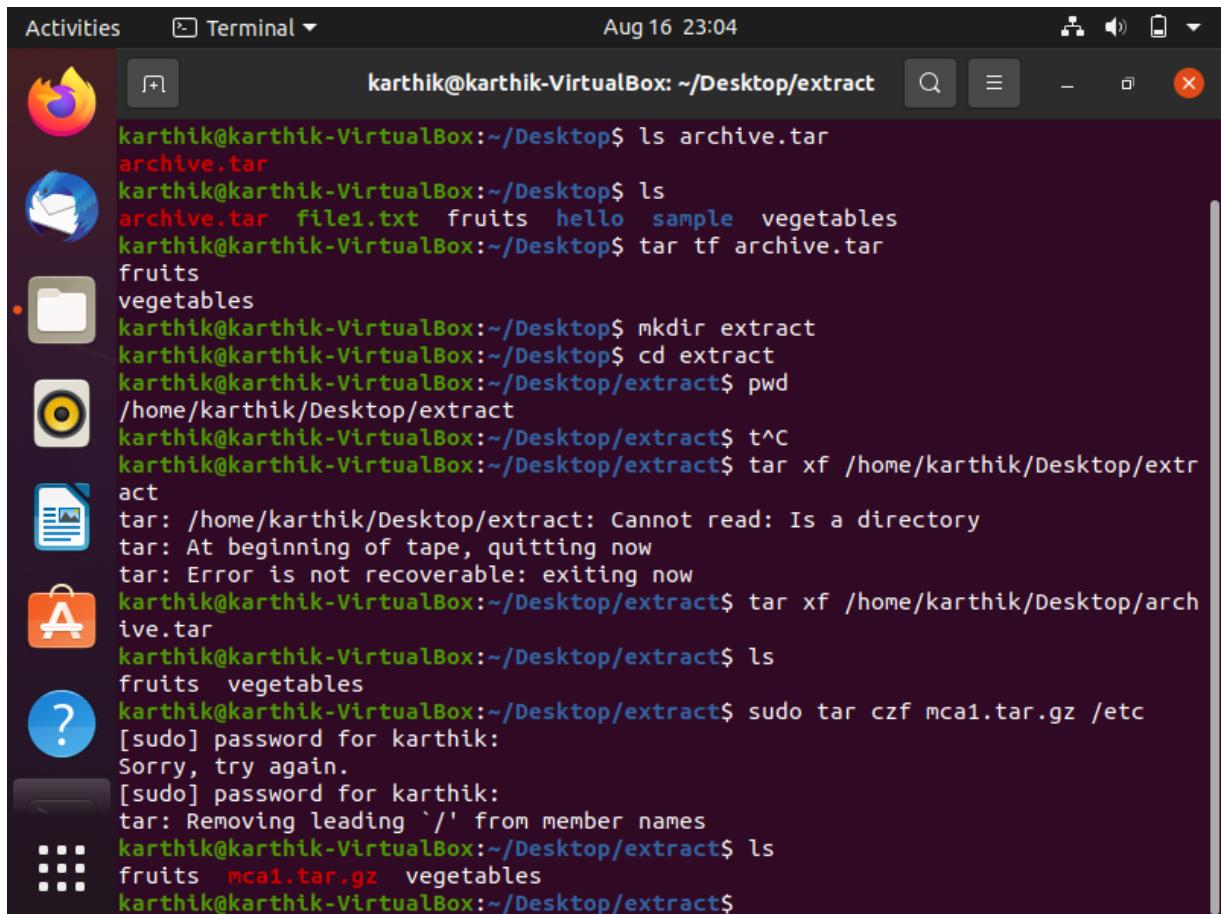
2. **tar** The Linux ‘tar’ stands for tape archive, is used to create Archive and extract the Archive files. tar command in Linux is one of the important command which provides archiving functionality in Linux. We can use Linux tar command to create compressed or uncompressed Archive files and also maintain and modify them.

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

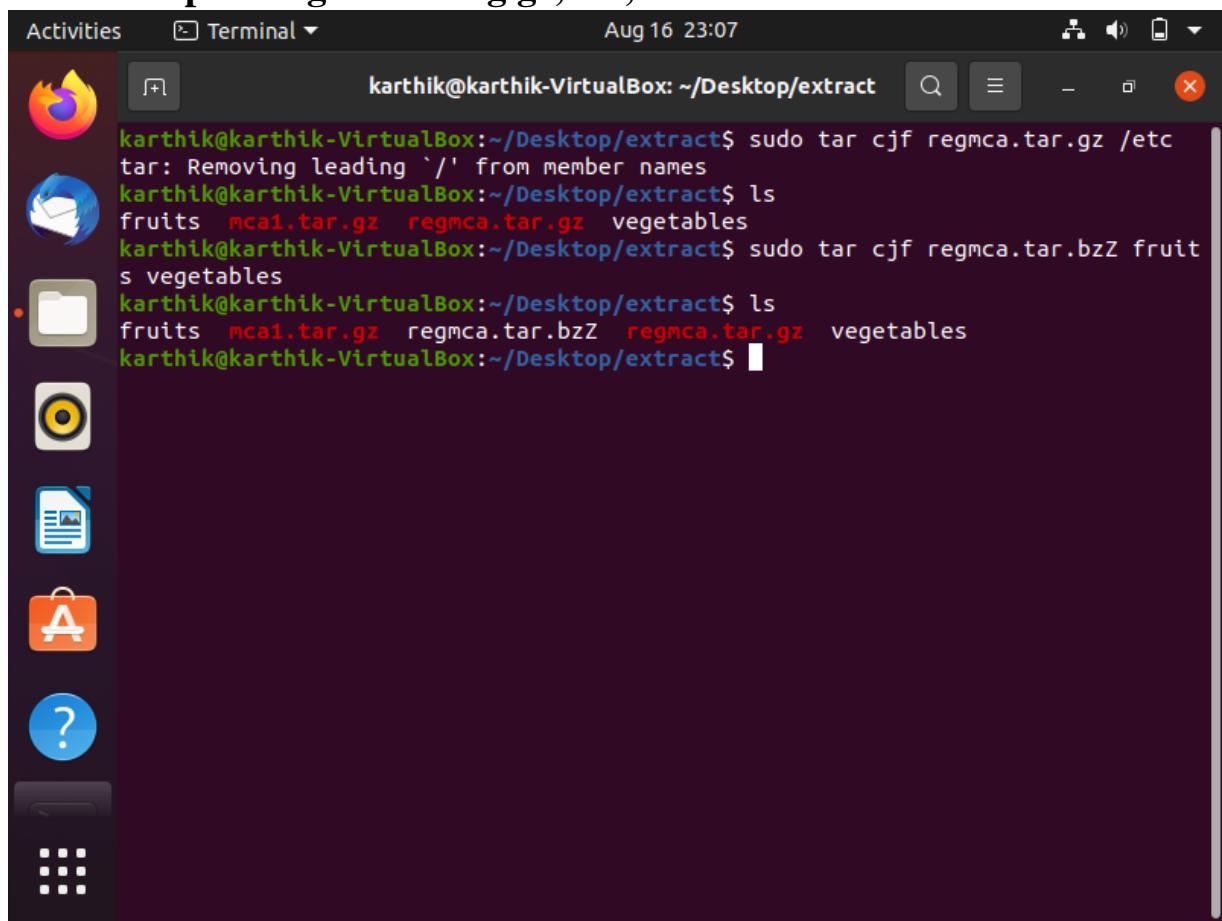
Tar command



```

Activities Terminal Aug 16 23:04
karthik@karthik-VirtualBox: ~/Desktop/extract
karthik@karthik-VirtualBox:~/Desktop$ ls archive.tar
archive.tar
karthik@karthik-VirtualBox:~/Desktop$ ls
archive.tar file1.txt fruits hello sample vegetables
karthik@karthik-VirtualBox:~/Desktop$ tar tf archive.tar
fruits
vegetables
karthik@karthik-VirtualBox:~/Desktop$ mkdir extract
karthik@karthik-VirtualBox:~/Desktop$ cd extract
karthik@karthik-VirtualBox:~/Desktop/extract$ pwd
/home/karthik/Desktop/extract
karthik@karthik-VirtualBox:~/Desktop/extract$ t^C
karthik@karthik-VirtualBox:~/Desktop/extract$ tar xf /home/karthik/Desktop/extract
tar: /home/karthik/Desktop/extract: Cannot read: Is a directory
tar: At beginning of tape, quitting now
tar: Error is not recoverable: exiting now
karthik@karthik-VirtualBox:~/Desktop/extract$ tar xf /home/karthik/Desktop/archive.tar
karthik@karthik-VirtualBox:~/Desktop/extract$ ls
fruits vegetables
karthik@karthik-VirtualBox:~/Desktop/extract$ sudo tar czf mca1.tar.gz /etc
[sudo] password for karthik:
Sorry, try again.
[sudo] password for karthik:
tar: Removing leading '/' from member names
karthik@karthik-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz vegetables
karthik@karthik-VirtualBox:~/Desktop/extract$
```

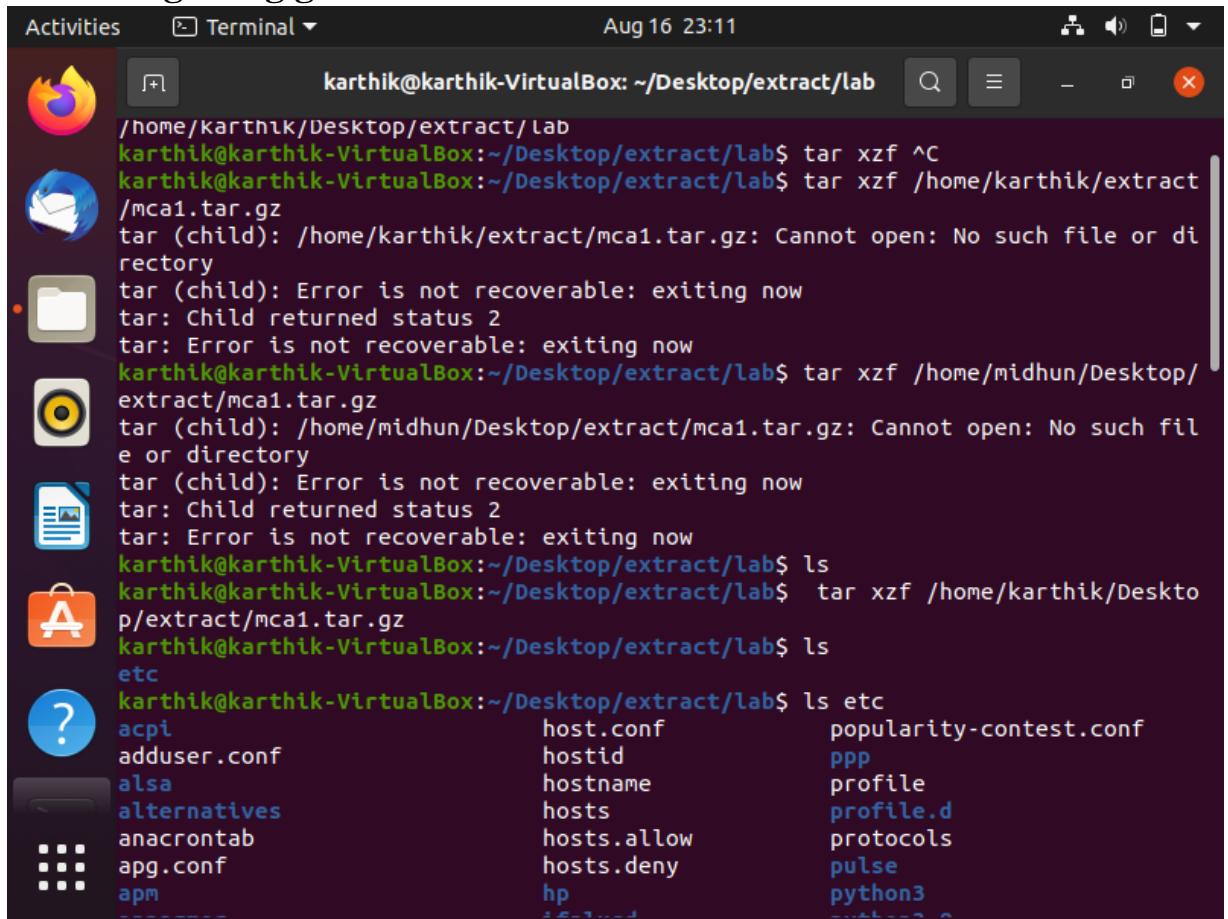
Compressing files using gz,bz2, xz



The image shows a screenshot of an Ubuntu desktop environment. On the left, there is a vertical dock containing icons for various applications: a browser, a file manager, a terminal, a mail client, a file viewer, a file manager, a system settings icon, and a help icon. The main area features a terminal window titled "Terminal" with the command "karthik@karthik-VirtualBox: ~/Desktop/extract". The terminal output shows the user extracting a tar.gz file and then compressing it again with a different method:

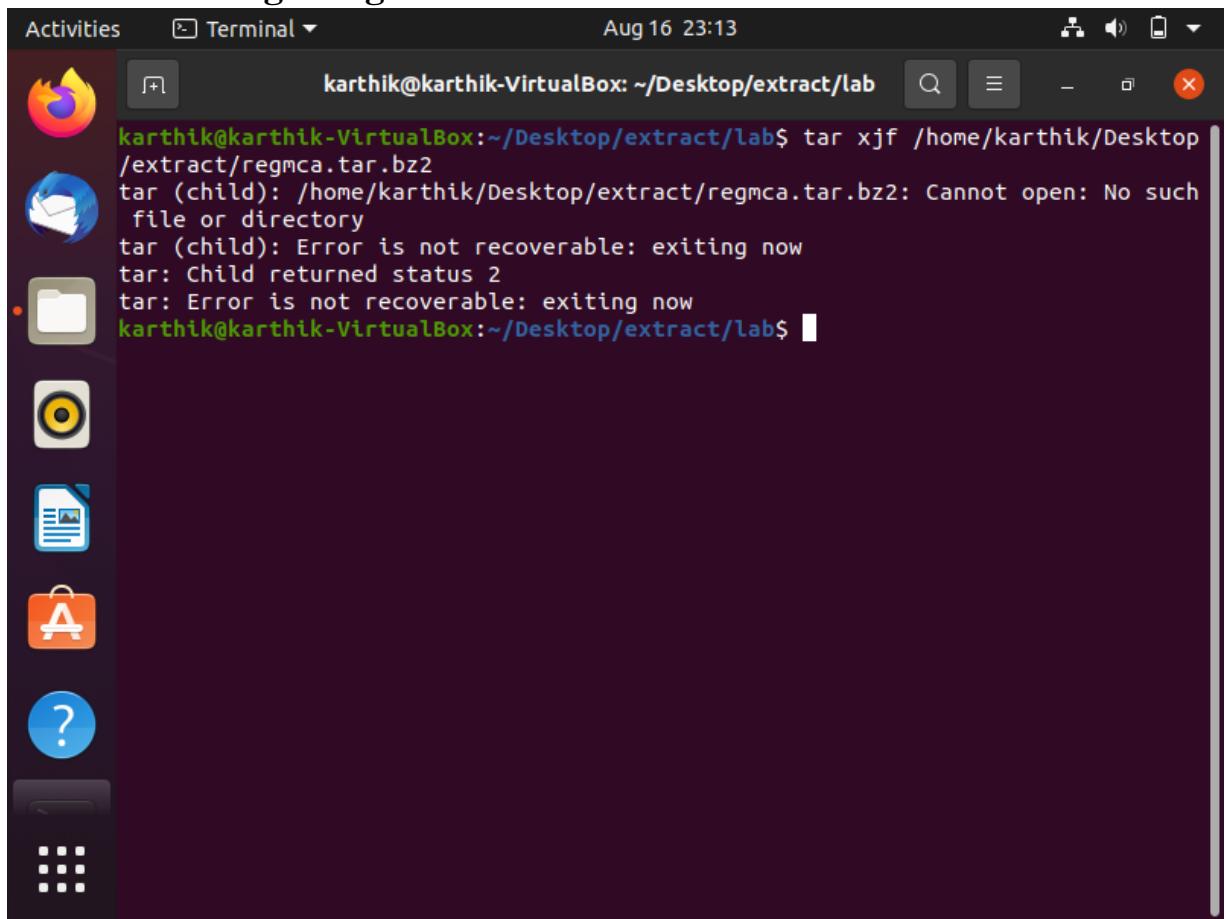
```
karthik@karthik-VirtualBox:~/Desktop/extract$ sudo tar cjf regmca.tar.gz /etc  
tar: Removing leading '/' from member names  
karthik@karthik-VirtualBox:~/Desktop/extract$ ls  
fruits mca1.tar.gz regmca.tar.gz vegetables  
karthik@karthik-VirtualBox:~/Desktop/extract$ sudo tar cjf regmca.tar.bzz fruits vegetables  
karthik@karthik-VirtualBox:~/Desktop/extract$ ls  
fruits mca1.tar.gz regmca.tar.bzz regmca.tar.gz vegetables  
karthik@karthik-VirtualBox:~/Desktop/extract$
```

Extracting using gz



```
Activities Terminal Aug 16 23:11
karthik@karthik-VirtualBox: ~/Desktop/extract/lab$ tar xzf ^
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ tar xzf /home/karthik/extract/
/mca1.tar.gz
tar (child): /home/karthik/extract/mca1.tar.gz: Cannot open: No such file or di-
rectory
tar (child): Error is not recoverable: exiting now
tar: Child returned status 2
tar: Error is not recoverable: exiting now
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ tar xzf /home/midhun/Desktop/
extract/mca1.tar.gz
tar (child): /home/midhun/Desktop/extract/mca1.tar.gz: Cannot open: No such fil-
e or directory
tar (child): Error is not recoverable: exiting now
tar: Child returned status 2
tar: Error is not recoverable: exiting now
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ ls
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ tar xzf /home/karthik/Desktop/
extract/mca1.tar.gz
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ ls
etc
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ ls etc
acpi host.conf popularity-contest.conf
adduser.conf hostid ppp
alsa hostname profile
alternatives hosts protocols
anacrontab hosts.allow pulse
apg.conf hosts.deny python3
apm hp systemd
```

Extracting using bz2



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled 'Terminal' and shows the command 'tar xjf /home/karthik/Desktop/extract/regmca.tar.bz2' being run. The output indicates that the file 'regmca.tar.bz2' cannot be opened because it does not exist. The terminal window has a dark background with light-colored text. On the left side of the screen, there is a vertical dock with various icons for applications like a web browser, file manager, and system settings.

```
Activities Terminal Aug 16 23:13
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ tar xjf /home/karthik/Desktop/extract/regmca.tar.bz2
tar (child): /home/karthik/Desktop/extract/regmca.tar.bz2: Cannot open: No such
file or directory
tar (child): Error is not recoverable: exiting now
tar: Child returned status 2
tar: Error is not recoverable: exiting now
karthik@karthik-VirtualBox:~/Desktop/extract/lab$
```

3. expr

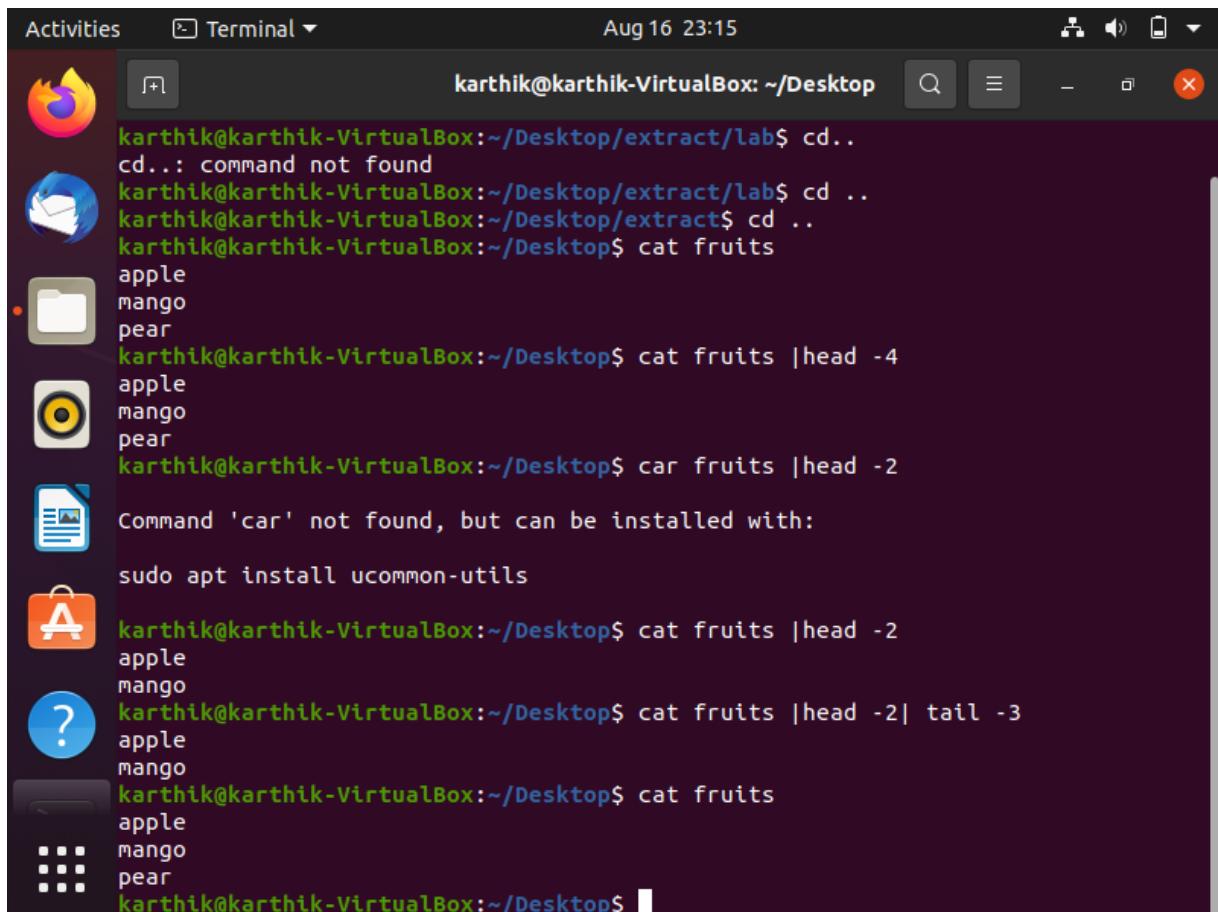
The **expr** command in Unix evaluates a given expression and displays its corresponding output.

- Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
- Evaluating regular expressions, string operations like substring, length of strings etc.

```
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ expr 5 + 5
10
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ expr 2-1
2-1
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ expr 2 - 1
1
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ expr 14/2
14/2
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ expr 14 / 2
7
midhun@midhun-VirtualBox:~/Desktop/extract/lab$
```

4. redirection and piping

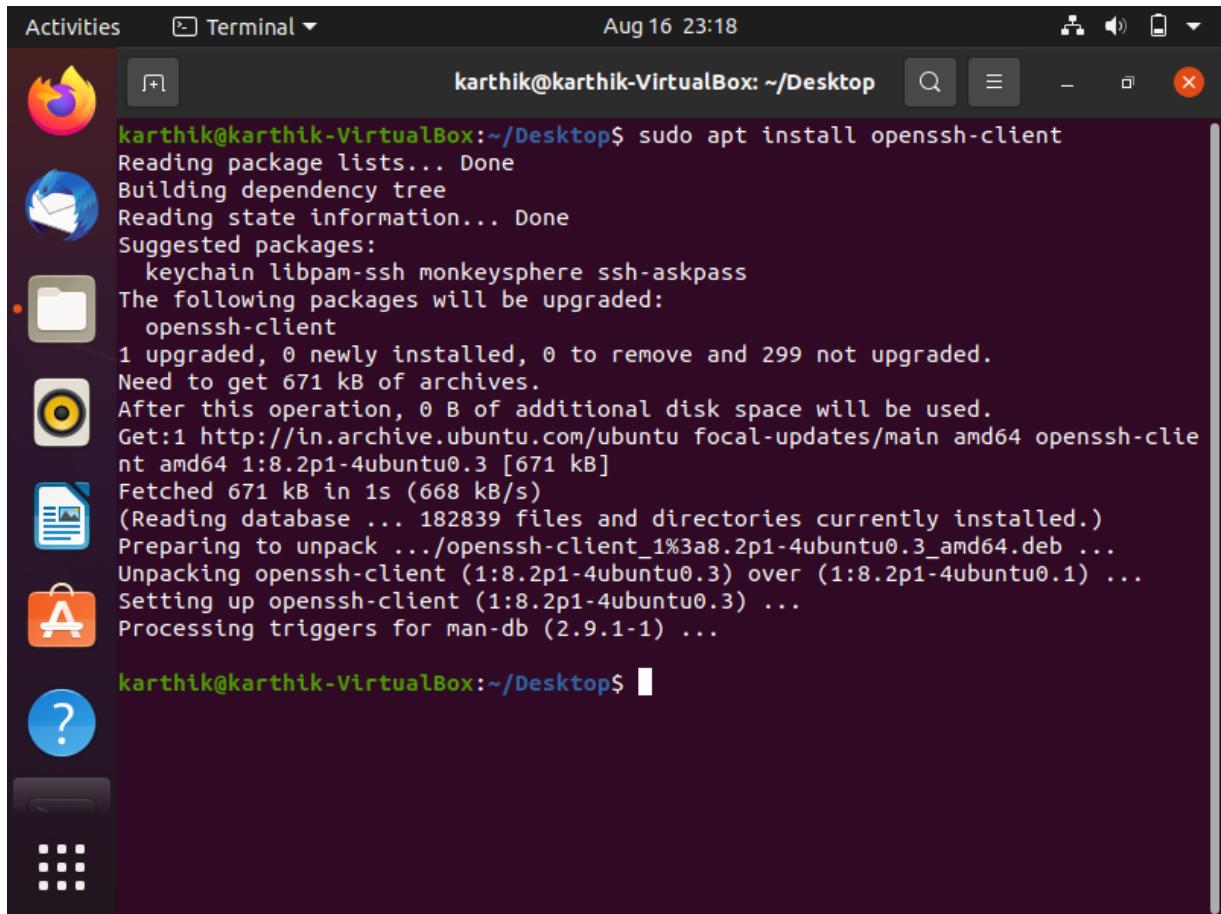
Pipe is used to combine two or more commands, and in this, the output of one command acts as input to another command, and this command's output may act as input to the next command and so on.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the date and time are "Aug 16 23:15". The terminal content is as follows:

```
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ cd..
cd..: command not found
karthik@karthik-VirtualBox:~/Desktop/extract/lab$ cd ..
karthik@karthik-VirtualBox:~/Desktop/extract$ cd ..
karthik@karthik-VirtualBox:~/Desktop$ cat fruits
apple
mango
pear
karthik@karthik-VirtualBox:~/Desktop$ cat fruits |head -4
apple
mango
pear
karthik@karthik-VirtualBox:~/Desktop$ car fruits |head -2
Command 'car' not found, but can be installed with:
sudo apt install ucommon-utils
karthik@karthik-VirtualBox:~/Desktop$ cat fruits |head -2
apple
mango
karthik@karthik-VirtualBox:~/Desktop$ cat fruits |head -2| tail -3
apple
mango
karthik@karthik-VirtualBox:~/Desktop$ cat fruits
apple
mango
pear
karthik@karthik-VirtualBox:~/Desktop$
```

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



```
Unpacking ssh-import-id (5.10-0ubuntu1) ...
Setting up openssh-sftp-server (1:8.2p1-4ubuntu0.2) ...
Setting up openssh-server (1:8.2p1-4ubuntu0.2) ...

Creating config file /etc/ssh/sshd_config with new version
Creating SSH2 RSA key; this may take some time ...
3072 SHA256:+owzSDCLl/5dqPC/eQLwaR+NEA9TqVK0uC9HbWVTnA root@midhun-VirtualBox
(RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:QoDt27vsoDvJY340FwilN7Fn7pkKN0UqJIsUQqfqWxY root@midhun-VirtualBox
(ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:Nf+XvKGIAu6y028wYA5WTk3iQ1UVtkd+p0DfbpSzJTg root@midhun-VirtualBox
(ED25519)
Created symlink /etc/systemd/system/sshd.service → /lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /lib/
systemd/system/ssh.service.
rescue-ssh.target is a disabled or a static unit, not starting it.
Setting up ssh-import-id (5.10-0ubuntu1) ...
Attempting to convert /etc/ssh/ssh_import_id
Setting up ii (1.8-2) ...
Setting up ncurses-term (6.2-0ubuntu2) ...
Processing triggers for systemd (245.4-4ubuntu3.6) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for ufw (0.36-6) ...
midhun@midhun-VirtualBox:~/Desktop/extract/lab$
```

6. **scp** **scp** (secure copy) command in Linux system is used to copy file(s) between servers in a secure way.

7. **ssh-keygen**

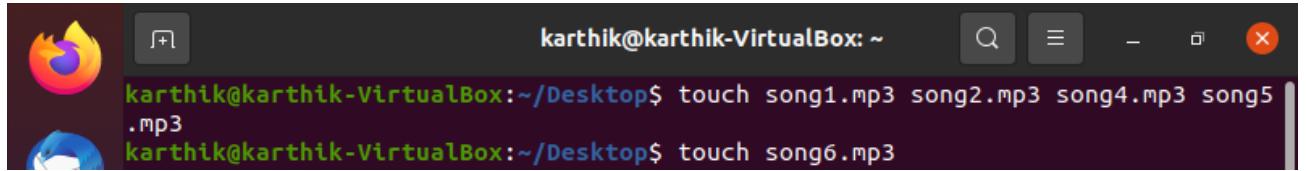
Use the ssh-keygen command to generate a public/private authentication key pair. Authentication keys allow a user to connect to a remote system without supplying a password. Keys must be generated for each user separately. If you generate key pairs as the root user, only the root can use the keys.

```
midhun@midhun-VirtualBox:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/midhun/.ssh/id_rsa): key1
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in key1
Your public key has been saved in key1.pub
The key fingerprint is:
SHA256:u7IsEAgzKpN8eilRpYbE3yvLmTeC/mD0DTM8AfcHHrM midhun@midhun-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
| .o ..=
|=+.+=
|+*o+.E .
|*o+o...
|.o+B.. S
|.oo+*. .
| o=o=. .
| ...*.+.
|....o.+o.
+---[SHA256]---+
```

8. **ssh-copy-id**

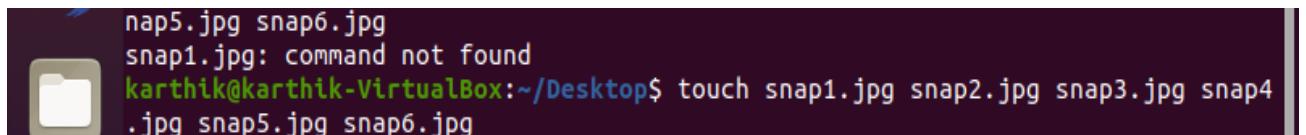
- The ssh-copy-id command is a simple tool that allows you to install an SSH key on a remote server's authorized keys.
- This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a passwordless, automatic login process.
- The ssh-copy-id command is part of OpenSSH, a tool for performing remote system administrations using encrypted SSH connections.

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



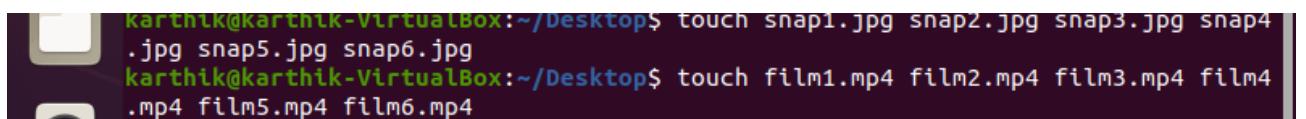
```
karthik@karthik-VirtualBox: ~
karthik@karthik-VirtualBox:~/Desktop$ touch song1.mp3 song2.mp3 song4.mp3 song5.
.kmp3
karthik@karthik-VirtualBox:~/Desktop$ touch song6.mp3
```

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



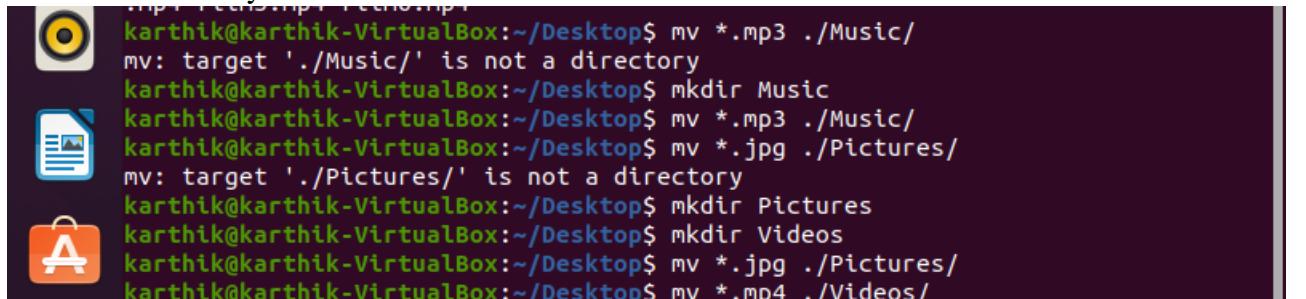
```
nap5.jpg snap6.jpg
snap1.jpg: command not found
karthik@karthik-VirtualBox:~/Desktop$ touch snap1.jpg snap2.jpg snap3.jpg snap4.
.jpg snap5.jpg snap6.jpg
```

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



```
karthik@karthik-VirtualBox:~/Desktop$ touch snap1.jpg snap2.jpg snap3.jpg snap4.
.jpg snap5.jpg snap6.jpg
karthik@karthik-VirtualBox:~/Desktop$ touch film1.mp4 film2.mp4 film3.mp4 film4.
.mp4 film5.mp4 film6.mp4
```

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



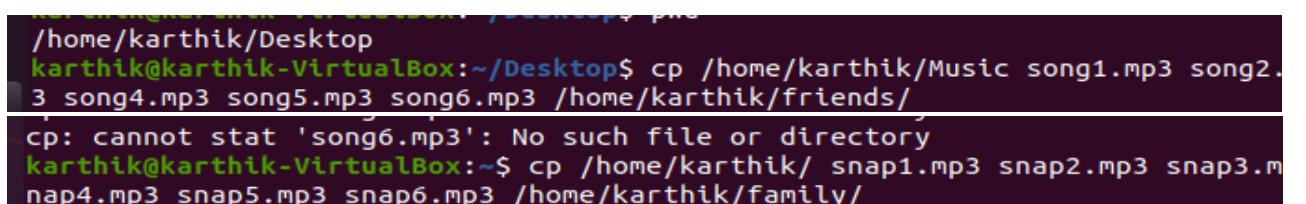
```
mv *.mp3 ./Music/
mv: target './Music/' is not a directory
mkdir Music
mv *.mp3 ./Music/
mv *.jpg ./Pictures/
mv: target './Pictures/' is not a directory
mkdir Pictures
mkdir Videos
mv *.jpg ./Pictures/
mv *.mp4 ./Videos/
karthik@karthik-VirtualBox:~/Desktop$
```

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



```
mkdir -p {friends,family,work}
pwd
/home/karthik/Desktop
```

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



```
cp song1.mp3 song2.mp3 song4.mp3 song5.mp3 song6.mp3 /home/karthik/friends/
cp: cannot stat 'song6.mp3': No such file or directory
cp /home/karthik/ snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/karthik/family/
```

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

```
karthik@karthik-VirtualBox:~/Desktop$ cd Desktop  
karthik@karthik-VirtualBox:~/Desktop$ rmdir {friends,family}  
rmdir: failed to remove 'friends': Directory not empty
```

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

```
karthik@karthik-VirtualBox:~/Desktop$ rm -r friends family  
rmdir: failed to remove 'friends': Directory not empty  
karthik@karthik-VirtualBox:~/Desktop$
```

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

```
[sudo] password for Karthik:  
karthik@karthik-VirtualBox:~/Desktop$ ls -a > allfiles.txt  
karthik@karthik-VirtualBox:~/Desktop$  
karthik@karthik-VirtualBox:~/Desktop$
```

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



```
karthik@karthik-VirtualBox:~/Desktop$ date  
Friday 20 August 2021 01:08:37 PM IST  
karthik@karthik-VirtualBox:~/Desktop$
```

- Add the user Juliet



```
karthik@karthik-VirtualBox:~/Desktop$ sudo useradd Juliet  
[sudo] password for karthik:
```

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



```
karthik@karthik-VirtualBox:~/Desktop$ cat /etc/passwd | grep Juliet  
Juliet:x:1007:1007::/home/Juliet:/bin/sh  
karthik@karthik-VirtualBox:~/Desktop$
```

- Use the passwd command to initialize Juliet's password



```
karthik@karthik-VirtualBox:~/Desktop$ sudo passwd JULiet  
[sudo] password for karthik:  
passwd: user 'JULiet' does not exist  
karthik@karthik-VirtualBox:~/Desktop$ sudo passwd Juliet  
New password:  
Retype new password:  
passwd: password updated successfully
```

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

```
new password:  
Retype new password:  
passwd: password updated successfully  
karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd -g 3000000 Shakespeare
```

13. Create a supplementary group called artists

```
[root] karthik@karthik-VirtualBox:~/Desktop$ sudo groupadd artist  
karthik@karthik-VirtualBox:~/Desktop$
```

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

```
Juliet:x:1005:  
Shakespeare:x:30000:  
artist:x:30001:  
(END)
```

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

```
[root] karthik@karthik-VirtualBox: ~/Desktop$ sudo usermod -G Shakespeare Juliet  
[sudo] password for karthik:
```

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

```
[root] karthik@karthik-VirtualBox: ~/Desktop$ sudo usermod -G Shakespeare Juliet  
[sudo] password for karthik:  
karthik@karthik-VirtualBox:~/Desktop$ id Juliet  
uid=1001(Juliet) gid=1005(Juliet) groups=1005(Juliet),30000(Shakespeare)
```

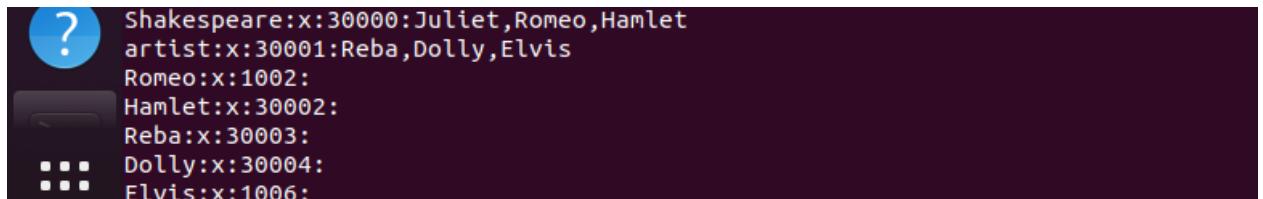
17. Add Romeo and Hamlet to the Shakespeare group.

```
[root] karthik@karthik-VirtualBox:~/Desktop$ sudo useradd Romeo  
karthik@karthik-VirtualBox:~/Desktop$ sudo useradd Hamlet  
karthik@karthik-VirtualBox:~/Desktop$ sudo usermod -G Shakespeare Romeo  
karthik@karthik-VirtualBox:~/Desktop$ sudo usermod -G Shakespeare Hamlet
```

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

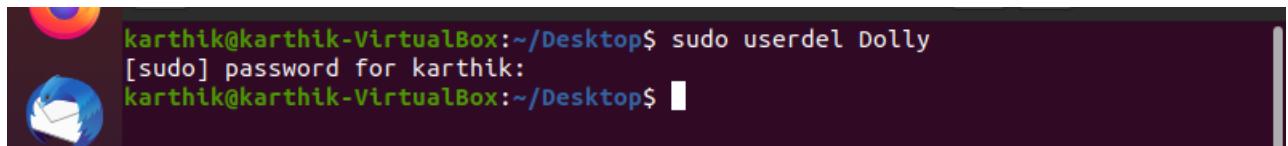
```
[root] karthik@karthik-VirtualBox:~/Desktop$ sudo useradd Reba  
karthik@karthik-VirtualBox:~/Desktop$ sudo usermod -G artist Reba  
karthik@karthik-VirtualBox:~/Desktop$ sudo usermod -G artist Dolly  
karthik@karthik-VirtualBox:~/Desktop$ sudo usermod -G artist Elvis  
karthik@karthik-VirtualBox:~/Desktop$
```

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



```
? Shakespeare:x:30000:Juliet,Romeo,Hamlet
artist:x:30001:Reba,Dolly,Elvis
Romeo:x:1002:
Hamlet:x:30002:
Reba:x:30003:
Dolly:x:30004:
Elvis:x:1006:
```

20. Attempt to remove user Dolly.



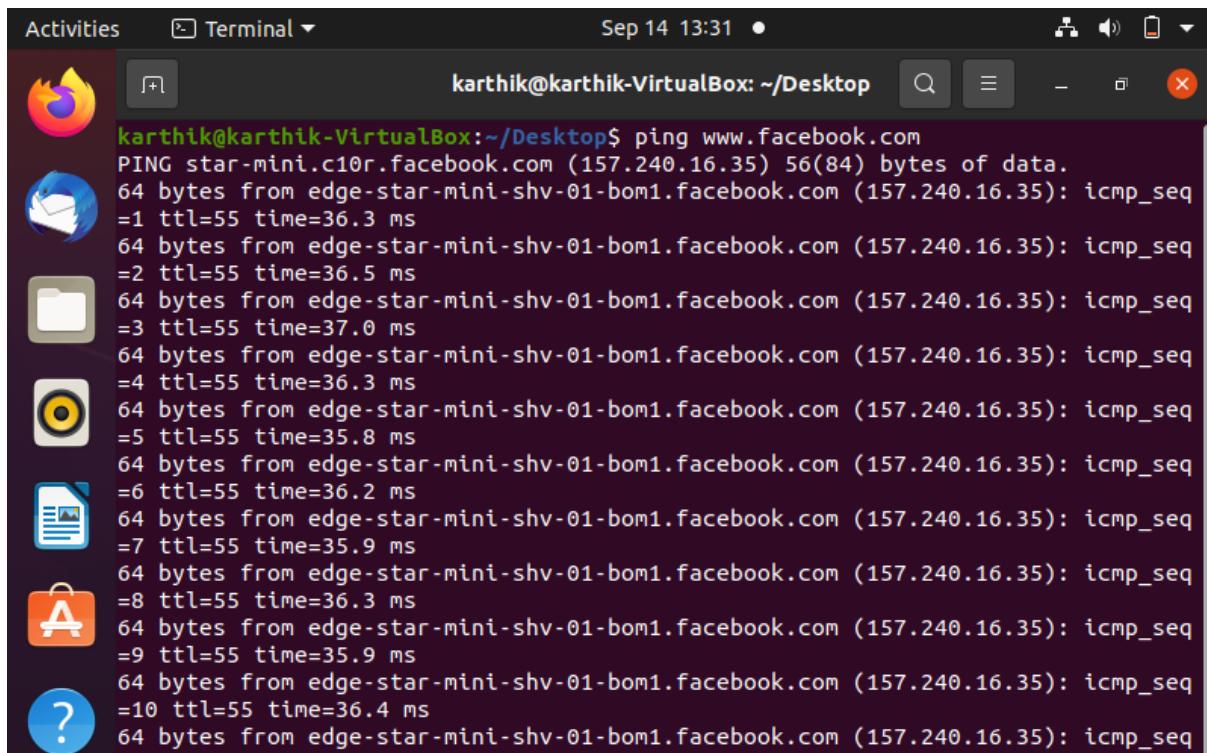
```
karthik@karthik-VirtualBox:~/Desktop$ sudo userdel Dolly
[sudo] password for karthik:
karthik@karthik-VirtualBox:~/Desktop$
```

Q1. Ping, route, traceroute, nslookup, IpConfig, NetStat

LINUX

1. Ping

ping is the primary TCP/IP command used to troubleshoot connectivity, reachability, and name resolution. Used without parameters, this command displays Help content.



The screenshot shows a terminal window titled "Terminal" with the command "ping www.facebook.com" entered. The output shows multiple ICMP echo requests being sent to the IP address 157.240.16.35, with each request having a sequence number (icmp_seq), Time-to-Live (ttl), and round-trip time (time). The terminal window also displays icons for various applications like a browser, file manager, and system monitor.

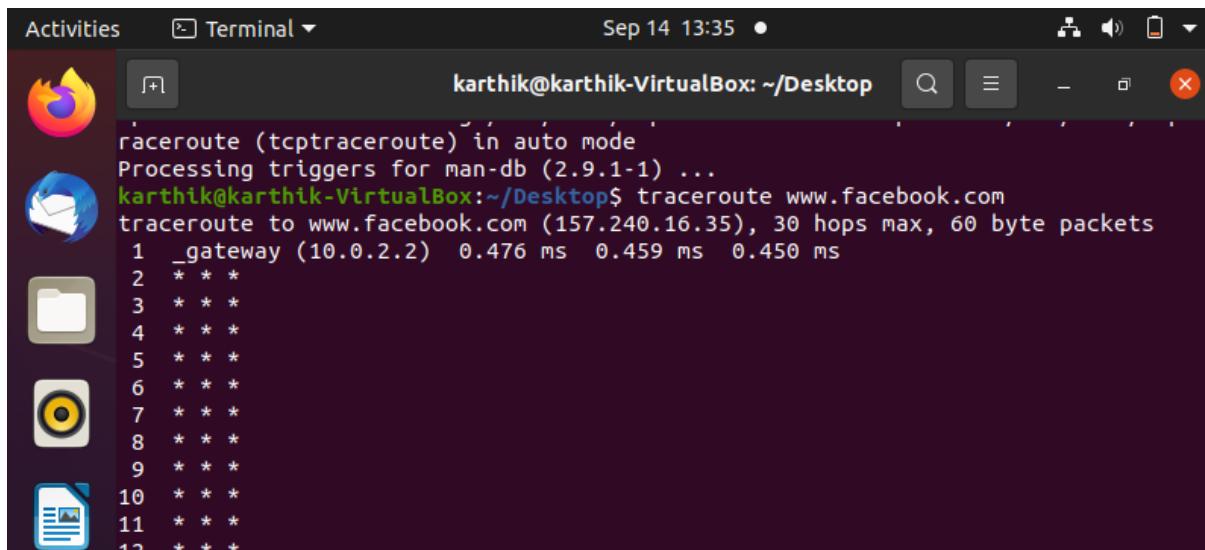
```
karthik@karthik-VirtualBox:~/Desktop$ ping www.facebook.com
PING star-mini.c10r.facebook.com (157.240.16.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=1 ttl=55 time=36.3 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=2 ttl=55 time=36.5 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=3 ttl=55 time=37.0 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=4 ttl=55 time=36.3 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=5 ttl=55 time=35.8 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=6 ttl=55 time=36.2 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=7 ttl=55 time=35.9 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=8 ttl=55 time=36.3 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=9 ttl=55 time=35.9 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=10 ttl=55 time=36.4 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
```

2. Traceroute

Traceroute is a network diagnostic tool used to track in real-time the pathway taken by a packet on an IP network from source to destination, reporting the IP addresses of all the routers it pinged in between.

Traceroute also records the time taken for each hop the packet makes during its route to the destination.

The difference between **tracert(windows)** and **traceroute(linux)** is that: tracert(windows) will only use ICMP echo requests. traceroute(linux) [and somewhat dependent on linux distro] default to UDP echo requests.

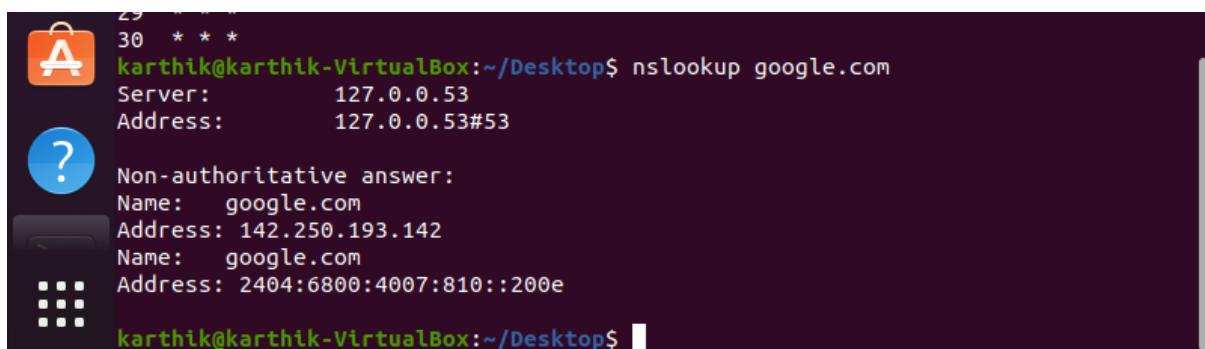


A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the following command and its output:

```
raceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.9.1-1) ...
karthik@karthik-VirtualBox:~/Desktop$ traceroute www.facebook.com
traceroute to www.facebook.com (157.240.16.35), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  0.476 ms  0.459 ms  0.450 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 * * *
 8 * * *
 9 * * *
10 * * *
11 * * *
12 * * *
```

3. Nslookup

Nslookup (stands for “Name Server Lookup”) is a **useful command for getting information from DNS server**. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record.



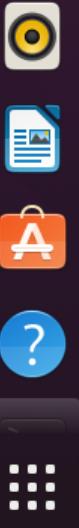
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the following command and its output:

```
29
30 * * *
karthik@karthik-VirtualBox:~/Desktop$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:  google.com
Address: 142.250.193.142
Name:  google.com
Address: 2404:6800:4007:810::200e
karthik@karthik-VirtualBox:~/Desktop$
```

4. netstat -l

The netstat command symbolically **displays the contents of various network-related data structures for active connections**. The Interval parameter, which is specified in seconds, continuously displays information regarding packet traffic on the configured network interfaces.



```

Processing triggers for man-db (2.7.5-1) ...
karthik@karthik-VirtualBox:~/Desktop$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:mysql          0.0.0.0:*
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 localhost:ipp           0.0.0.0:*
tcp6     0      0 [::]:http              [::]:*                LISTEN
tcp6     0      0 ip6-localhost:ipp       [::]:*                LISTEN
udp      0      0 0.0.0.0:631            0.0.0.0:*
udp      0      0 0.0.0.0:mdns           0.0.0.0:*
udp      0      0 0.0.0.0:58898          0.0.0.0:*
udp      0      0 localhost:domain        0.0.0.0:*
udp6     0      0 [::]:59053             [::]:*                LISTEN
udp6     0      0 [::]:mdns              [::]:*                LISTEN
raw6    0      0 [::]:ipv6-icmp         [::]:*                7
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix    2 [ ACC ]     STREAM    LISTENING   144323 /run/mysqld/mysqld.s
ock
unix    2 [ ACC ]     STREAM    LISTENING   34598  @/tmp/.ICE-unix/1574
unix    2 [ ACC ] SEORPACKET LISTENING  15175  /run/udev/control

```

5. route

The route command allows **you to make manual entries into the network routing tables**. The route command distinguishes between routes to hosts and routes to networks by interpreting the network address of the Destination variable, which can be specified either by symbolic name or numeric address.



```

? kernel@karthik-VirtualBox:~/Desktop$ sudo 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
karthik@karthik-VirtualBox:~/Desktop$ 

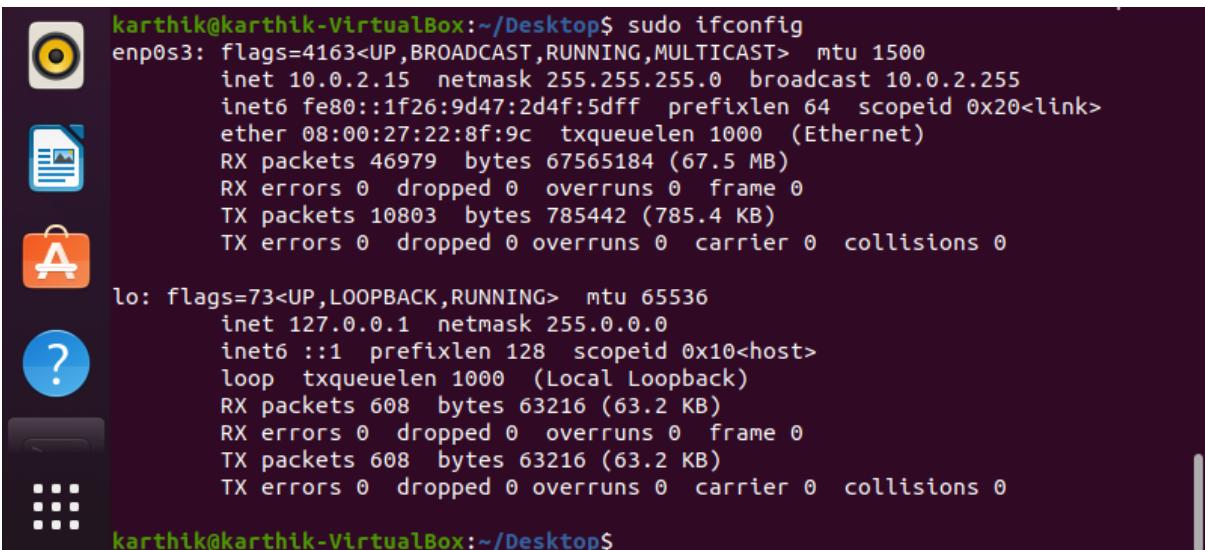
```

6. ipconfig

- ipconfig (standing for "Internet Protocol configuration") is a console application program of some computer operating systems that displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.
- Ifconfig(interface configuration) command is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also,

this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.

- The ifconfig command is supported by Unix-based operating systems. Functionality: The ipconfig command **displays all the currently connected network interfaces whether they are active or not**. On the other hand, the ifconfig command displays only the enabled network interfaces that are connected to the system.

A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the output of the 'sudo ifconfig' command. To the left of the terminal window, there is a vertical dock with several icons: a yellow circle with a black dot, a blue document icon, an orange icon with a white letter 'A', a blue circle with a white question mark, and a grey icon with a 4x4 grid of dots.

```
karthik@karthik-VirtualBox:~/Desktop$ sudo 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::1f26:9d47:2d4f:5dff prefixlen 64 scopeid 0x20<link>
            ether 08:00:27:22:8f:9c txqueuelen 1000 (Ethernet)
              RX packets 46979 bytes 67565184 (67.5 MB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 10803 bytes 785442 (785.4 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 608 bytes 63216 (63.2 KB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 608 bytes 63216 (63.2 KB)
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

karthik@karthik-VirtualBox:~/Desktop$
```

WINDOWS

1. ping

```
cmd Command Prompt
Microsoft Windows [Version 10.0.19043.1165]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Karthik>ping www.facebook.com

Pinging star-mini.c10r.facebook.com [157.240.16.35] with 32 bytes of data:
Reply from 157.240.16.35: bytes=32 time=67ms TTL=56
Reply from 157.240.16.35: bytes=32 time=34ms TTL=56
Reply from 157.240.16.35: bytes=32 time=34ms TTL=56
Reply from 157.240.16.35: bytes=32 time=35ms TTL=56

Ping statistics for 157.240.16.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 34ms, Maximum = 67ms, Average = 42ms

C:\Users\Karthik>
```

2. route

```
C:\Users\Karthik>route www.facebook.com

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
        [MASK netmask] [gateway] [METRIC metric] [IF interface]

-f      Clears the routing tables of all gateway entries. If this is
used in conjunction with one of the commands, the tables are
cleared prior to running the command.

-p      When used with the ADD command, makes a route persistent across
boots of the system. By default, routes are not preserved
when the system is restarted. Ignored for all other commands,
which always affect the appropriate persistent routes.

-4      Force using IPv4.

-6      Force using IPv6.

command  One of these:
        PRINT   Prints a route
        ADD    Adds a route
        DELETE Deletes a route
        CHANGE Modifies an existing route

destination Specifies the host.
MASK      Specifies that the next parameter is the 'netmask' value.
netmask   Specifies a subnet mask value for this route entry.
          If not specified, it defaults to 255.255.255.255.
gateway   Specifies gateway.
interface  the interface number for the specified route.
METRIC    specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database.
```

3. tracert

```
C:\Users\Karthik>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.16.35]
over a maximum of 30 hops:

1  64 ms   99 ms   2 ms  192.168.18.1
2  4 ms    4 ms   17 ms  100.65.128.1
3  65 ms   6 ms   5 ms  192.168.20.5
4  5 ms    4 ms   4 ms  172.16.1.9
5  964 ms  26 ms  26 ms  10.1.1.250
6  111 ms  100 ms  99 ms  as32934.bom.extreme-ix.net [103.77.108.136]
7  41 ms   100 ms  99 ms  po102.psw03.bom1.tfbnw.net [157.240.44.27]
8  75 ms   98 ms   100 ms  157.240.38.211
9  36 ms   34 ms   34 ms  edge-star-mini-shv-01-bom1.facebook.com [157.240.16.35]

Trace complete.

C:\Users\Karthik>
```

4. netstat

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

Active Connections

Proto Local Address          Foreign Address          State
TCP   0.0.0.0:80              LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:135             LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:443             LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:445             LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:3306            LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:5040            LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:5357            LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:6646            LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:49664           LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:49665           LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:49666           LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:49667           LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:49668           LAPTOP-Q57RT371:0      LISTENING
TCP   0.0.0.0:4976             LAPTOP-Q57RT371:0      LISTENING
TCP   127.0.0.1:5354          LAPTOP-Q57RT371:0      LISTENING
TCP   127.0.0.1:27017         LAPTOP-Q57RT371:0      LISTENING
TCP   192.168.18.6:139         LAPTOP-Q57RT371:0      LISTENING
TCP   192.168.18.6:55634       20.198.162.78:https  ESTABLISHED
```

5. ipconfig

```
C:\Users\Karthik>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::3c38:c836:ffbf:1304%18
  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 . :
  Link-local IPv6 Address . . . . . : fe80::2804:4169:c4fc:6687%12
  IPv4 Address . . . . . : 192.168.18.6
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :
```

6. nslookup

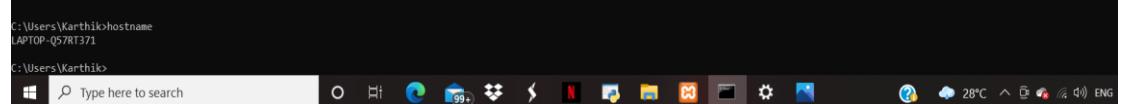
```
C:\Users\Karthik>nslookup google.com
Server: UnKnown
Address: 192.168.18.1

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4007:810::200e
           142.250.182.14
```

Q2. Identify and perform 5 more network commands

1. hostname

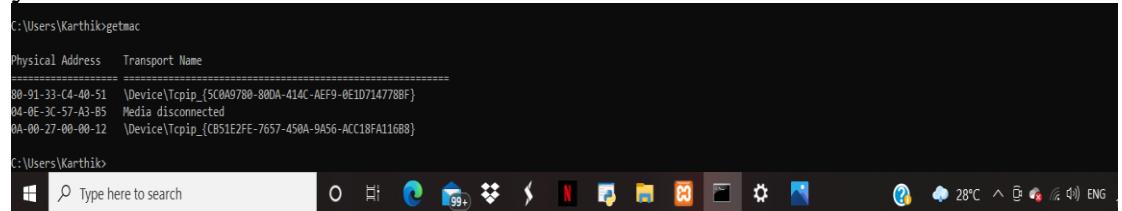
A very simple command that displays the host name of your machine. This is much quicker than going to the control panel>system route.



```
C:\Users\Karthik>hostname  
LAPTOP-Q578T371
```

2. getmac

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



```
C:\Users\Karthik>getmac  
  
Physical Address Transport Name  
=====  
00-91-33-C4-40-51 \Device\Tcpip_{5C0A9780-800A-414C-AEF9-0E1D7147788F}  
04-0E-3C-57-A3-B5 Media disconnected  
0A-00-27-00-00-12 \Device\Tcpip_{CB51E2FE-7657-450A-9A56-ACC18FA116B8}
```

3. arp

This is used for showing the **address resolution cache**. This command must be used with a command line switch **arp -a** is the most common.



```
C:\Users\Karthik>arp -a  
  
Interface: 192.168.18.6 --- 0x0c  
Internet Address Physical Address Type  
192.168.18.1 cc-05-77-d7-2a-c5 dynamic  
192.168.18.255 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  
  
Interface: 192.168.56.1 --- 0x02  
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  
255.255.255.255 ff-ff-ff-ff-ff-ff static
```

4. nbtstat

The nbtstat command is a **diagnostic tool for NetBIOS over TCP/IP**. Its primary design is to help troubleshoot NetBIOS name resolution problems. The command is included in several versions of Microsoft Windows. ... When a network is functioning normally, NetBIOS over TCP/IP (NetBT) resolves NetBIOS names to IP addresses.

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

NetBIOS Names Resolution and Registration Statistics
-----

Resolved By Broadcast = 0
Resolved By Name Server = 0

Registered By Broadcast = 318
Registered By Name Server = 0
```

5. path ping

The pathping command which provides a combination of the best aspects of Tracert and Ping. This command takes 300 seconds to gather statistics and then returns reports on latency and packet loss statistics at intermediate hops between the source and the target in more detail than those reports provided by Ping or Tracert commands.

```
C:\Users\hp>pathping www.facebook.com
Tracing route to star-mini.c10r.facebook.com [157.240.16.35]
over maximum of 30 hops:
  0  user ([192.168.18.71])
  1  192.168.18.1
  2  100.65.128.1
  3  192.168.20.5
  4  172.16.1.9
  5  10.1.1.254
  6  103.27.170.158
  7  po104.psw01.bomi.tfbnw.net [157.240.38.85]
  8  157.240.38.85
  9  edge-star-mini-shv-01-bomi.facebook.com [157.240.16.35]

Computing statistics for 225 seconds...
Source to Here This Node/Link
Hop  RTT Lost/Sent = Pct Lost/Sent = Pct  Address
  0          user ([192.168.18.71])
  1  1ms   0/ 100 = 0%   0/ 100 = 0%  192.168.18.1
  2  5ms   0/ 100 = 0%   0/ 100 = 0%  100.65.128.1
  3  5ms   0/ 100 = 0%   0/ 100 = 0%  192.168.20.5
  4  4ms   0/ 100 = 0%   0/ 100 = 0%  172.16.1.9
  5  27ms  0/ 100 = 0%   0/ 100 = 0%  10.1.1.254
  6  ---  100/ 100 =100%  99/ 100 = 99%  103.27.170.158
  7  ---  100/ 100 =100%  99/ 100 = 99%  po104.psw01.bomi.tfbnw.net [157.24
0.38.85]
  8  ---  100/ 100 =100%  99/ 100 = 99%  157.240.38.85
  9  35ms  1/ 100 =  1%  0/ 100 = 0%  edge-star-mini-shv-01-bomi.facebook
.com [157.240.16.35]

Trace complete.
```

Install apache

- **Update your system**

```
sudo apt update
```

- **Install Apache using apt:**

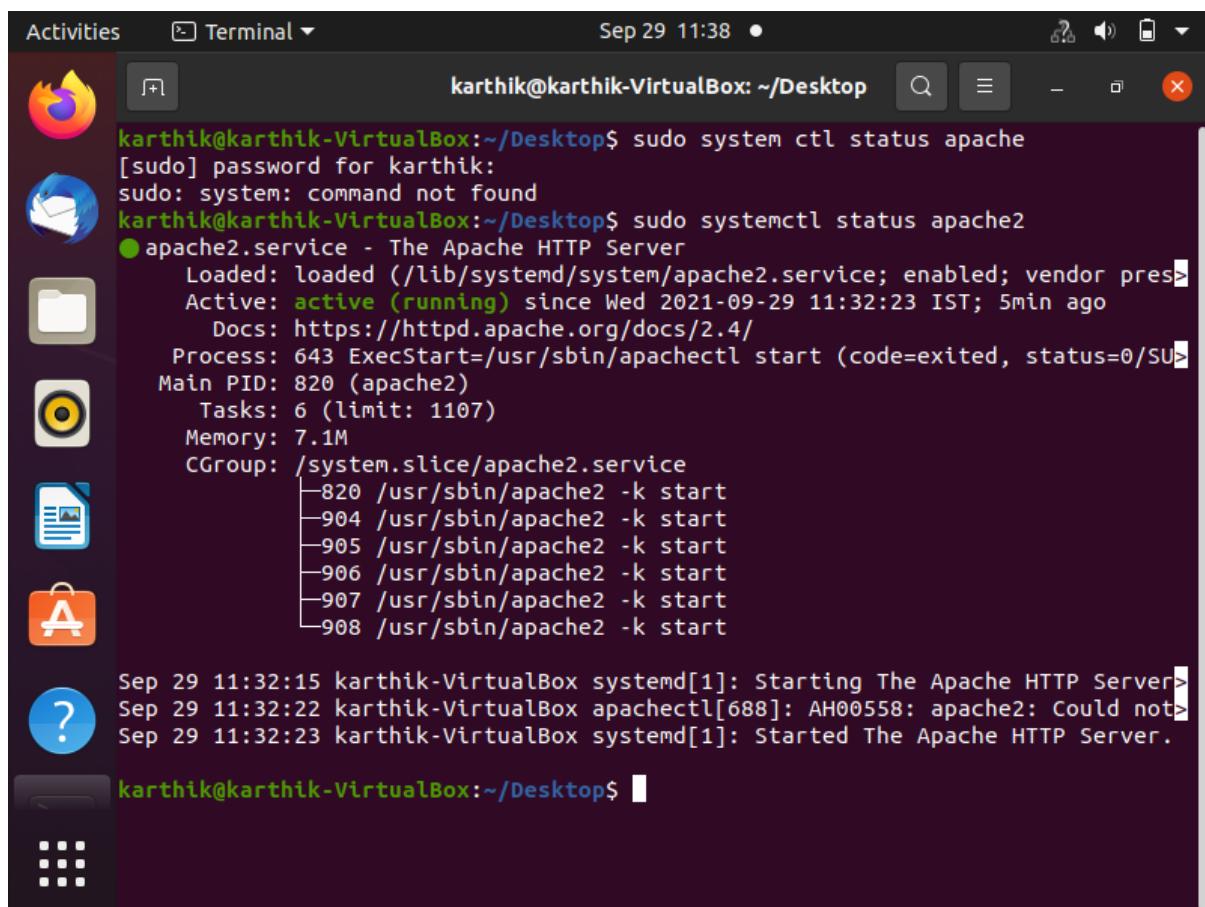
```
sudo apt install apache2
```

- **Confirm that Apache is now running with the following command:**

```
sudo systemctl status apache2
```

- **if it is not working**

```
sudo systemctl start apache2
```



```
Activities Terminal Sep 29 11:38 ● karthik@karthik-VirtualBox: ~/Desktop [+] karthik@karthik-VirtualBox:~/Desktop$ sudo systemctl status apache [sudo] password for karthik: sudo: system: command not found karthik@karthik-VirtualBox:~/Desktop$ sudo systemctl status apache2 ● apache2.service - The Apache HTTP Server Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres Active: active (running) since Wed 2021-09-29 11:32:23 IST; 5min ago Docs: https://httpd.apache.org/docs/2.4/ Process: 643 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SU Main PID: 820 (apache2) Tasks: 6 (limit: 1107) Memory: 7.1M CGroup: /system.slice/apache2.service └─820 /usr/sbin/apache2 -k start ├─904 /usr/sbin/apache2 -k start ├─905 /usr/sbin/apache2 -k start ├─906 /usr/sbin/apache2 -k start ├─907 /usr/sbin/apache2 -k start └─908 /usr/sbin/apache2 -k start Sep 29 11:32:15 karthik-VirtualBox systemd[1]: Starting The Apache HTTP Server Sep 29 11:32:22 karthik-VirtualBox apachectl[688]: AH00558: apache2: Could not Sep 29 11:32:23 karthik-VirtualBox systemd[1]: Started The Apache HTTP Server. karthik@karthik-VirtualBox:~/Desktop$
```

Install mariadb

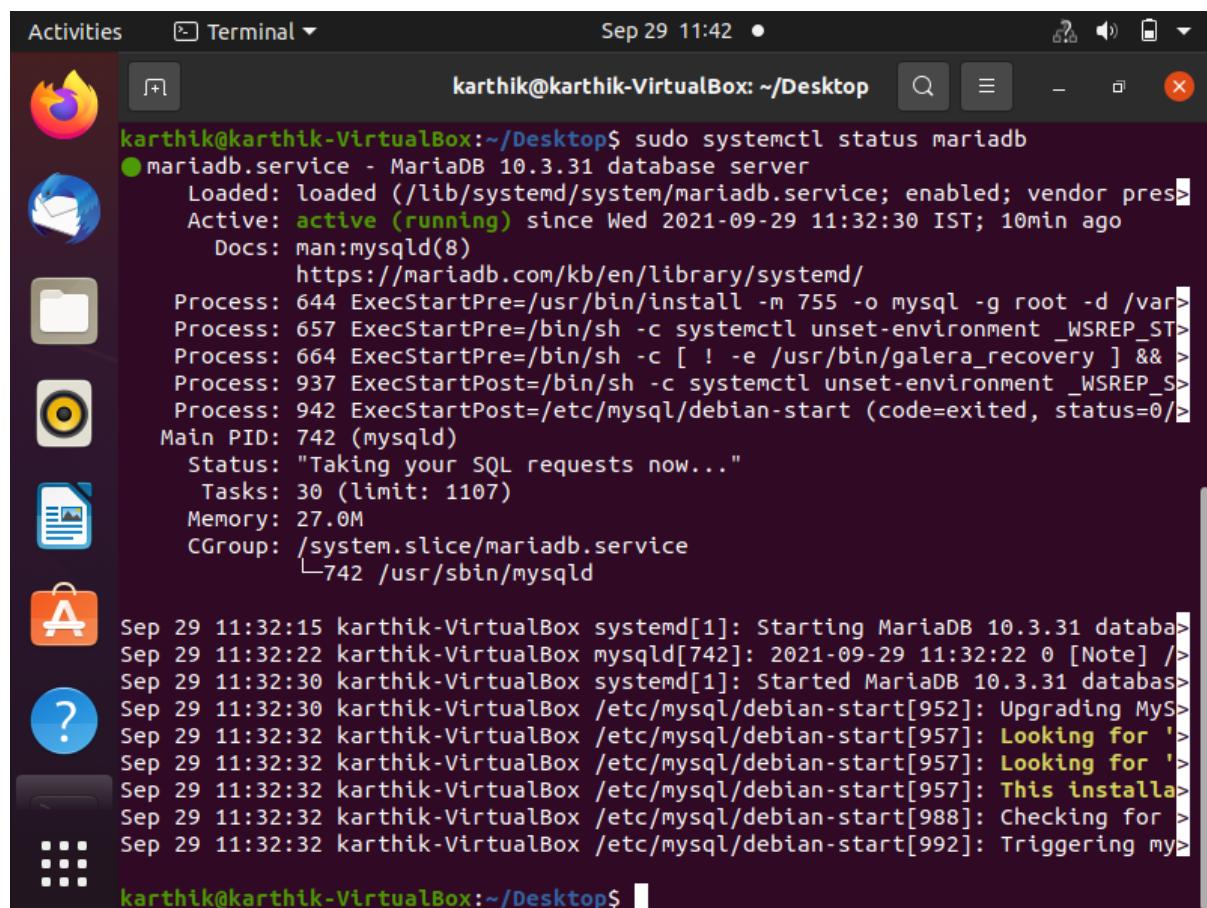
- **Install mariaDB**

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

- **Check mariadb Installation**

```
sudo systemctl status mysql
```

(if it is not working sudo systemctl start mysql)



```
karthik@karthik-VirtualBox:~/Desktop$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.3.31 database server
  Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
  Active: active (running) since Wed 2021-09-29 11:32:30 IST; 10min ago
    Docs: man:mysqld(8)
          https://mariadb.com/kb/en/library/systemd/
   Process: 644 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var>
   Process: 657 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_ST>
   Process: 664 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && >
   Process: 937 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_S>
   Process: 942 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/>
 Main PID: 742 (mysqld)
   Status: "Taking your SQL requests now..."
      Tasks: 30 (limit: 1107)
     Memory: 27.0M
        CPU: 0.000 CPU(s) (idle)
       CGroup: /system.slice/mariadb.service
                 └─742 /usr/sbin/mysqld

Sep 29 11:32:15 karthik-VirtualBox systemd[1]: Starting MariaDB 10.3.31 database>
Sep 29 11:32:22 karthik-VirtualBox mysqld[742]: 2021-09-29 11:32:22 0 [Note] />
Sep 29 11:32:30 karthik-VirtualBox systemd[1]: Started MariaDB 10.3.31 databas>
Sep 29 11:32:30 karthik-VirtualBox /etc/mysql/debian-start[952]: Upgrading Mys>
Sep 29 11:32:32 karthik-VirtualBox /etc/mysql/debian-start[957]: Looking for '>
Sep 29 11:32:32 karthik-VirtualBox /etc/mysql/debian-start[957]: Looking for '>
Sep 29 11:32:32 karthik-VirtualBox /etc/mysql/debian-start[957]: This installa>
Sep 29 11:32:32 karthik-VirtualBox /etc/mysql/debian-start[988]: Checking for >
Sep 29 11:32:32 karthik-VirtualBox /etc/mysql/debian-start[992]: Triggering my>

karthik@karthik-VirtualBox:~/Desktop$
```

Install PHP

- **Install PHP**

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

- **Restart apache2**

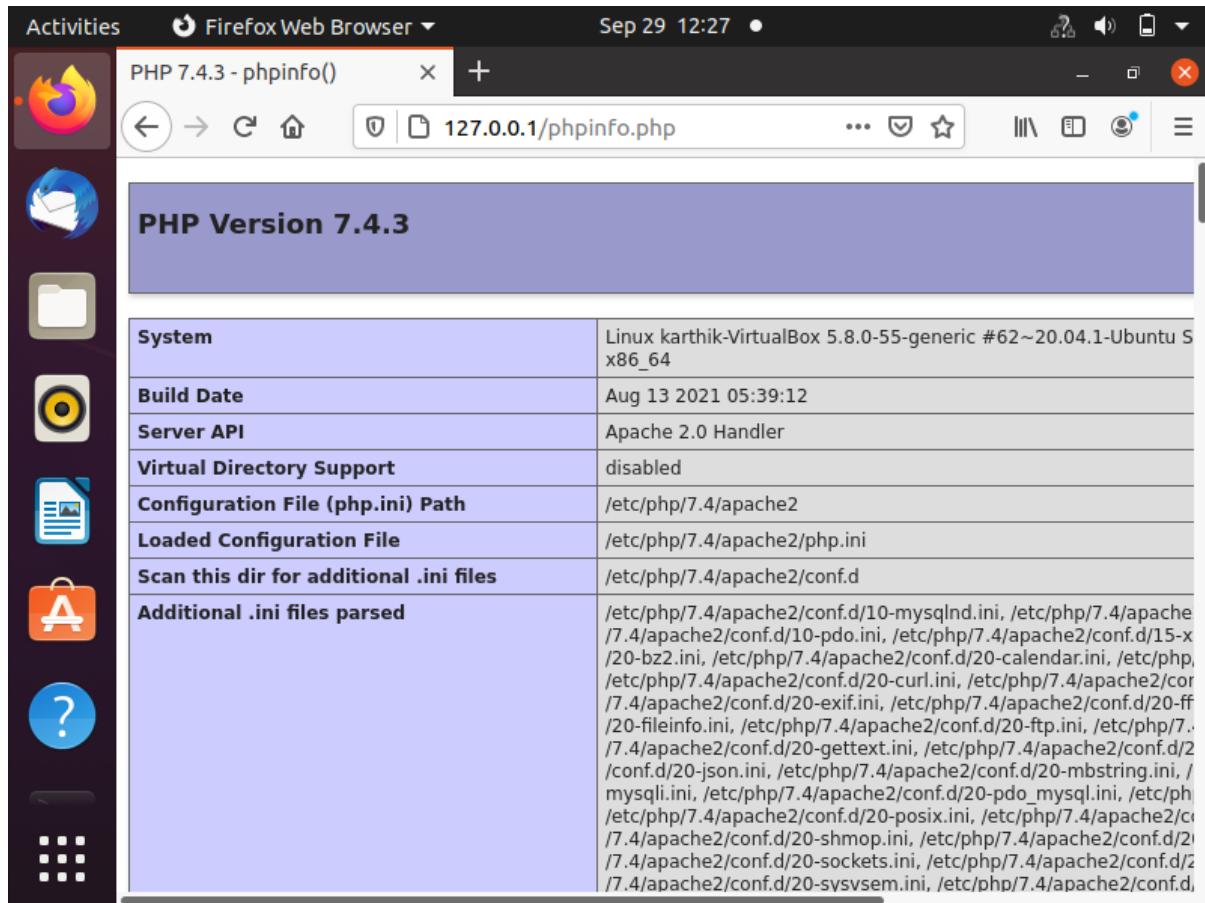
```
sudo systemctl restart apache2
```

- **Now you can check php installation**

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

- **Open a browser**

<http://127.0.0.1/phpinfo.php>



Install phpmyadmin

- **Install phpmyadmin**

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

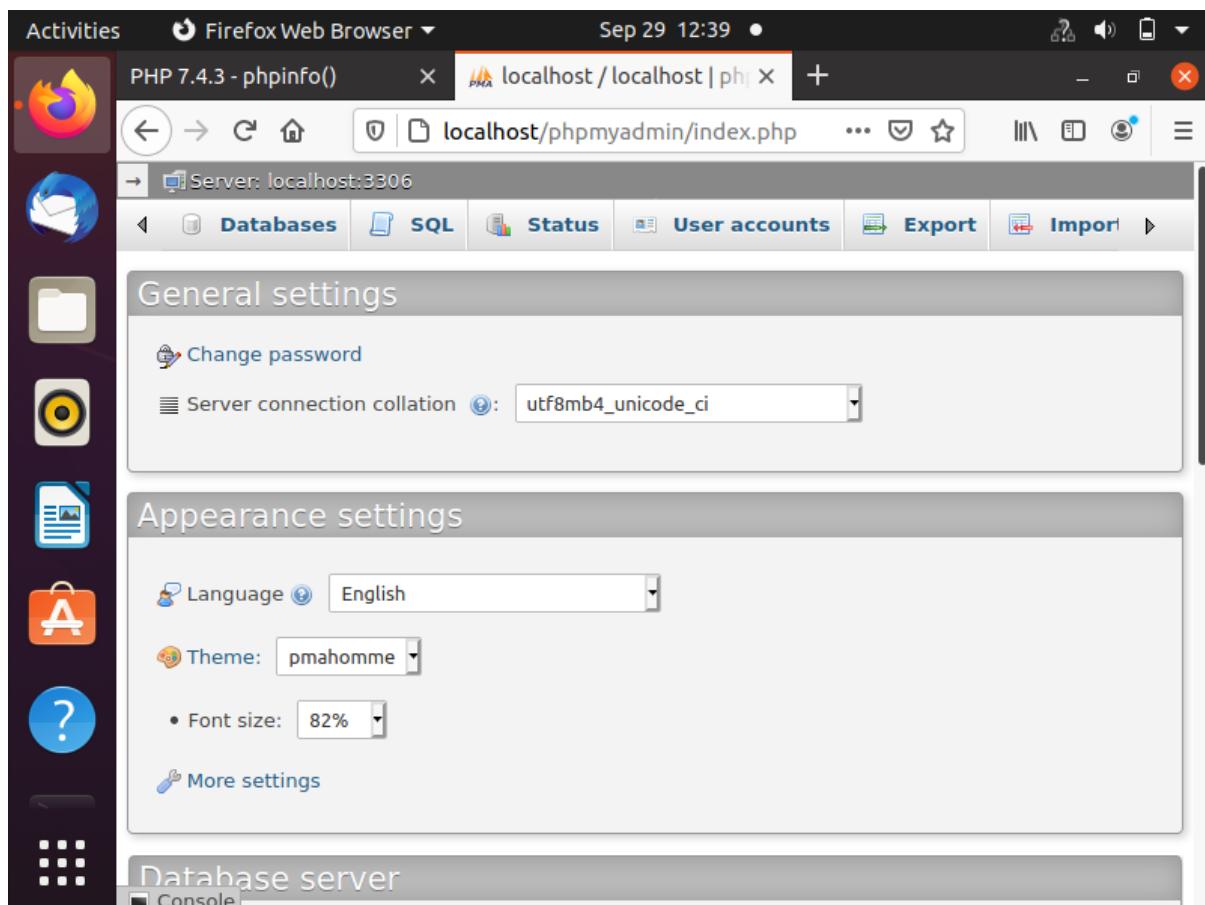
(It ask for webserver select apache2, select db configuration and set password)

- **Restart apache2**

```
sudo systemctl restart apache2
```

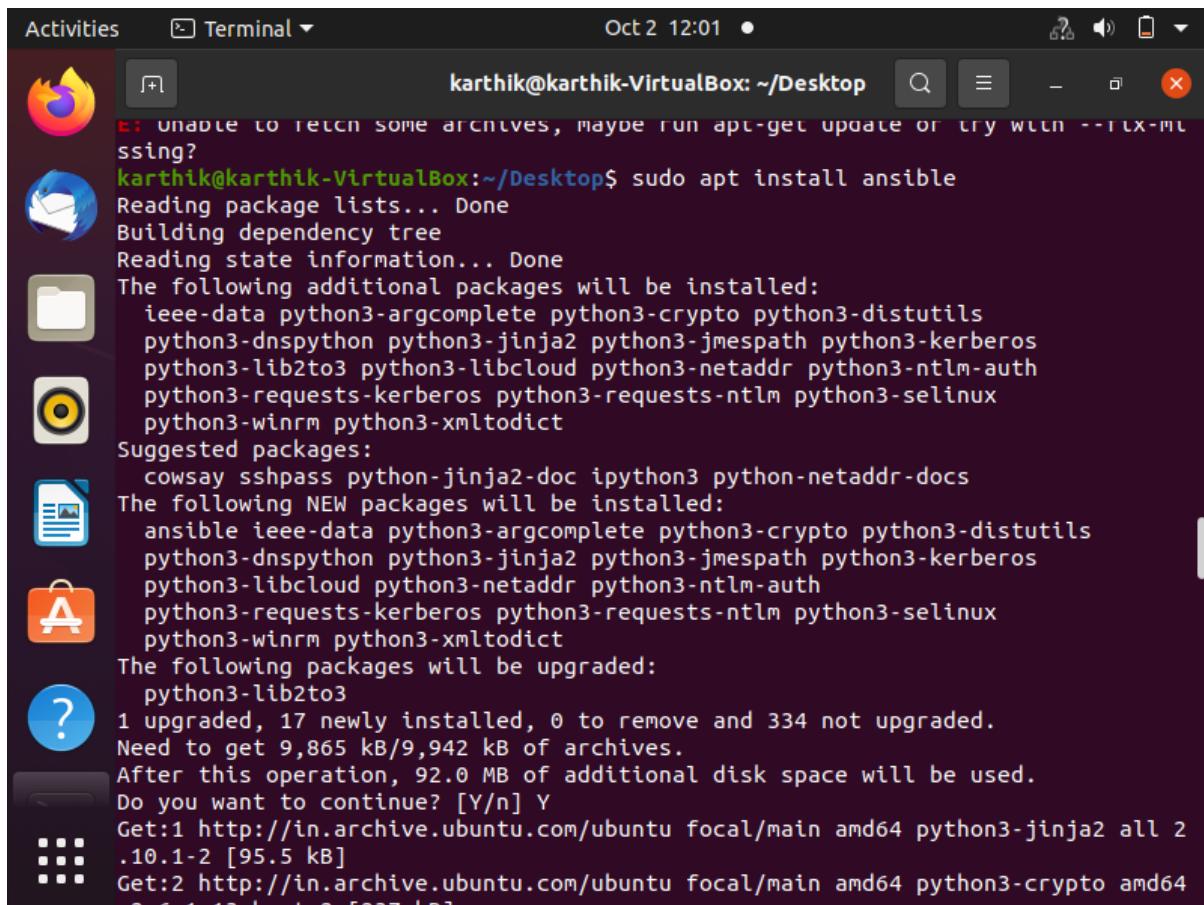
- **Check phpmyadmin**
- **Open a browser**

<http://localhost/phpmyadmin>



Installation

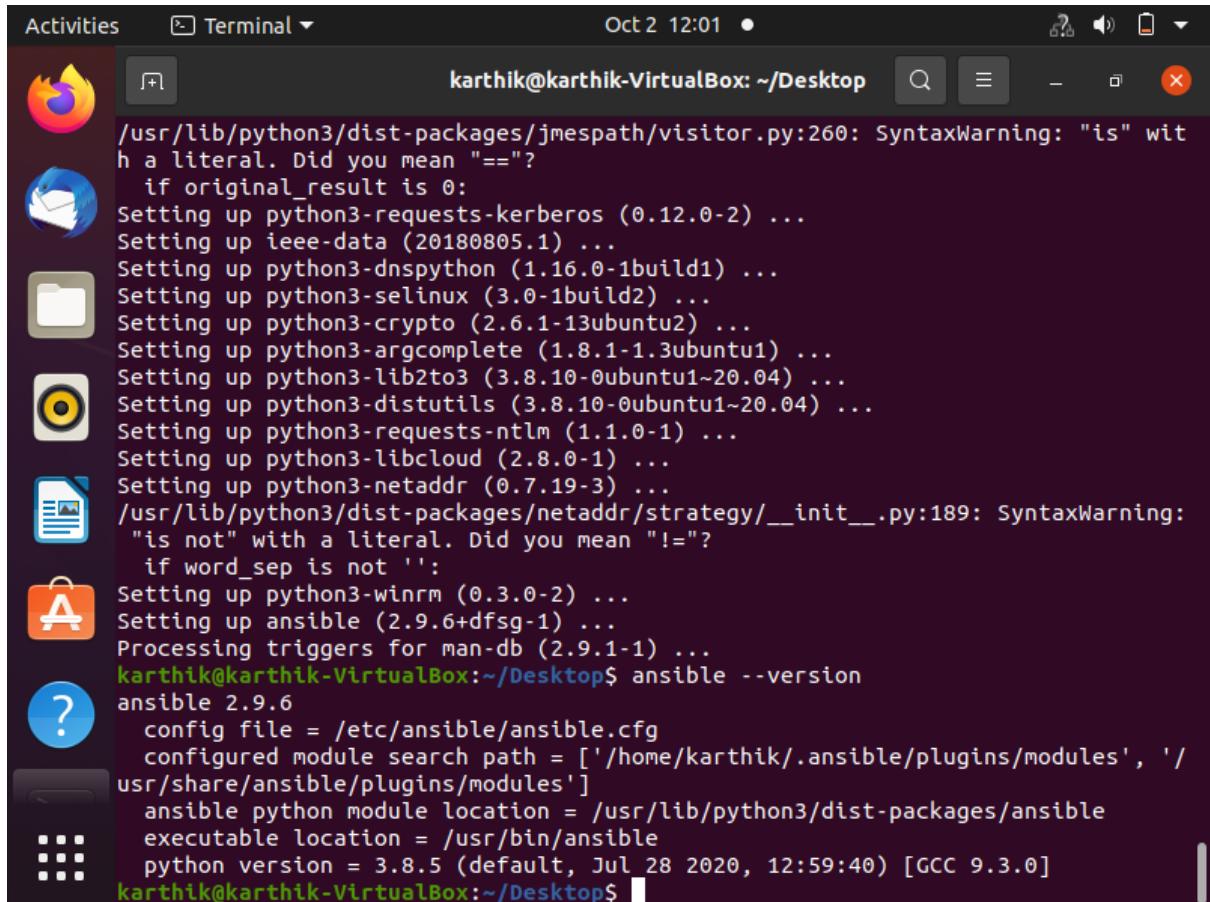
Step1: sudo apt install ansible



```
Activities Terminal Oct 2 12:01
karthik@karthik-VirtualBox: ~/Desktop
E: Unable to fetch some archives, maybe run apt-get update or try with --fix-missing?
karthik@karthik-VirtualBox:~/Desktop$ sudo apt install ansible
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-lib2to3 python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmllodict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmllodict
The following packages will be upgraded:
  python3-lib2to3
1 upgraded, 17 newly installed, 0 to remove and 334 not upgraded.
Need to get 9,865 kB/9,942 kB of archives.
After this operation, 92.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-jinja2 all 2
.10.1-2 [95.5 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 python3-crypto amd64
  3.6.1-13ubuntu2 [227 kB]
```

Installation check

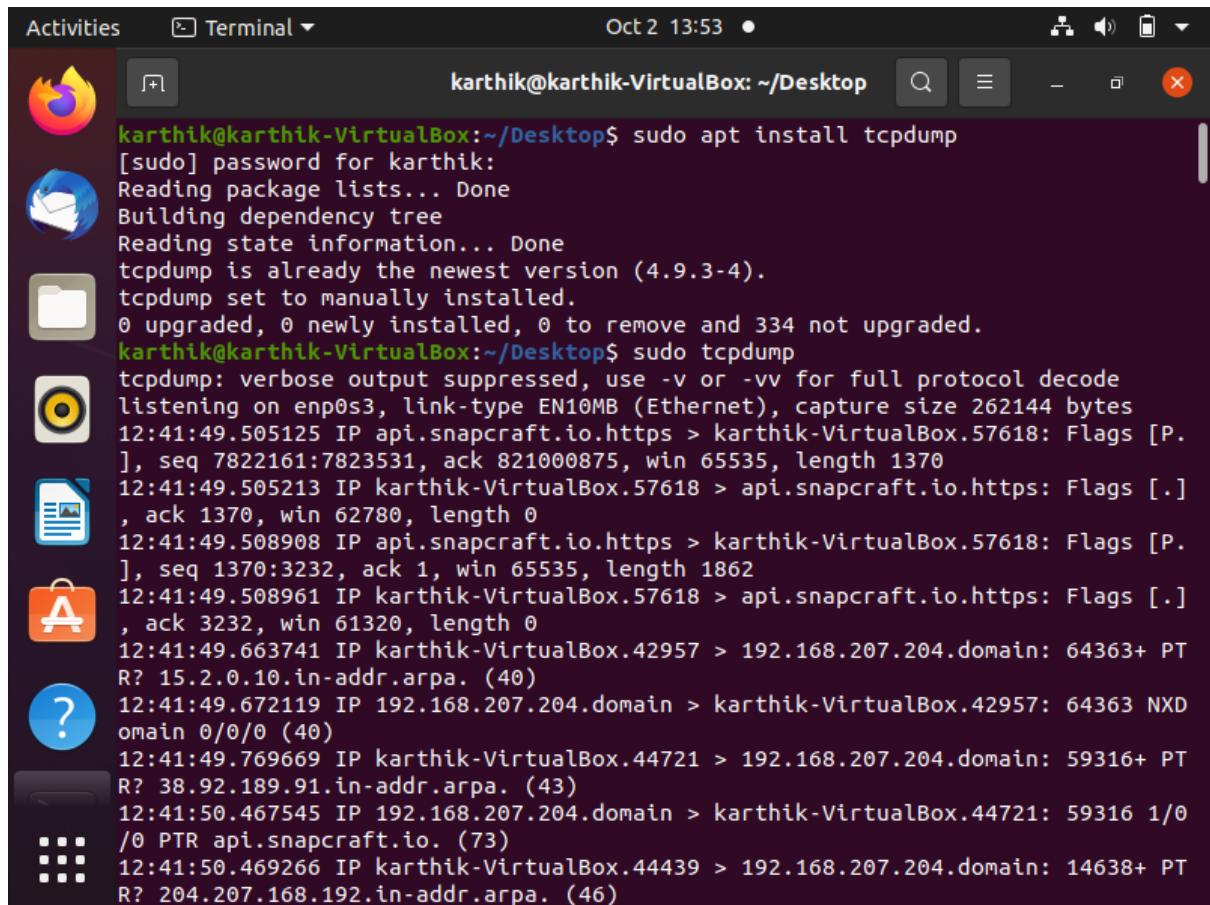
Step2:ansible –version



```
Activities Terminal Oct 2 12:01 ● karthik@karthik-VirtualBox: ~/Desktop
/usr/lib/python3/dist-packages/jmespath/visitor.py:260: SyntaxWarning: "is" with a literal. Did you mean "=="?
  if original_result is 0:
Setting up python3-requests-kerberos (0.12.0-2) ...
Setting up ieee-data (20180805.1) ...
Setting up python3-dnspython (1.16.0-1build1) ...
Setting up python3-selinux (3.0-1build2) ...
Setting up python3-crypto (2.6.1-13ubuntu2) ...
Setting up python3-argcomplete (1.8.1-1.3ubuntu1) ...
Setting up python3-lib2to3 (3.8.10-0ubuntu1~20.04) ...
Setting up python3-distutils (3.8.10-0ubuntu1~20.04) ...
Setting up python3-requests-ntlm (1.1.0-1) ...
Setting up python3-libcloud (2.8.0-1) ...
Setting up python3-netaddr (0.7.19-3) ...
/usr/lib/python3/dist-packages/netaddr/strategy/__init__.py:189: SyntaxWarning:
  "is not" with a literal. Did you mean "!="?
  if word_sep is not '':
Setting up python3-winrm (0.3.0-2) ...
Setting up ansible (2.9.6+dfsg-1) ...
Processing triggers for man-db (2.9.1-1) ...
karthik@karthik-VirtualBox:~/Desktop$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/karthik/.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 = 3.8.5 (default, Jul 28 2020, 12:59:40) [GCC 9.3.0]
karthik@karthik-VirtualBox:~/Desktop$
```

tcpdump installation:

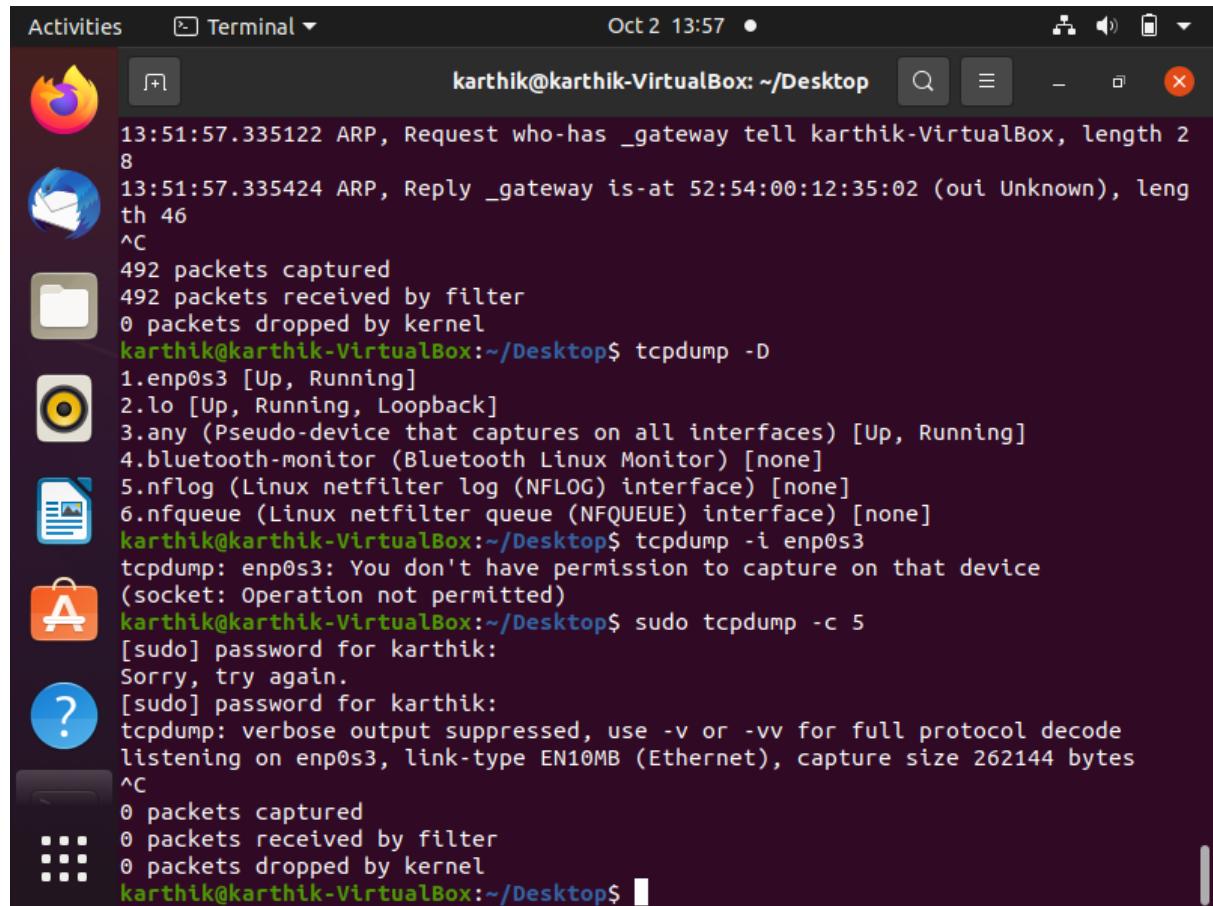
- **sudo apt install tcpdump**
- **sudo tcpdump**



A screenshot of an Ubuntu desktop environment. In the top left, there's a dock with icons for Dash, Home, Activities, and Terminal. The terminal window is open and shows the following command and its execution:

```
karthik@karthik-VirtualBox:~/Desktop$ sudo apt install tcpdump
[sudo] password for karthik:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-4).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 334 not upgraded.
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
12:41:49.505125 IP api.snapcraft.io.https > karthik-VirtualBox.57618: Flags [P.]
, seq 7822161:7823531, ack 821000875, win 65535, length 1370
12:41:49.505213 IP karthik-VirtualBox.57618 > api.snapcraft.io.https: Flags [.]
, ack 1370, win 62780, length 0
12:41:49.508908 IP api.snapcraft.io.https > karthik-VirtualBox.57618: Flags [P.]
, seq 1370:3232, ack 1, win 65535, length 1862
12:41:49.508961 IP karthik-VirtualBox.57618 > api.snapcraft.io.https: Flags [.]
, ack 3232, win 61320, length 0
12:41:49.663741 IP karthik-VirtualBox.42957 > 192.168.207.204.domain: 64363+ PT
R? 15.2.0.10.in-addr.arpa. (40)
12:41:49.672119 IP 192.168.207.204.domain > karthik-VirtualBox.42957: 64363 NXD
omain 0/0/0 (40)
12:41:49.769669 IP karthik-VirtualBox.44721 > 192.168.207.204.domain: 59316+ PT
R? 38.92.189.91.in-addr.arpa. (43)
12:41:50.467545 IP 192.168.207.204.domain > karthik-VirtualBox.44721: 59316 1/0
/0 PTR api.snapcraft.io. (73)
12:41:50.469266 IP karthik-VirtualBox.44439 > 192.168.207.204.domain: 14638+ PT
R? 204.207.168.192.in-addr.arpa. (46)
```

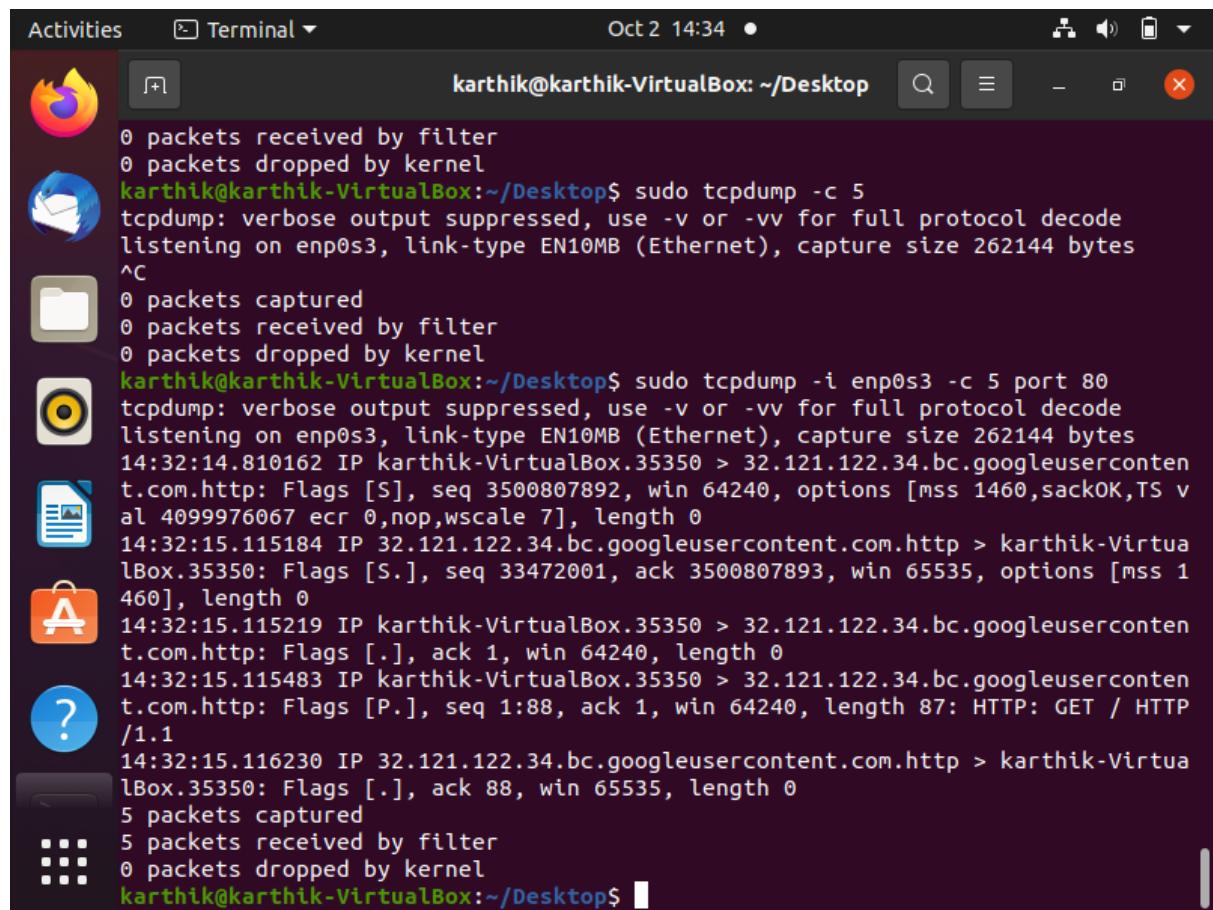
- **tcpdump -D**
- **sudo tcpdump -i enp0s3**
- **sudo tcpdump -c 5**



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window title is "Terminal" and the command line shows the user "karthik" at "karthik@karthik-VirtualBox". The terminal displays the output of several "tcpdump" commands:

```
13:51:57.335122 ARP, Request who-has _gateway tell karthik-VirtualBox, length 28
13:51:57.335424 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), length 46
^C
492 packets captured
492 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$ tcpdump -D
1.enp0s3 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
karthik@karthik-VirtualBox:~/Desktop$ tcpdump -i enp0s3
tcpdump: enp0s3: You don't have permission to capture on that device
(socket: Operation not permitted)
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -c 5
[sudo] password for karthik:
Sorry, try again.
[sudo] password for karthik:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$
```

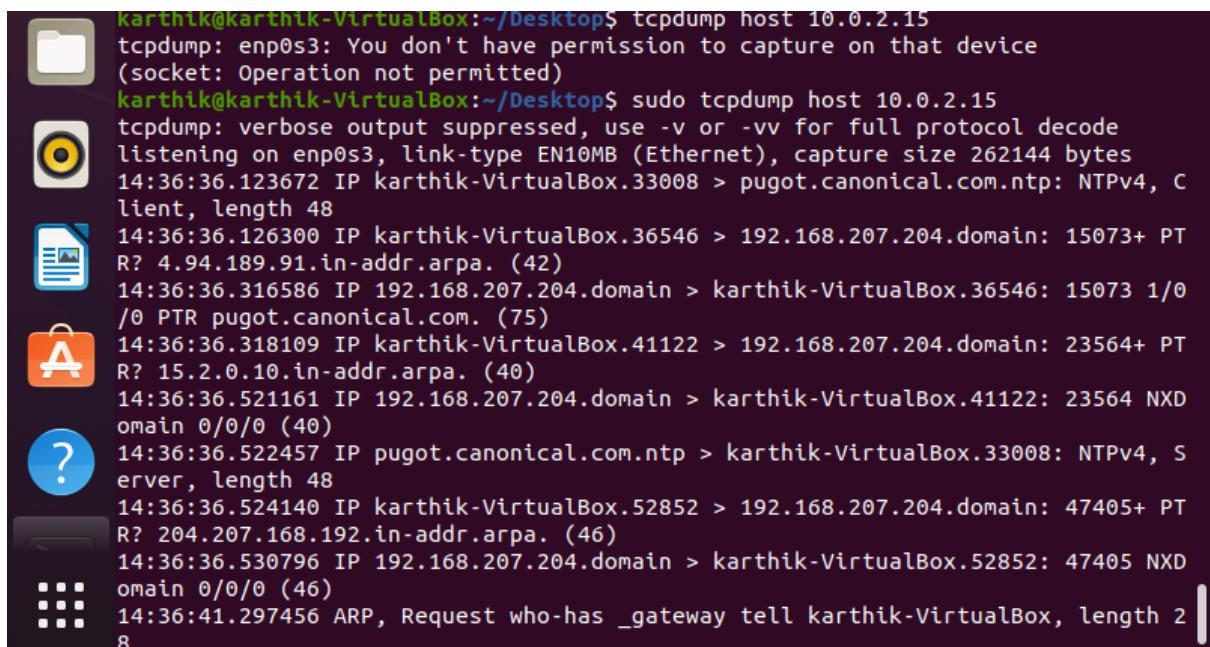
- **sudo tcpdump -I enp0s3 -c 5 port 80**



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and displays the output of a command. On the left side of the desktop, there is a vertical dock with several icons: a browser, file manager, terminal, system settings, and others.

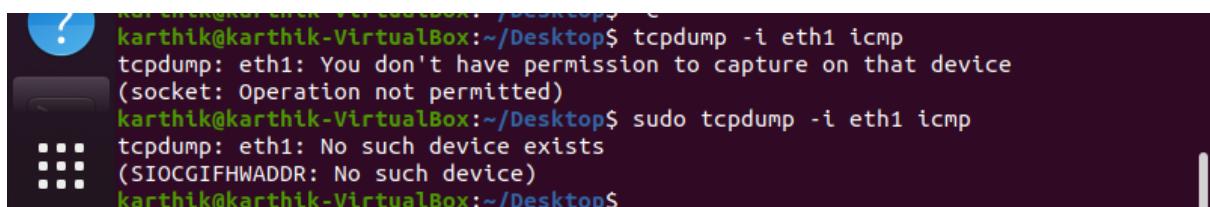
```
Activities Terminal Oct 2 14:34
karthik@karthik-VirtualBox: ~/Desktop
0 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
14:32:14.810162 IP karthik-VirtualBox.35350 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 3500807892, win 64240, options [mss 1460,sackOK,TS val 4099976067 ecr 0,nop,wscale 7], length 0
14:32:15.115184 IP 32.121.122.34.bc.googleusercontent.com.http > karthik-VirtualBox.35350: Flags [S.], seq 33472001, ack 3500807893, win 65535, options [mss 1460], length 0
14:32:15.115219 IP karthik-VirtualBox.35350 > 32.121.122.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 64240, length 0
14:32:15.115483 IP karthik-VirtualBox.35350 > 32.121.122.34.bc.googleusercontent.com.http: Flags [P.], seq 1:88, ack 1, win 64240, length 87: HTTP: GET / HTTP/1.1
14:32:15.116230 IP 32.121.122.34.bc.googleusercontent.com.http > karthik-VirtualBox.35350: Flags [.], ack 88, win 65535, length 0
5 packets captured
5 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$
```

- **sudo tcpdump host 10.0.2.15**



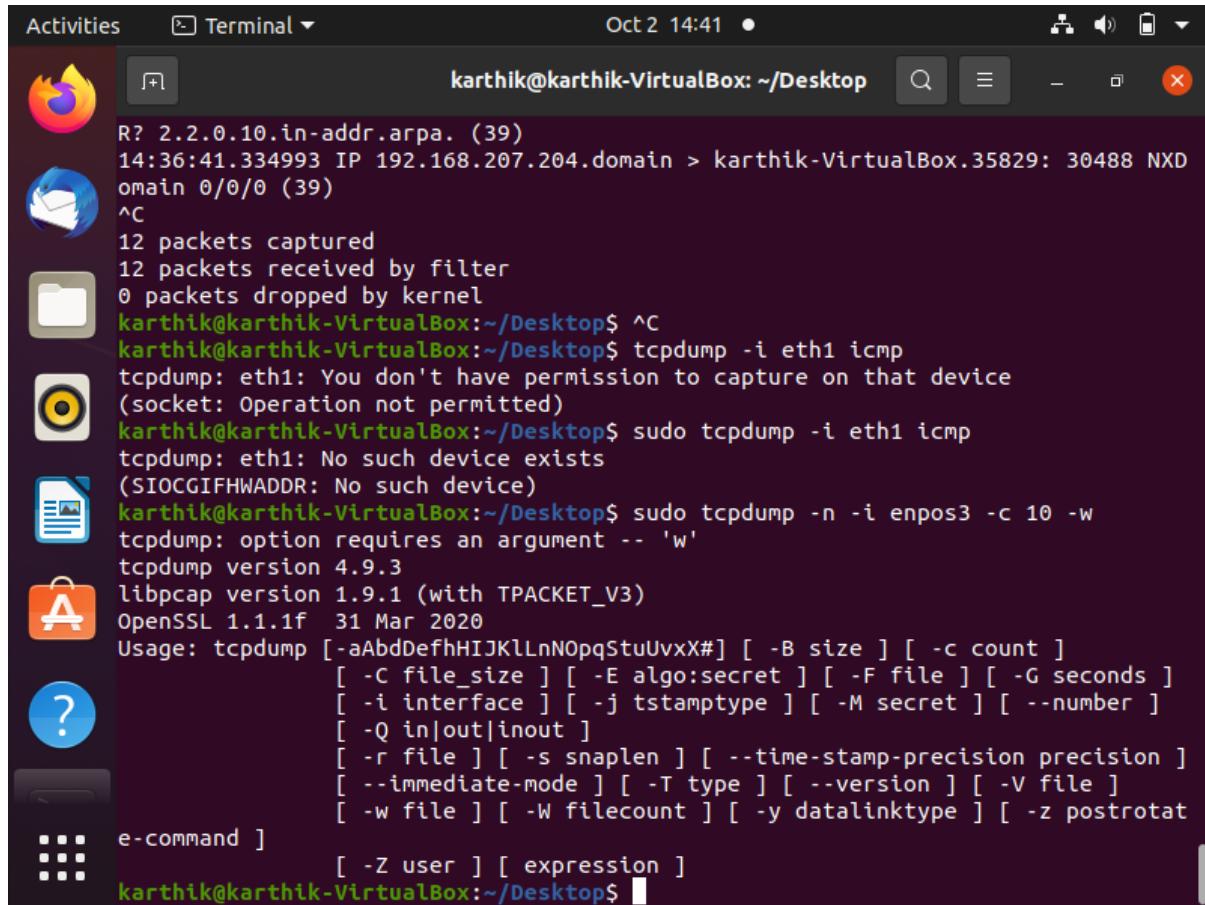
```
karthik@karthik-VirtualBox:~/Desktop$ tcpdump host 10.0.2.15
tcpdump: enp0s3: You don't have permission to capture on that device
(socket: Operation not permitted)
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump host 10.0.2.15
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
14:36:36.123672 IP karthik-VirtualBox.33008 > pugot.canonical.com.ntp: NTPv4, C
lient, length 48
14:36:36.126300 IP karthik-VirtualBox.36546 > 192.168.207.204.domain: 15073+ PT
R? 4.94.189.91.in-addr.arpa. (42)
14:36:36.316586 IP 192.168.207.204.domain > karthik-VirtualBox.36546: 15073 1/0
/0 PTR pugot.canonical.com. (75)
14:36:36.318109 IP karthik-VirtualBox.41122 > 192.168.207.204.domain: 23564+ PT
R? 15.2.0.10.in-addr.arpa. (40)
14:36:36.521161 IP 192.168.207.204.domain > karthik-VirtualBox.41122: 23564 NXD
omain 0/0/0 (40)
14:36:36.522457 IP pugot.canonical.com.ntp > karthik-VirtualBox.33008: NTPv4, S
erver, length 48
14:36:36.524140 IP karthik-VirtualBox.52852 > 192.168.207.204.domain: 47405+ PT
R? 204.207.168.192.in-addr.arpa. (46)
14:36:36.530796 IP 192.168.207.204.domain > karthik-VirtualBox.52852: 47405 NXD
omain 0/0/0 (46)
14:36:41.297456 ARP, Request who-has _gateway tell karthik-VirtualBox, length 2
8
```

- **tcpdump -i eth1 icmp**



```
karthik@karthik-VirtualBox:~/Desktop$ tcpdump -i eth1 icmp
tcpdump: eth1: You don't have permission to capture on that device
(socket: Operation not permitted)
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -i eth1 icmp
tcpdump: eth1: No such device exists
(SIOCGIFHWADDR: No such device)
karthik@karthik-VirtualBox:~/Desktop$
```

- **sudo tcpdump -n -i enp0s3 -c 10 -w**



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled 'Terminal' and has the command 'karthik@karthik-VirtualBox: ~/Desktop'. The output of the terminal shows the following:

```
R? 2.2.0.10.in-addr.arpa. (39)
14:36:41.334993 IP 192.168.207.204.domain > karthik-VirtualBox.35829: 30488 NXD
omain 0/0/0 (39)
^C
12 packets captured
12 packets received by filter
0 packets dropped by kernel
karthik@karthik-VirtualBox:~/Desktop$ ^C
karthik@karthik-VirtualBox:~/Desktop$ tcpdump -i eth1 icmp
tcpdump: eth1: You don't have permission to capture on that device
(socket: Operation not permitted)
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -i eth1 icmp
tcpdump: eth1: No such device exists
(SIOCGIFHWADDR: No such device)
karthik@karthik-VirtualBox:~/Desktop$ sudo tcpdump -n -i enpos3 -c 10 -w
tcpdump: option requires an argument -- 'w'
tcpdump version 4.9.3
libpcap version 1.9.1 (with TPACKET_V3)
OpenSSL 1.1.1f  31 Mar 2020
Usage: tcpdump [-aAbdDefhHIJKLMNOPQRSTUVWXYZ] [ -B size ] [ -c count ]
           [ -C file_size ] [ -E algo:secret ] [ -F file ] [ -G seconds ]
           [ -i interface ] [ -j tstamptype ] [ -M secret ] [ --number ]
           [ -Q inout|inout ]
           [ -r file ] [ -s snaplen ] [ --time-stamp-precision precision ]
           [ --immediate-mode ] [ -T type ] [ --version ] [ -V file ]
           [ -w file ] [ -W filecount ] [ -y datalinktype ] [ -z postrotat
e-command ]
           [ -Z user ] [ expression ]
karthik@karthik-VirtualBox:~/Desktop$
```

Docker installation on Windows 10

Step-I

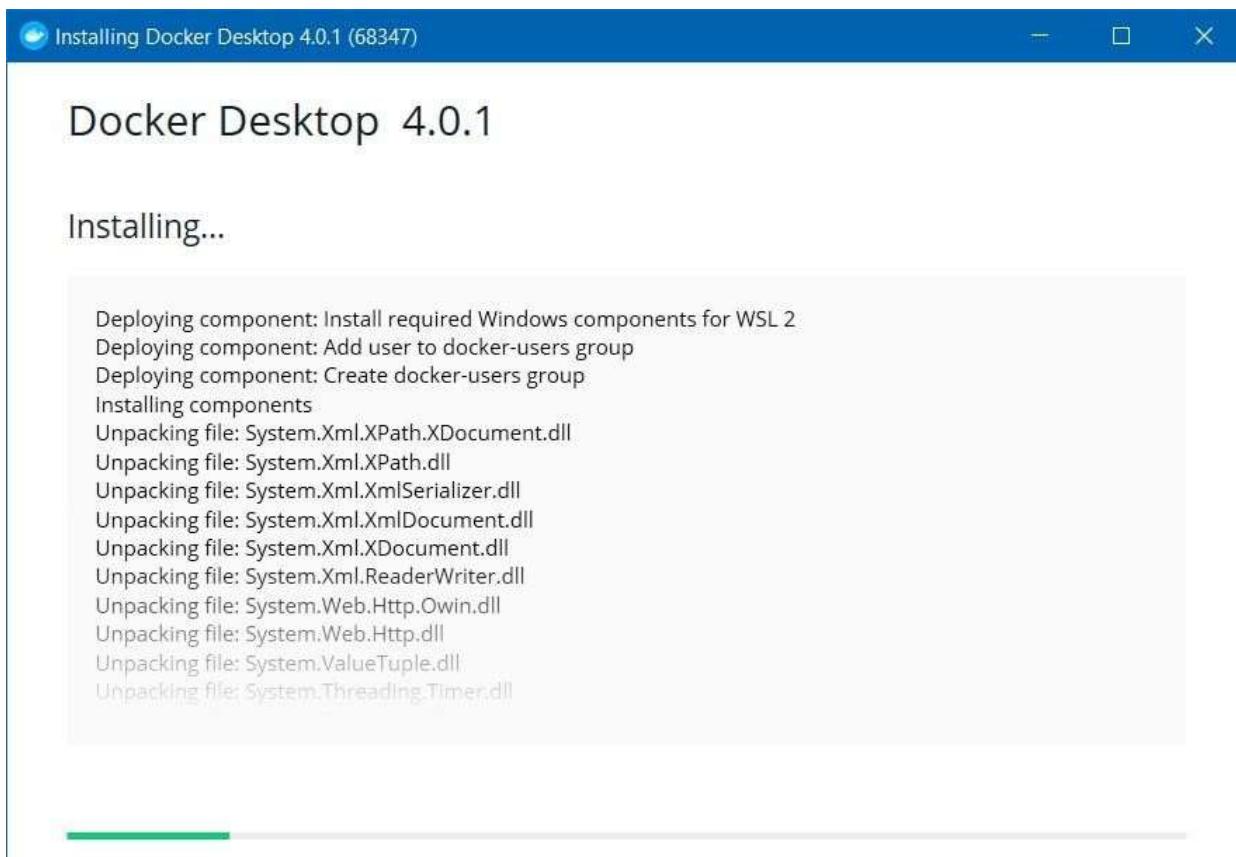
Download Docker desktop Installer for Windows from

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



Step-II

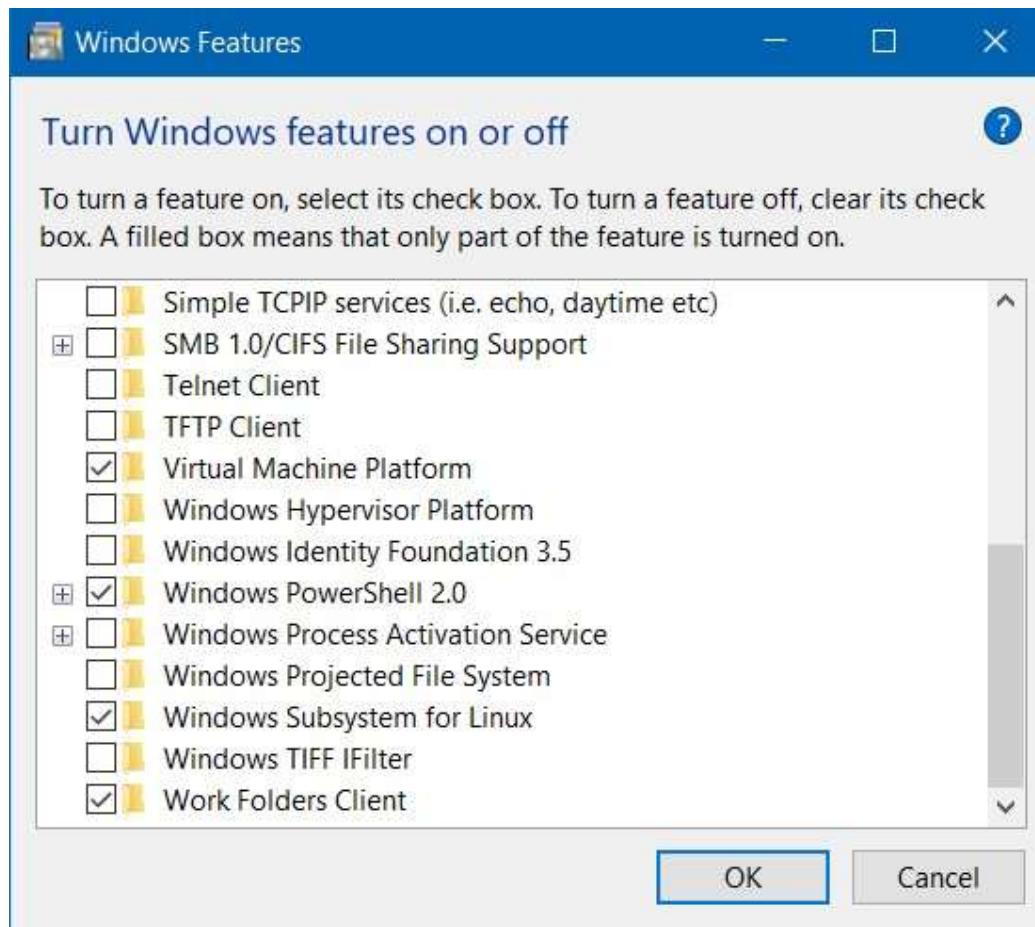
Open the .exe file and follow the steps after clicking install button.



Step-III

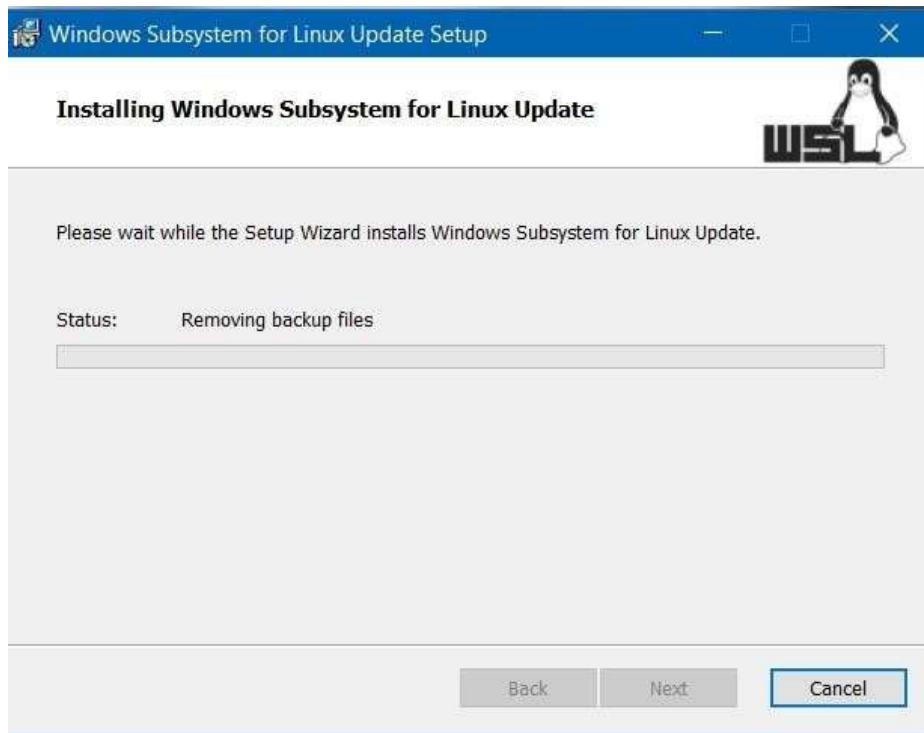
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



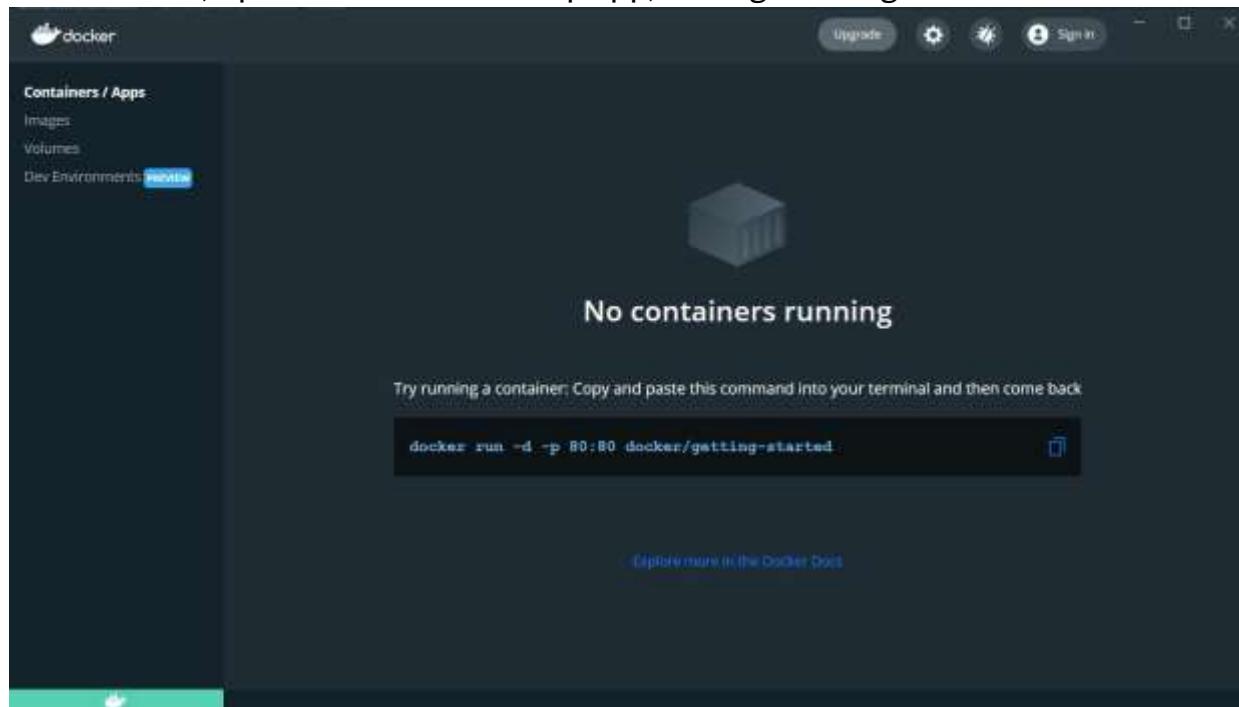
Step-IV

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



Step-V

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



Step-VI

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

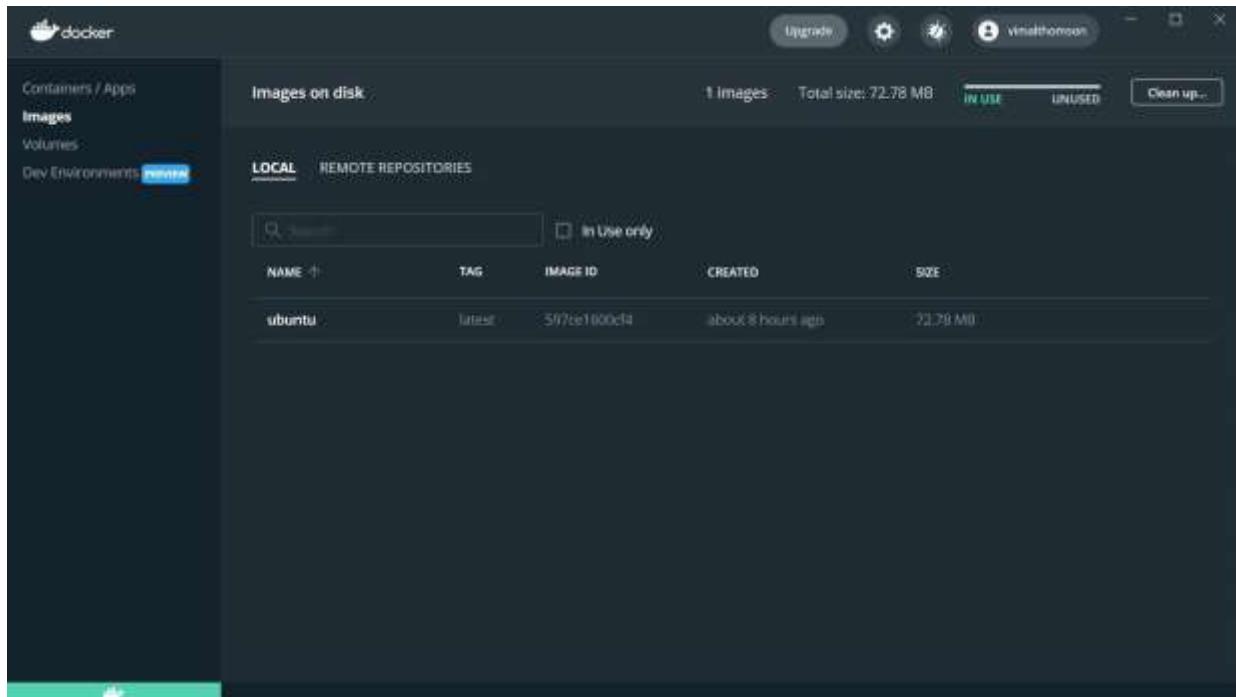
```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

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

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

C:\Windows\system32>
```

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



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: Karthik
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:2.5000000000000000000000000000000
the product is:24
```

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

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

OUTPUT:

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

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

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

OUTPUT:

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

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

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

OUTPUT:

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

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

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

OUTPUT:

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

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

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

OUTPUT:

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

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

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

OUTPUT:

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

Wireshark installation

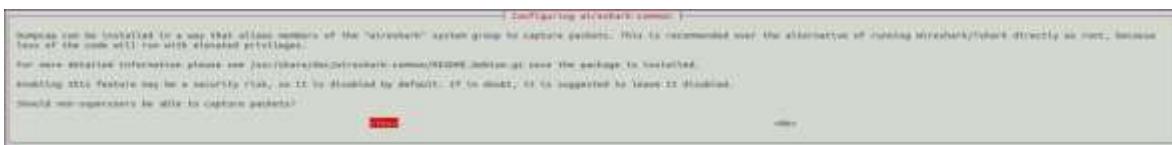
1. Command: sudo apt-get install wireshark

```
vimalthomson@vimal-thomson:~$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree...
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libgstreamer-plugins-bad1.0-8 libnvidia-cfg1-460 libnvidia-common-460 libnvidia-gl-460 libnvidia-ifr1-460 libva-wayland2 libx11-xcb1:1386 libxnvctrl0 nvidia-compute-utils-460 nvidia-kernel-xserver-xorg-video-nvidia-460
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libdouble-conversion1 liblpcrc2-16-0 libqt5core5a libqt5dbuss libqt5sgui5 libqt5multimedias libqt5multimedias-plugins libqt5printsupport5 libqt5svg5 libqt5swidgets5 libsmi2l2db libspandsp2 libwireshark-data libwireshark13 libwireshark18 libwireshark-common wireshark-qt
Suggested packages:
  qt5-image-formats-plugins qtwaylands snmp-mibs-downloader geolupdate geoip-database geoip-database-extra libjs-leaflet
The following NEW packages will be installed:
  libdouble-conversion1 liblpcrc2-16-0 libqt5core5a libqt5dbuss libqt5sgui5 libqt5multimedias libqt5multimedias-plugins libqt5printsupport5 libqt5svg5 libqt5swidgets5 libsmi2l2db libspandsp2 libwireshark-data libwireshark13 libwireshark18 libwireshark-common wireshark-qt
0 upgraded, 27 newly installed, 0 to remove and 342 not upgraded.
Need to get 32.6 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libdouble-conversion3 amd64 3.1.5-4ubuntu1 [37.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 liblpcrc2-16-0 amd64 10.34-7 [181 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5core5a amd64 5.12.8+dfsg-8ubuntu1 [2,005 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5dbuss amd64 5.12.8+dfsg-8ubuntu1 [208 kB]
```

2. Command: sudo dpkg-reconfigure wireshark-common

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

3. Command: Select Yes and press enter



4. Open wireshark from the applist

