

NETWORKING AND SYSTEM ADMINISTRATION LAB RECORD

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RMCA B

10/5/2021

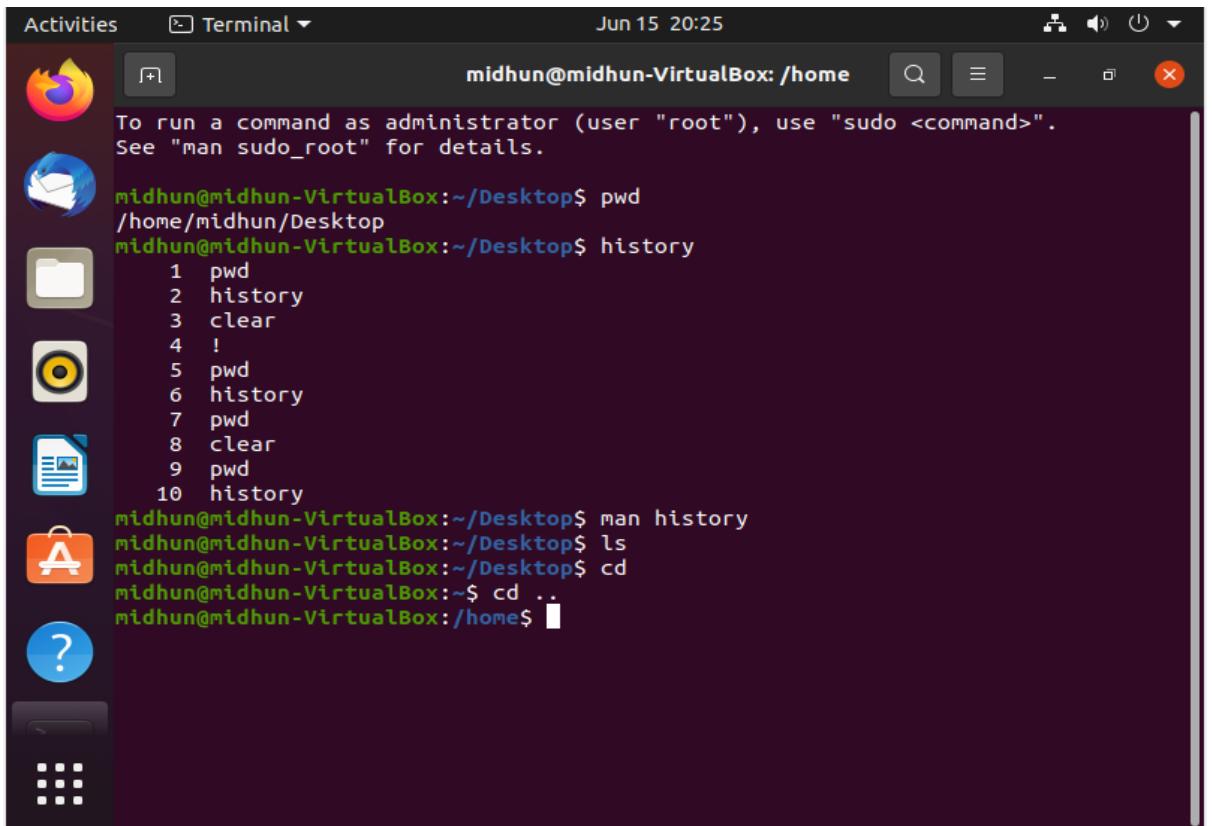
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BASIC LINUX COMMANDS

1. pwd (Print Working Directory)

- Use the `pwd` command to find out the path of the current working directory (folder) you're in.
- The command will return an absolute (full) path, which is basically a path of all the directories that starts with a forward slash (/).

A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has a timestamp of "Jun 15 20:25". The terminal content shows a user named "midhun" running several commands:

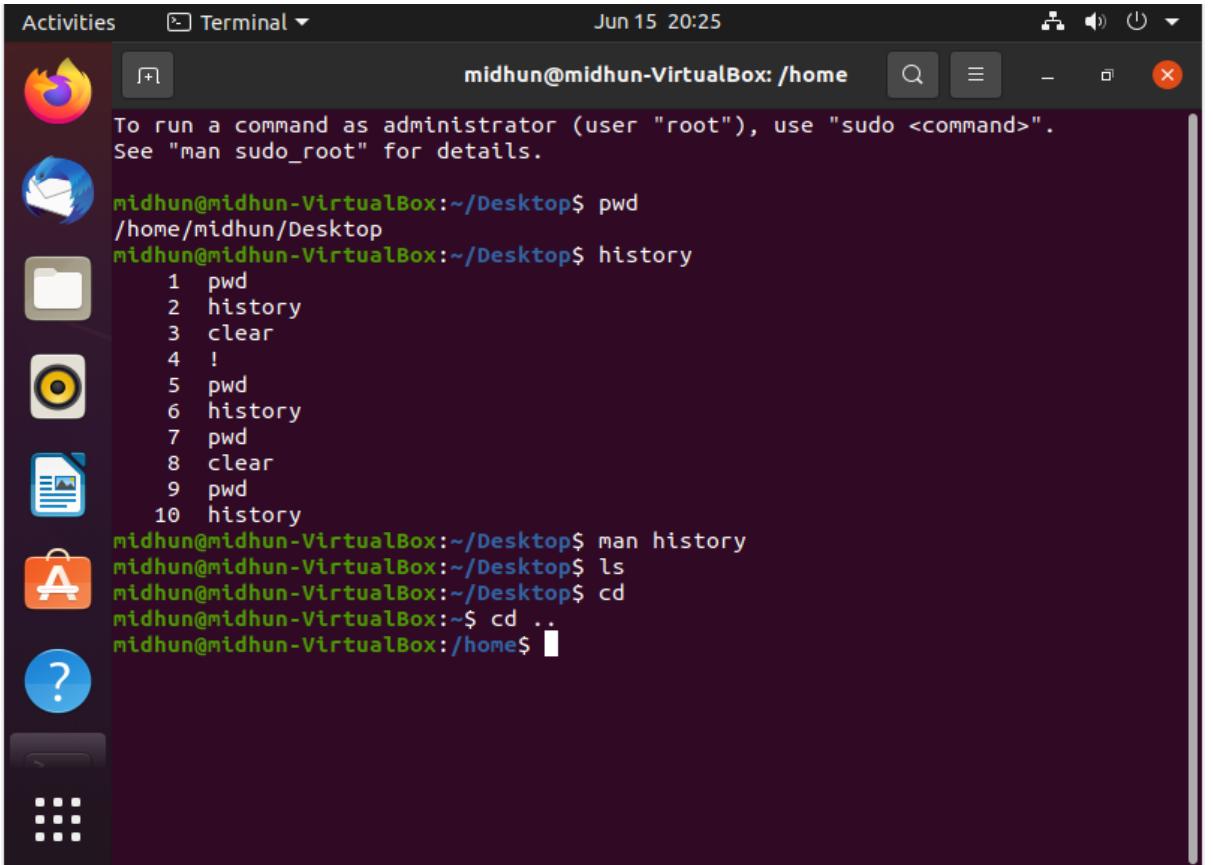
```
midhun@midhun-VirtualBox: /home
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ pwd
/home/midhun/Desktop
midhun@midhun-VirtualBox:~/Desktop$ history
1  pwd
2  history
3  clear
4  !
5  pwd
6  history
7  pwd
8  clear
9  pwd
10 history
midhun@midhun-VirtualBox:~/Desktop$ man history
midhun@midhun-VirtualBox:~/Desktop$ ls
midhun@midhun-VirtualBox:~/Desktop$ cd ..
midhun@midhun-VirtualBox:~$ cd ..
midhun@midhun-VirtualBox:/home$
```

The desktop environment includes a dock with icons for the Dash, Home, Applications, and Help, and a panel at the top with system status indicators.

2. 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.
 - #history
 - !command number to run a command from history



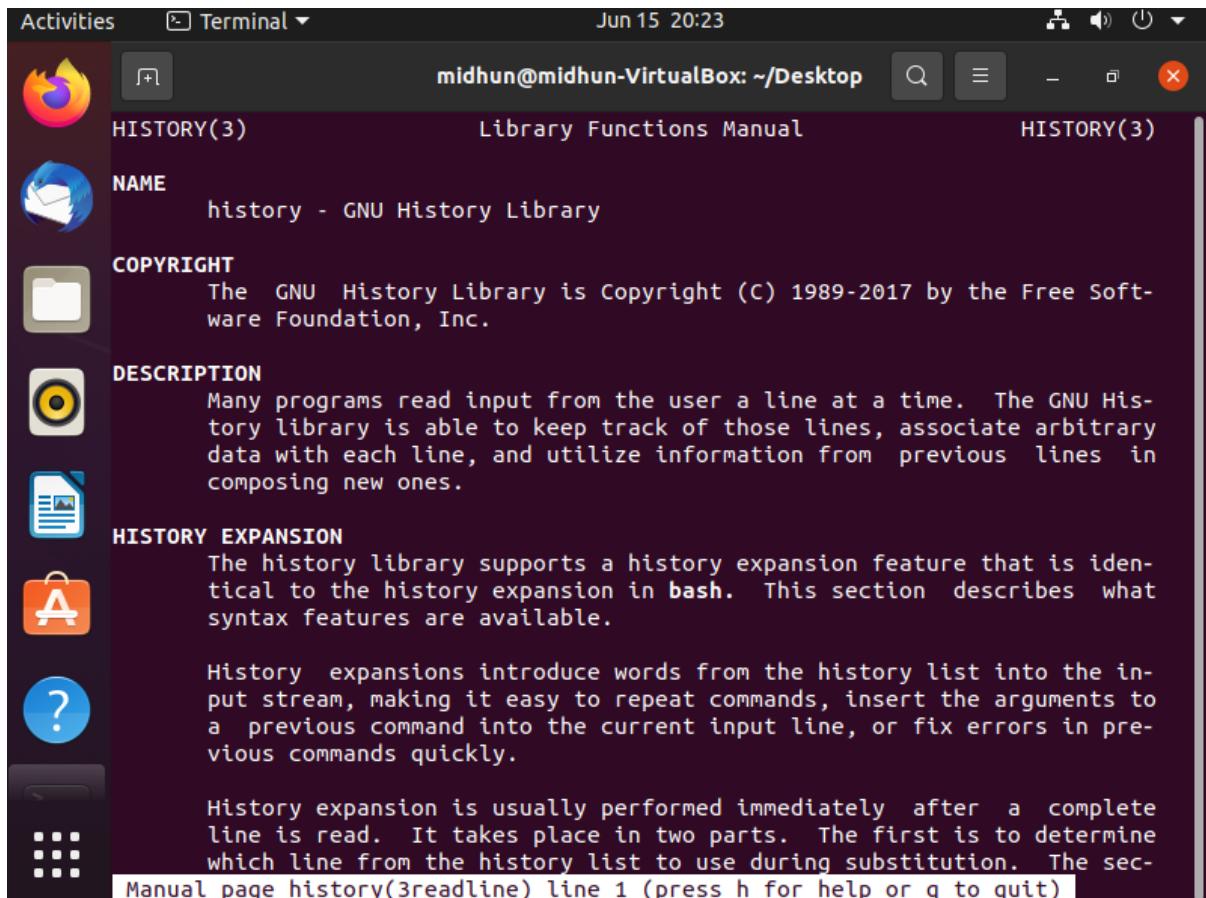
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window is titled "Terminal" and shows the user's session history. The user has run several commands including pwd, history, clear, !, and man history. The terminal window is located on the desktop next to a dock containing icons for various applications like a browser, file manager, terminal, and system settings.

```
midhun@midhun-VirtualBox: /home
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ pwd
/home/midhun/Desktop
midhun@midhun-VirtualBox:~/Desktop$ history
1  pwd
2  history
3  clear
4  !
5  pwd
6  history
7  pwd
8  clear
9  pwd
10 history
midhun@midhun-VirtualBox:~/Desktop$ man history
midhun@midhun-VirtualBox:~/Desktop$ ls
midhun@midhun-VirtualBox:~/Desktop$ cd
midhun@midhun-VirtualBox:~$ cd ..
midhun@midhun-VirtualBox:/home$
```

3. man

- We can easily learn how to use them right from Linux's shell by using the man command.
- For instance, entering man tail will show the manual instruction of the tail command.
- Use the command: man to start learning about man utility.
- The man page (short for manual page) includes a command description, applicable options, flags, examples, and other informative sections.



The screenshot shows a terminal window titled "Terminal" with the command "man HISTORY(3)" entered. The output displays the manual page for the GNU History Library. The page is structured with sections: NAME, COPYRIGHT, DESCRIPTION, and HISTORY EXPANSION. The DESCRIPTION section contains a detailed explanation of how history expansions work. The HISTORY EXPANSION section provides specific details about how words from the history list are inserted into the input stream. The bottom of the screen shows a scroll bar and a status bar indicating the user is at line 1 of the manual page.

```
midhun@midhun-VirtualBox: ~/Desktop
```

HISTORY(3) Library Functions Manual **HISTORY(3)**

NAME
history - GNU History Library

COPYRIGHT
The GNU History Library is Copyright (C) 1989-2017 by the Free Software Foundation, Inc.

DESCRIPTION
Many programs read input from the user a line at a time. The GNU History library is able to keep track of those lines, associate arbitrary data with each line, and utilize information from previous lines in composing new ones.

HISTORY EXPANSION
The history library supports a history expansion feature that is identical to the history expansion in **bash**. This section describes what syntax features are available.

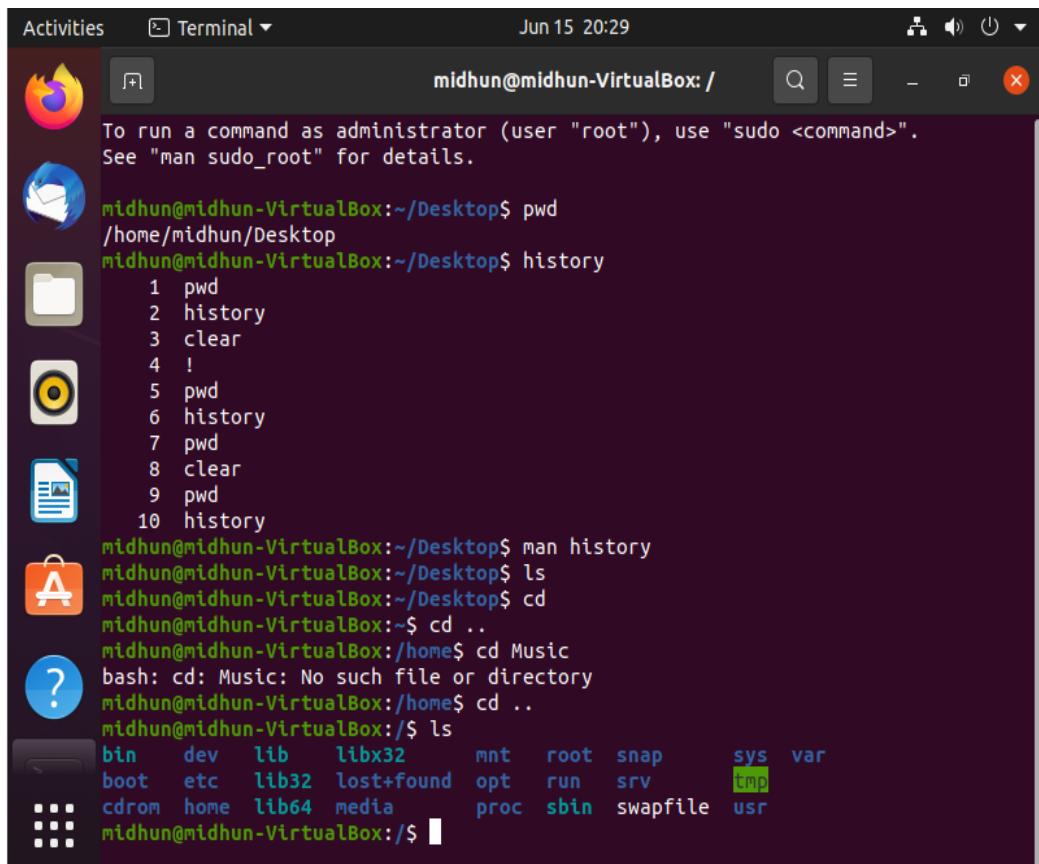
History expansions introduce words from the history list into the input stream, making it easy to repeat commands, insert the arguments to a previous command into the current input line, or fix errors in previous commands quickly.

History expansion is usually performed immediately after a complete line is read. It takes place in two parts. The first is to determine which line from the history list to use during substitution. The sec-

Manual page history(3) readline) line 1 (press h for help or q to quit)

4. cd

- To navigate through the Linux files and directories, use the cd
- It requires either the full path or the name of the directory, depending on the current working directory that you're in.
- Let's say you're in /home/username/Documents and you want to go to Photos, a subdirectory of Documents. To do so, simply type the following command: cd Photos.
- Another scenario is if you want to switch to a completely new directory, for example,/home/username/Movies. In this case, you have to type cd followed by the directory's absolute path: cd /home/username/Movies.
- Shortcuts to help you navigate quickly:
 - 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.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the status bar shows the date and time as "Jun 15 20:29". The terminal content is as follows:

```
midhun@midhun-VirtualBox: ~
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ pwd  
/home/midhun/Desktop  
midhun@midhun-VirtualBox:~/Desktop$ history  
1  pwd  
2  history  
3  clear  
4  !  
5  pwd  
6  history  
7  pwd  
8  clear  
9  pwd  
10 history  
midhun@midhun-VirtualBox:~/Desktop$ man history  
midhun@midhun-VirtualBox:~/Desktop$ ls  
midhun@midhun-VirtualBox:~/Desktop$ cd  
midhun@midhun-VirtualBox:~$ cd ..  
midhun@midhun-VirtualBox:/home$ cd Music  
bash: cd: Music: No such file or directory  
midhun@midhun-VirtualBox:/home$ cd ..  
midhun@midhun-VirtualBox:/~$ ls  
bin  dev  lib  libx32  mnt  root  snap  sys  var  
boot  etc  lib32  lost+found  opt  run  srv  tmp  
cdrom  home  lib64  media  proc  sbin  swapfile  usr  
midhun@midhun-VirtualBox:/$
```

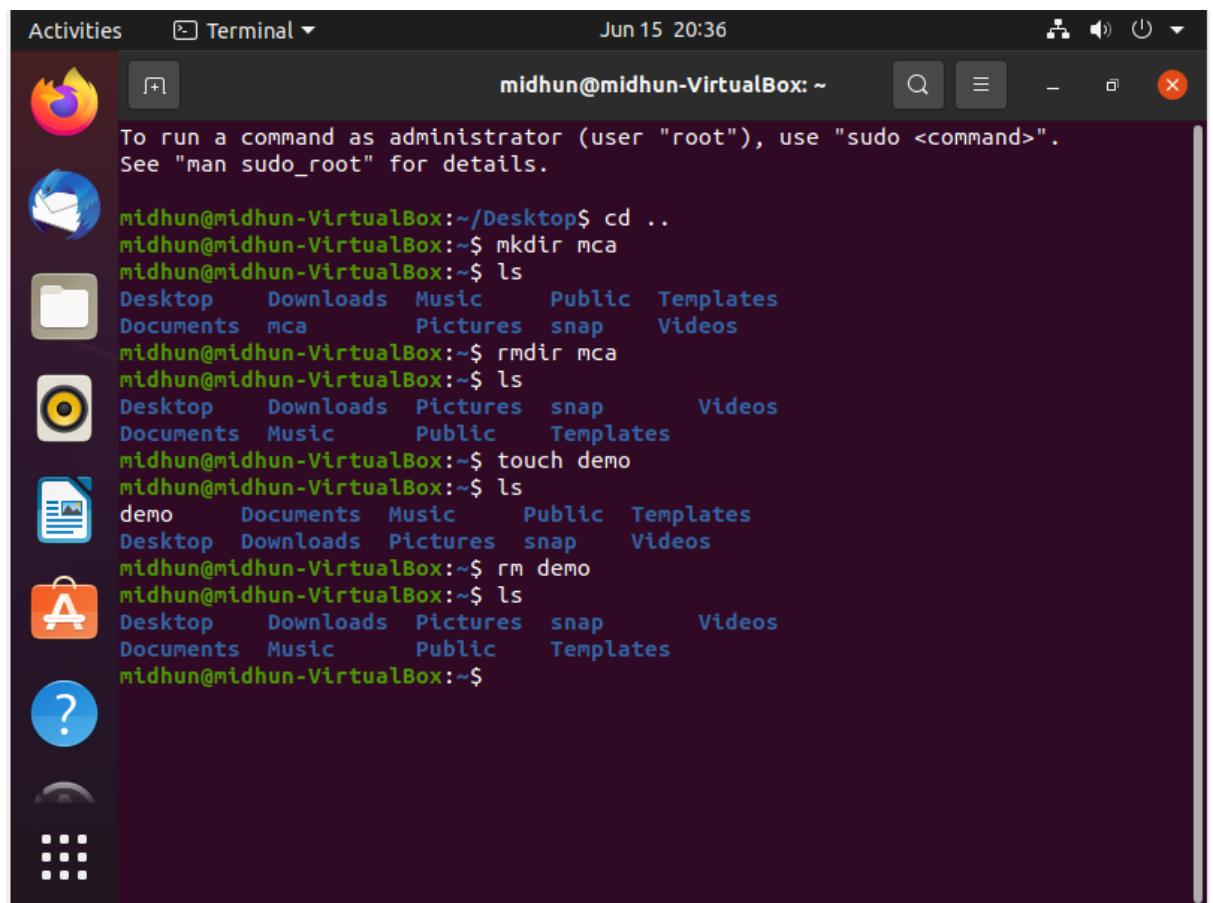
5. ls

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

If you want to see the content of other directories, type ls and then the directory's path.

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.



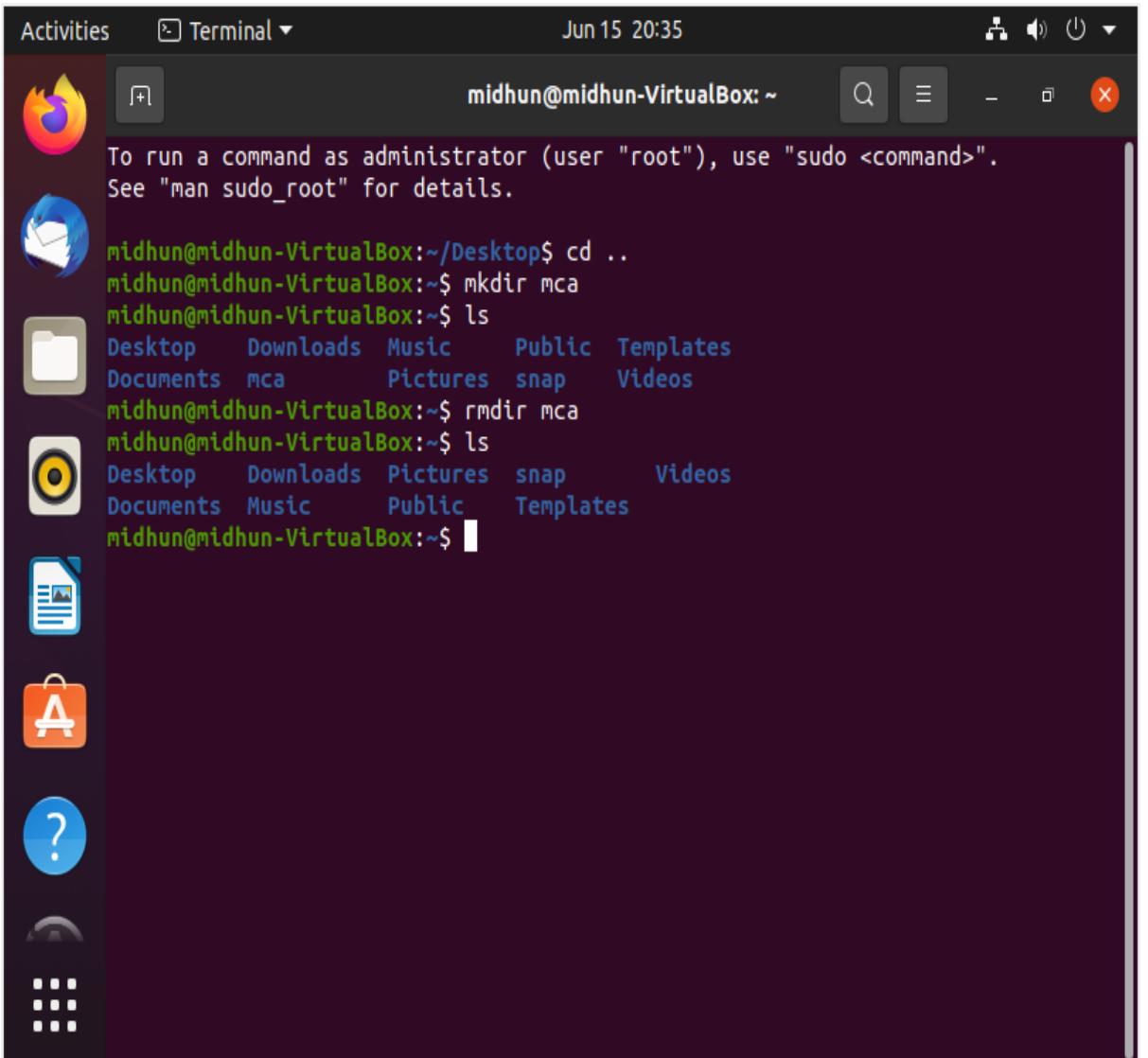
The screenshot shows a Linux desktop environment with a dark theme. On the left, there is a dock with icons for various applications: a browser, file manager, terminal, messaging, calendar, documents, music, public folder, templates, and videos. The terminal window is open and displays the following command-line session:

```
Activities Terminal ▾ Jun 15 20:36
midhun@midhun-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ cd ..
midhun@midhun-VirtualBox:~/Desktop$ mkdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Music Public Templates
Documents mca Pictures snap Videos
midhun@midhun-VirtualBox:~/Desktop$ rmdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$ touch demo
midhun@midhun-VirtualBox:~/Desktop$ ls
demo Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$ rm demo
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$
```

6. 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.



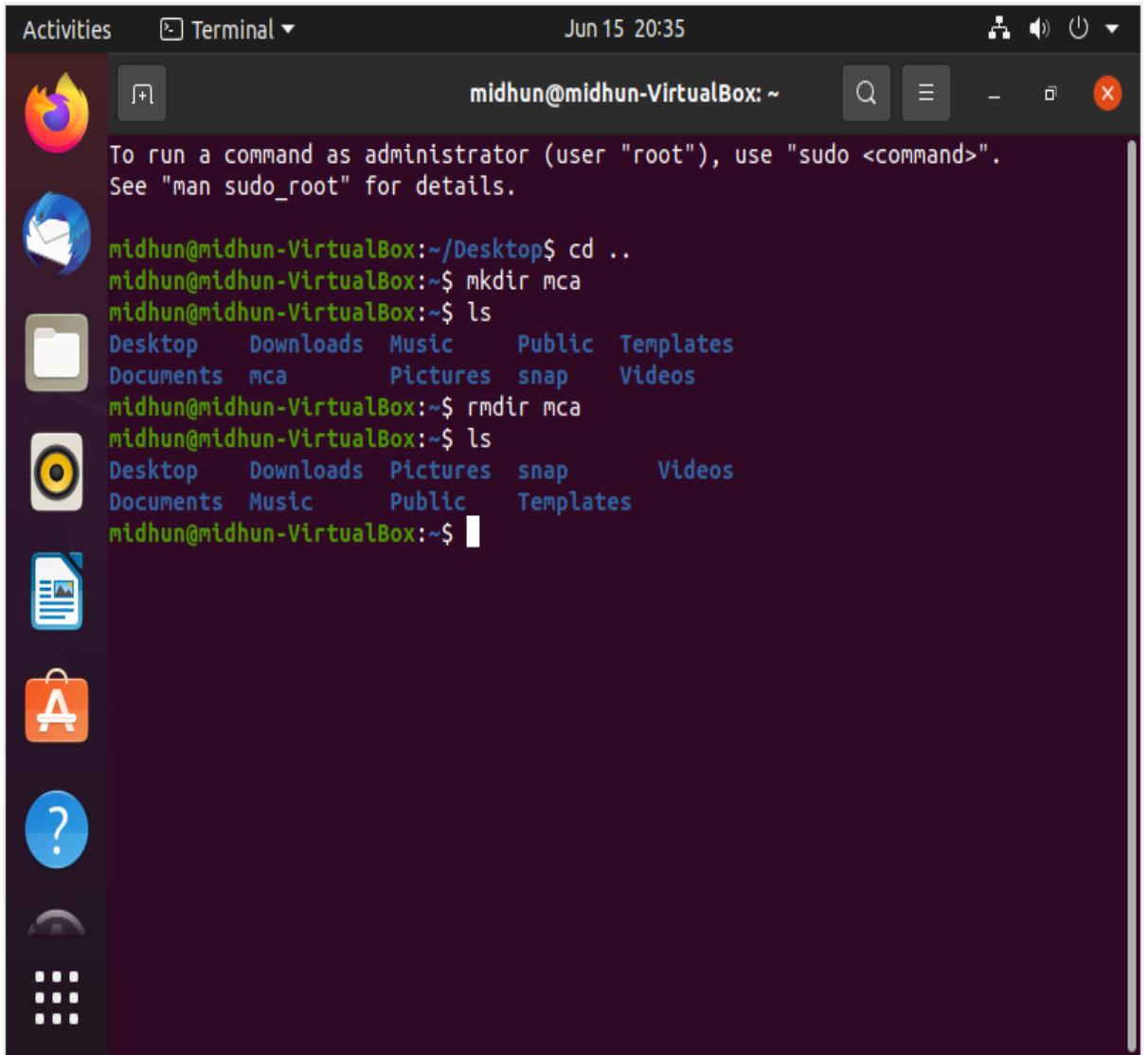
The screenshot shows a Linux desktop environment with a dark theme. On the left is a vertical dock containing icons for various applications: a browser, a file manager, a terminal, a messaging application, a file viewer, a document editor, a help center, and a system settings icon. The main area is a terminal window titled "Terminal". The terminal output is as follows:

```
Activities Terminal ▾ Jun 15 20:35
midhun@midhun-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ cd ..
midhun@midhun-VirtualBox:~$ mkdir mca
midhun@midhun-VirtualBox:~$ ls
Desktop  Downloads  Music    Public  Templates
Documents  mca      Pictures  snap    Videos
midhun@midhun-VirtualBox:~$ rmdir mca
midhun@midhun-VirtualBox:~$ ls
Desktop  Downloads  Pictures  snap      Videos
Documents  Music    Public    Templates
midhun@midhun-VirtualBox:~$ |
```

7. rmdir

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



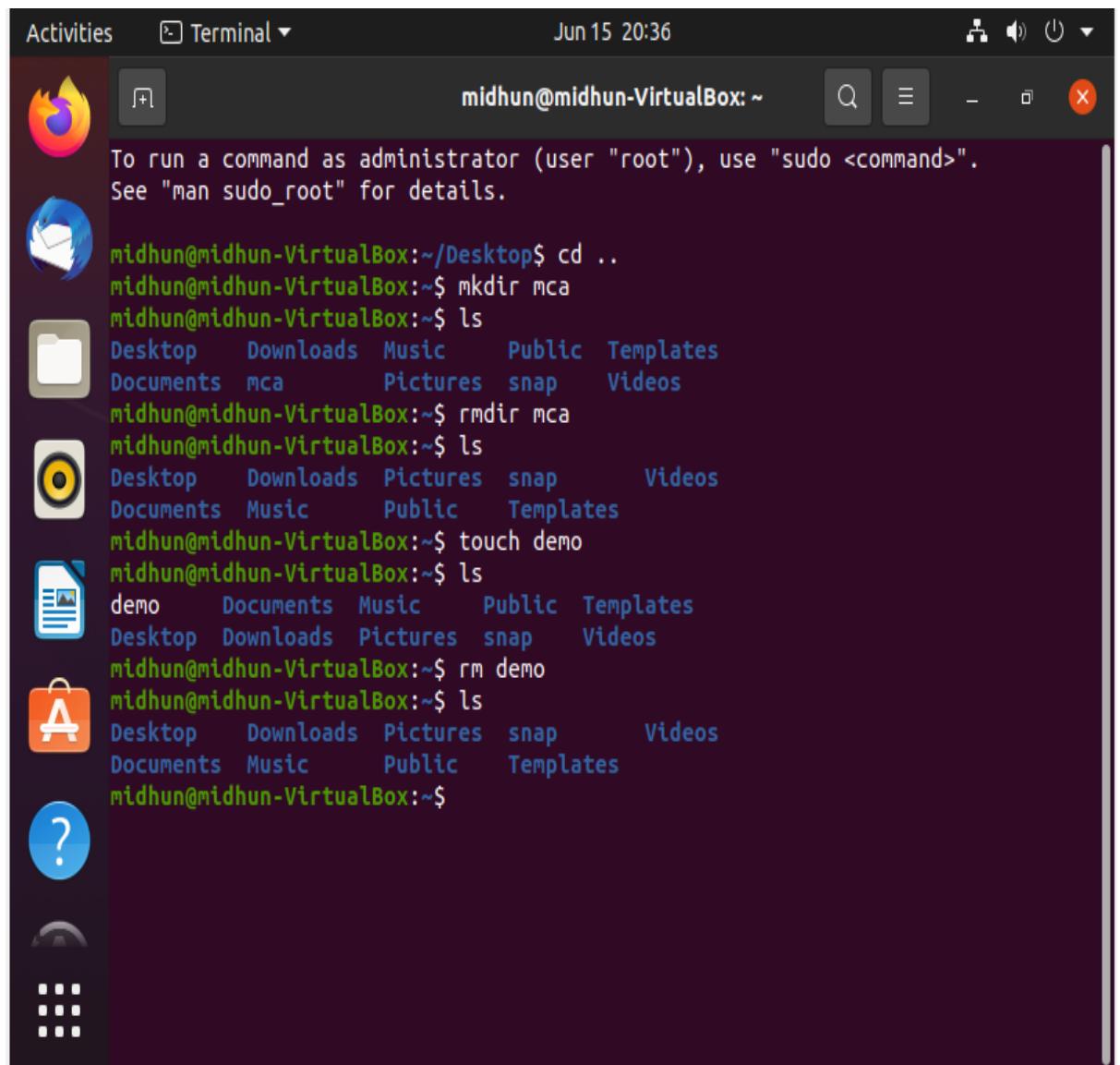
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the date and time are "Jun 15 20:35". The terminal content is as follows:

```
midhun@midhun-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ cd ..
midhun@midhun-VirtualBox:~/Desktop$ mkdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop  Downloads  Music    Public  Templates
Documents  mca      Pictures  snap    Videos
midhun@midhun-VirtualBox:~/Desktop$ rmdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop  Downloads  Pictures  snap    Videos
Documents  Music    Public    Templates
midhun@midhun-VirtualBox:~/Desktop$
```

8. touch

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



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window is titled "Terminal" and has the command line interface (CLI) visible. The CLI shows the user navigating through their home directory, creating a directory named "mca", then removing it, creating a file named "demo", and finally removing it again. The desktop background features a dark theme with various icons for applications like the Dash, Home, and Help.

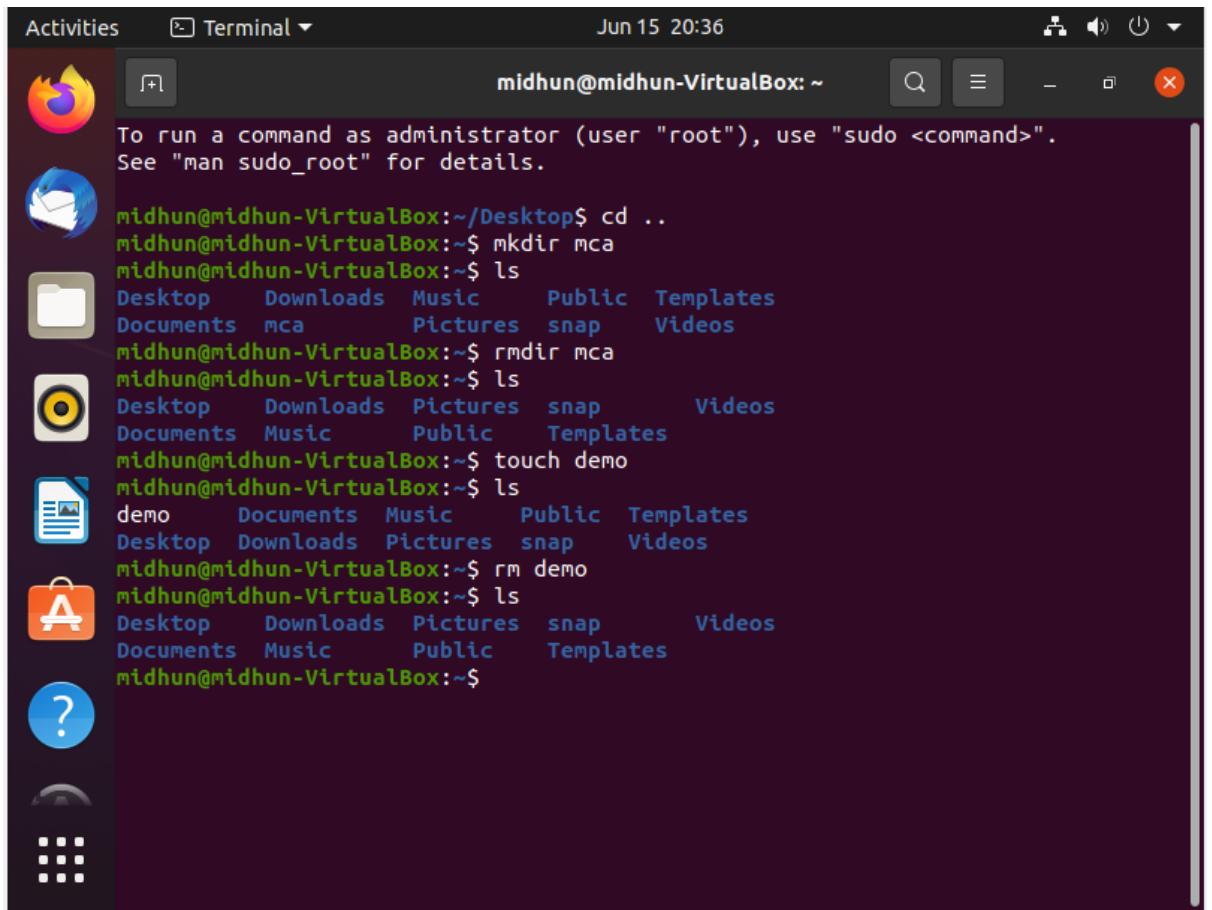
```
midhun@midhun-VirtualBox: ~$ cd ..
midhun@midhun-VirtualBox: ~$ mkdir mca
midhun@midhun-VirtualBox: ~$ ls
Desktop Downloads Music Public Templates
Documents mca Pictures snap Videos
midhun@midhun-VirtualBox: ~$ rmdir mca
midhun@midhun-VirtualBox: ~$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox: ~$ touch demo
midhun@midhun-VirtualBox: ~$ ls
demo Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox: ~$ rm demo
midhun@midhun-VirtualBox: ~$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox: ~$
```

9. rm

- The rm command is used to delete directories and the contents within them.

If you only want to delete the directory — as an alternative to rmdir — use rm -r.

To remove a file use : rm filename



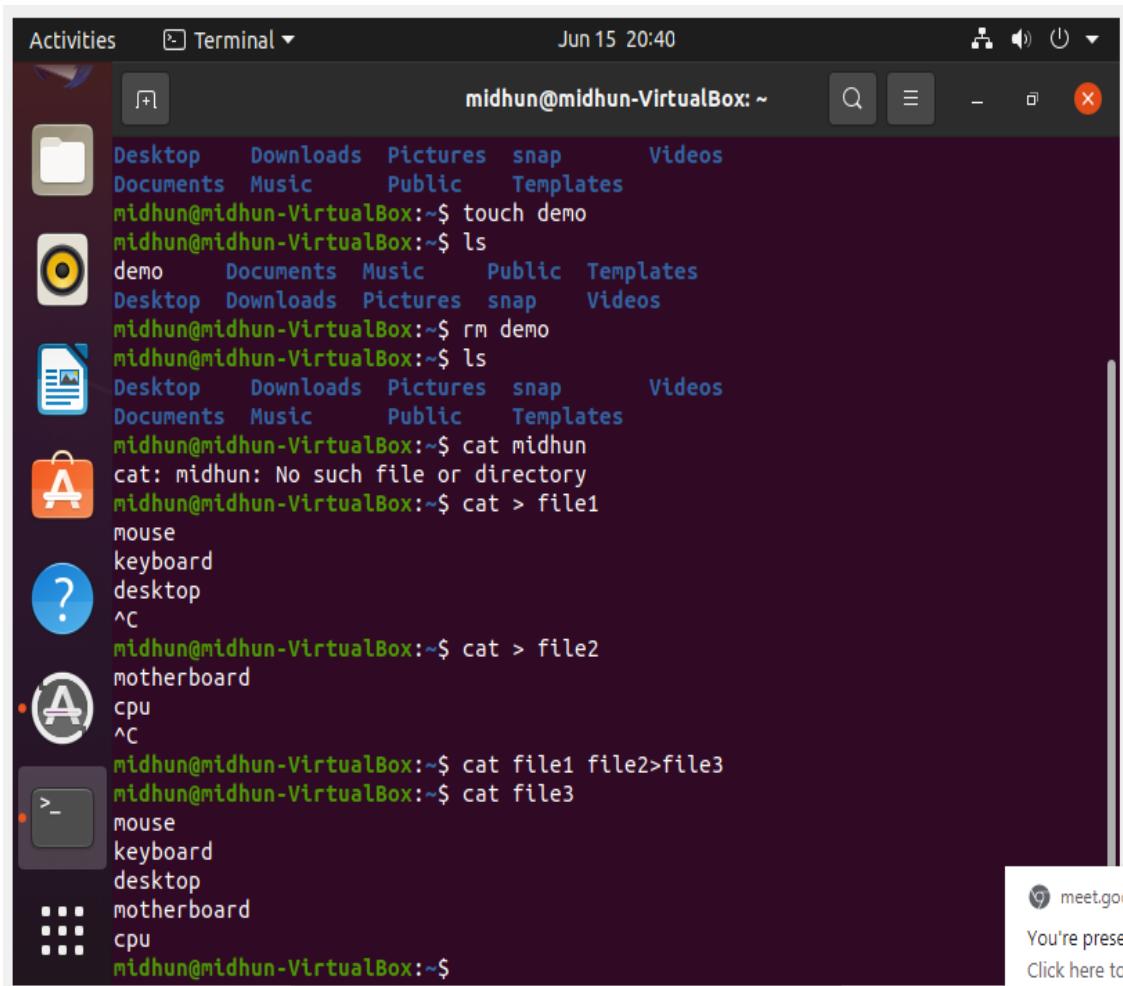
A screenshot of an Ubuntu desktop environment. On the left, there's a dock with various icons: a browser, a file manager, a terminal, a mail client, a folder, a system settings gear, a help question mark, and a dash. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

```
Activities Terminal Jun 15 20:36
midhun@midhun-VirtualBox: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

midhun@midhun-VirtualBox:~/Desktop$ cd ..
midhun@midhun-VirtualBox:~/Desktop$ mkdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Music Public Templates
Documents mca Pictures snap Videos
midhun@midhun-VirtualBox:~/Desktop$ rmdir mca
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$ touch demo
midhun@midhun-VirtualBox:~/Desktop$ ls
demo Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$ rm demo
midhun@midhun-VirtualBox:~/Desktop$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~/Desktop$
```

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.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the status bar shows the date and time as "Jun 15 20:40". The terminal content is as follows:

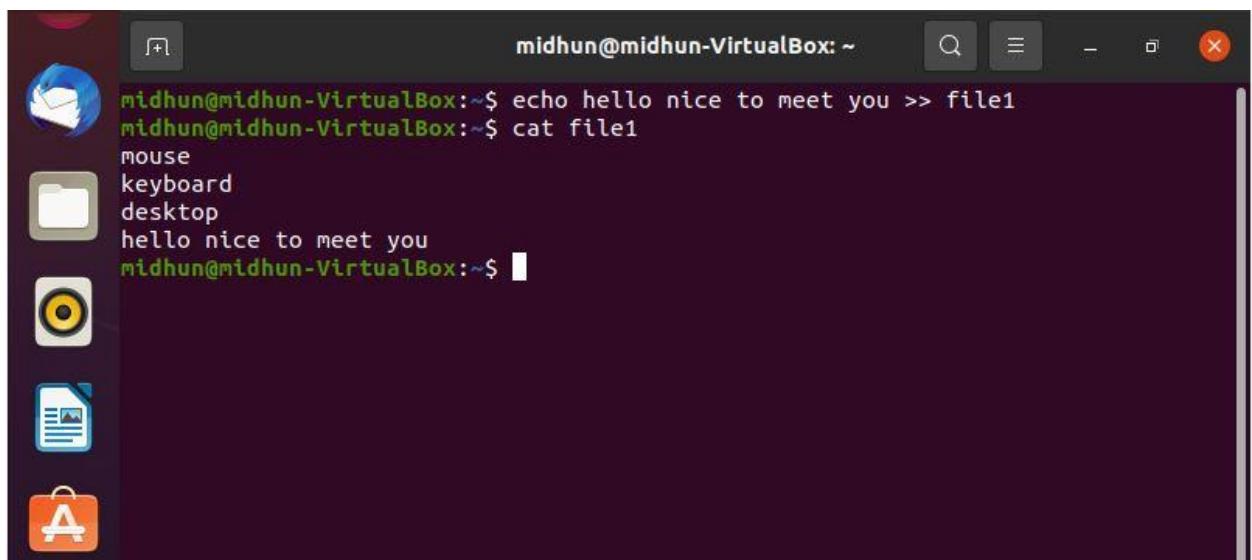
```
Activities Terminal ▾ Jun 15 20:40
midhun@midhun-VirtualBox: ~
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~$ touch demo
midhun@midhun-VirtualBox:~$ ls
demo Documents Music Public Templates
Desktop Downloads Pictures snap Videos
midhun@midhun-VirtualBox:~$ rm demo
midhun@midhun-VirtualBox:~$ ls
Desktop Downloads Pictures snap Videos
Documents Music Public Templates
midhun@midhun-VirtualBox:~$ cat midhun
cat: midhun: No such file or directory
midhun@midhun-VirtualBox:~$ cat > file1
mouse
keyboard
desktop
^C
midhun@midhun-VirtualBox:~$ cat > file2
motherboard
cpu
^C
midhun@midhun-VirtualBox:~$ cat file1 file2>file3
midhun@midhun-VirtualBox:~$ cat file3
mouse
keyboard
desktop
motherboard
cpu
midhun@midhun-VirtualBox:~$
```

A small "meet.google.com" watermark is visible in the bottom right corner of the terminal window.

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 screenshot shows a terminal window with a dark background and light-colored text. The window title is "midhun@midhun-VirtualBox: ~". The terminal contains the following command and its output:

```
midhun@midhun-VirtualBox:~$ echo hello nice to meet you >> file1
midhun@midhun-VirtualBox:~$ cat file1
mouse
keyboard
desktop
hello nice to meet you
midhun@midhun-VirtualBox:~$
```

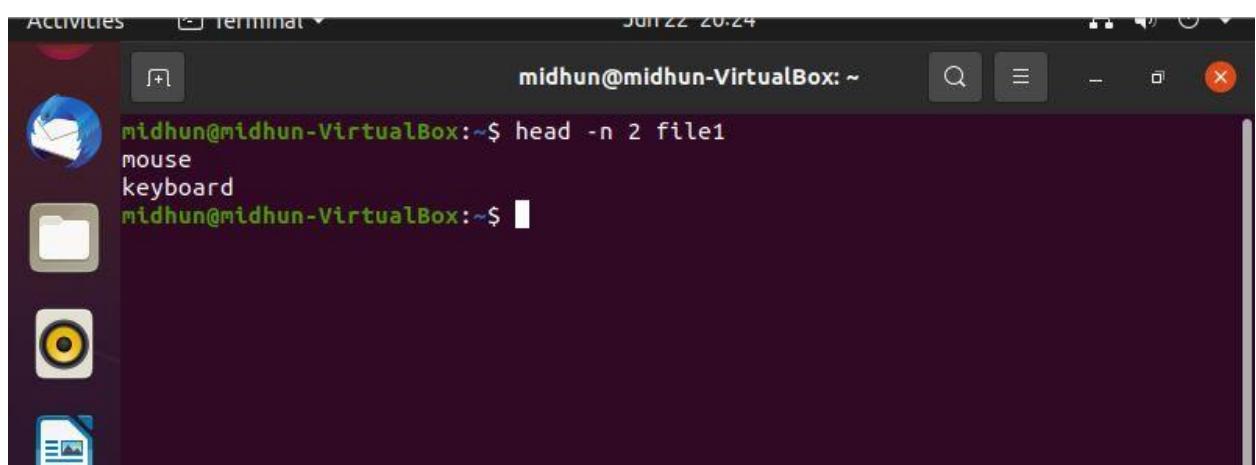
The terminal window has a standard Linux-style header with icons for search, minimize, maximize, and close. To the left of the terminal, there is a vertical dock with several icons: a mail icon, a folder icon, a target icon, a document icon, and an application icon.

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



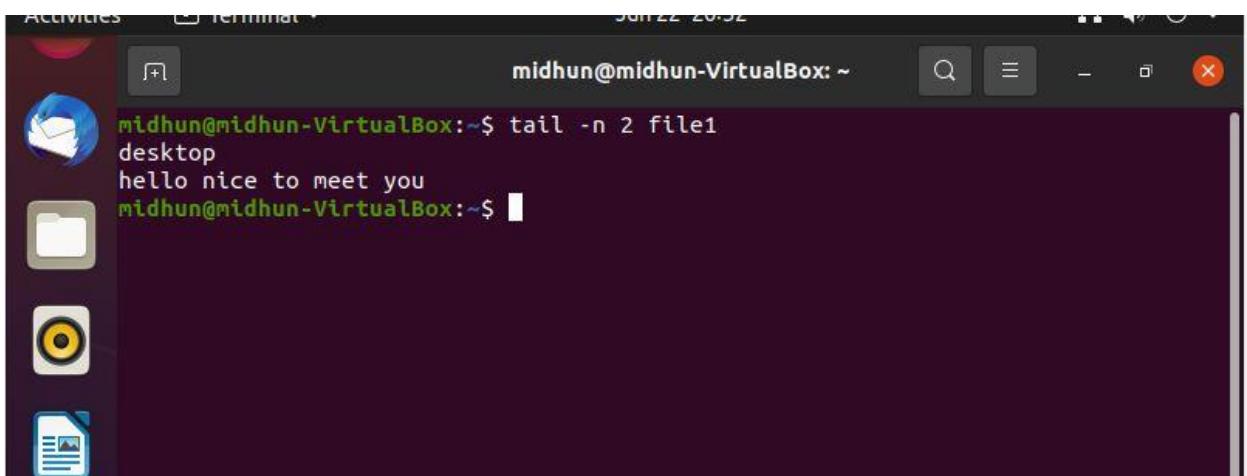
A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and a light-colored title bar. In the title bar, it says "Activities", "Terminal", and the date and time "JUN 22 20:24". The main area of the terminal shows the command "midhun@midhun-VirtualBox:~\$ head -n 2 file1" followed by the output "mouse" and "keyboard". Below the terminal window, there is a dock with several icons: a mail icon, a folder icon, a system settings icon, and a file manager icon.

```
midhun@midhun-VirtualBox:~$ head -n 2 file1
mouse
keyboard
midhun@midhun-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



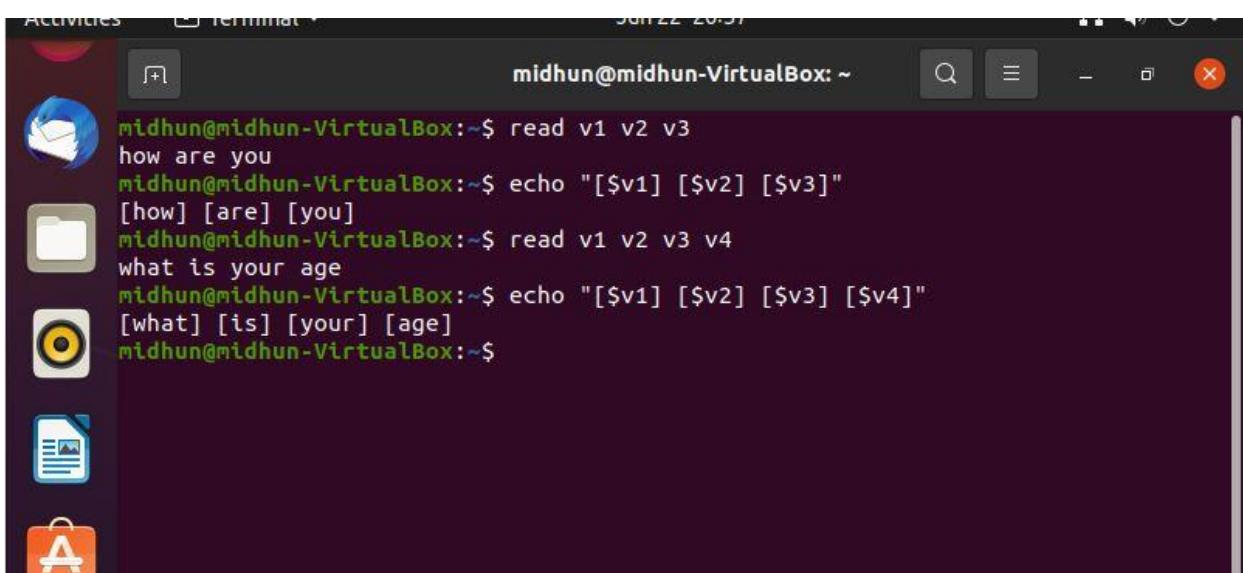
A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Activities Terminal". The terminal content shows the command "tail -n 2 file1" being run, followed by the output "desktop" and "hello nice to meet you". The terminal window has a dark theme with a light-colored text area.

```
midhun@midhun-VirtualBox:~$ tail -n 2 file1
desktop
hello nice to meet you
midhun@midhun-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 a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. It displays the following session:

```
midhun@midhun-VirtualBox:~$ read v1 v2 v3
how are you
midhun@midhun-VirtualBox:~$ echo "[\$v1] [\$v2] [\$v3]"
[how] [are] [you]
midhun@midhun-VirtualBox:~$ read v1 v2 v3 v4
what is your age
midhun@midhun-VirtualBox:~$ echo "[\$v1] [\$v2] [\$v3] [\$v4]"
[what] [is] [your] [age]
midhun@midhun-VirtualBox:~$
```

The terminal window is titled "Terminal" and is located in the "Activities" dock. To the left of the terminal, there are icons for a file, a folder, a terminal, and a document.

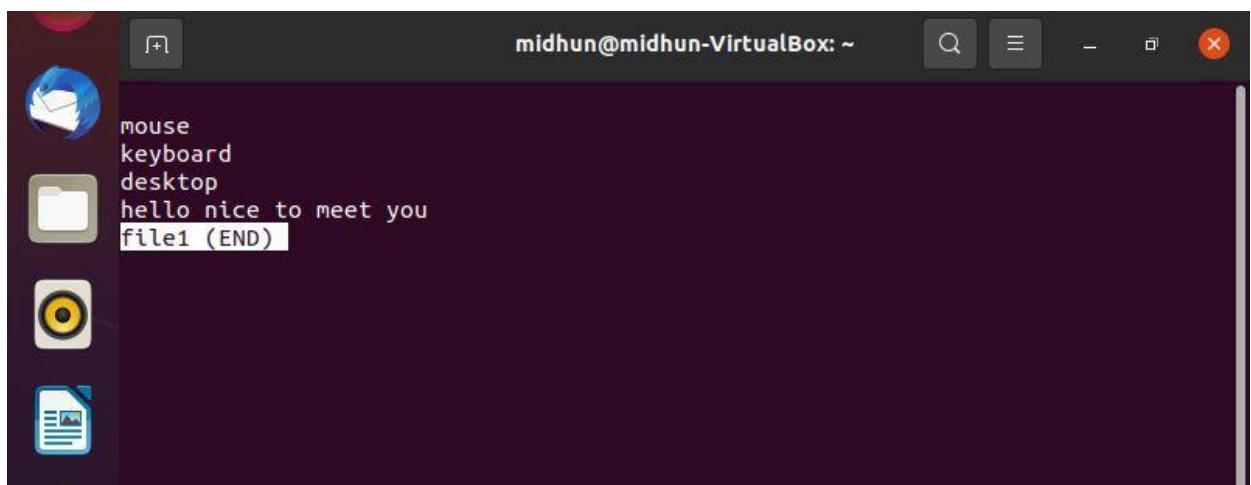
5.more

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.



A screenshot of a terminal window titled "midhun@midhun-VirtualBox: ~". The window contains the following text:

```
mouse
keyboard
desktop
hello nice to meet you
file1 (END)
```

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.

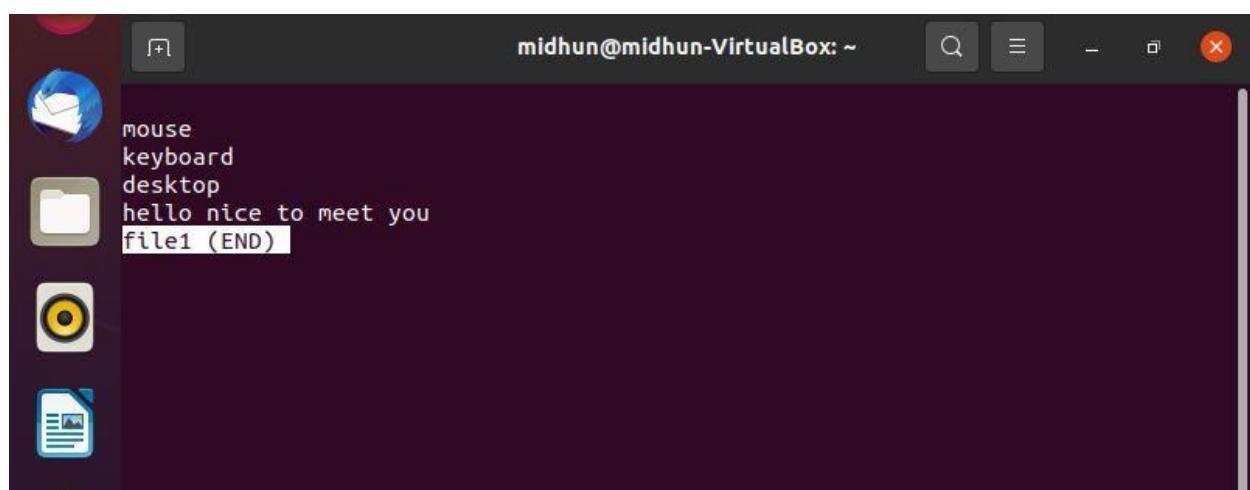
For example, if it's a large file and you are reading it using any text editor, then the complete file will be loaded to main memory, but less command don't load entire file, but load it part by part, which makes it faster.

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



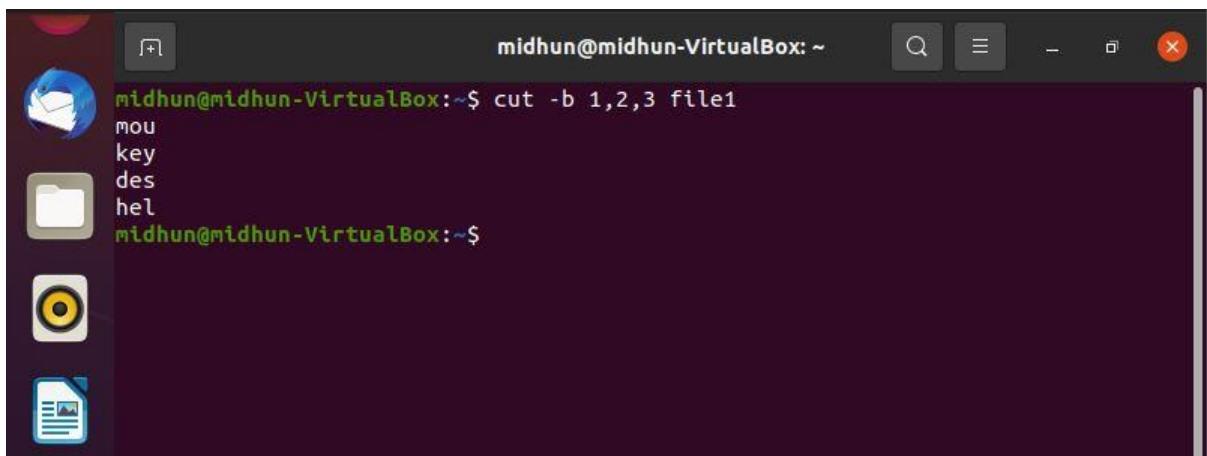
A screenshot of a terminal window titled "midhun@midhun-VirtualBox: ~". The window contains the following text:

```
mouse
keyboard
desktop
hello nice to meet you
file1 (END)
```

The text "hello nice to meet you" is highlighted with a yellow background, demonstrating the search functionality of the less command.

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.

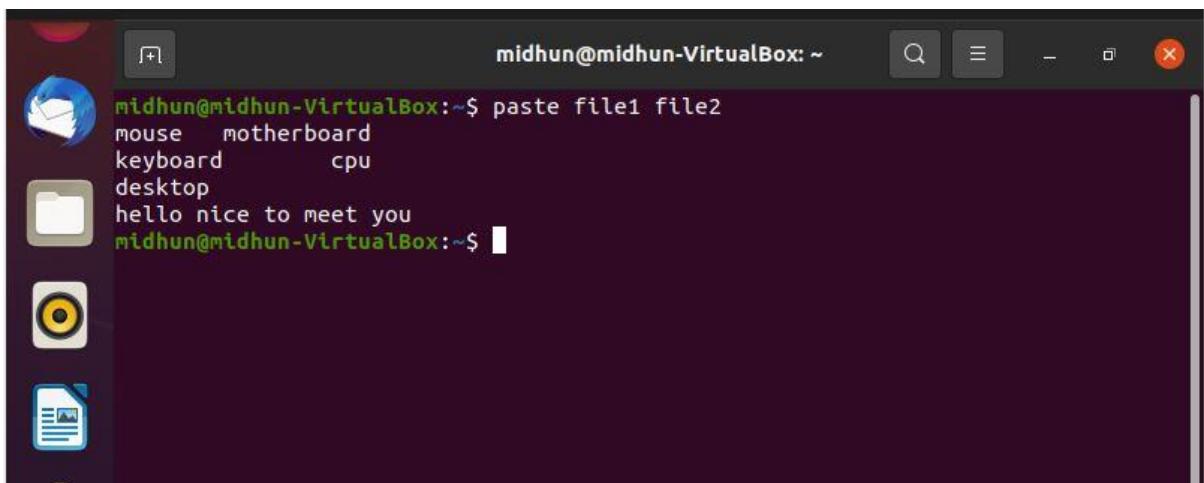


A screenshot of a Linux terminal window titled "midhun@midhun-VirtualBox: ~". The terminal shows the command "cut -b 1,2,3 file1" being run, and the output "mou key des hel" is displayed. The terminal has a dark background with light-colored text. On the left side of the terminal, there is a vertical dock containing icons for a mail application, a file manager, a terminal, and a file viewer.

```
midhun@midhun-VirtualBox:~$ cut -b 1,2,3 file1
mou
key
des
hel
midhun@midhun-VirtualBox:~$
```

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 terminal window titled "midhun@midhun-VirtualBox: ~". The terminal shows the command "paste file1 file2" being run, followed by its output:

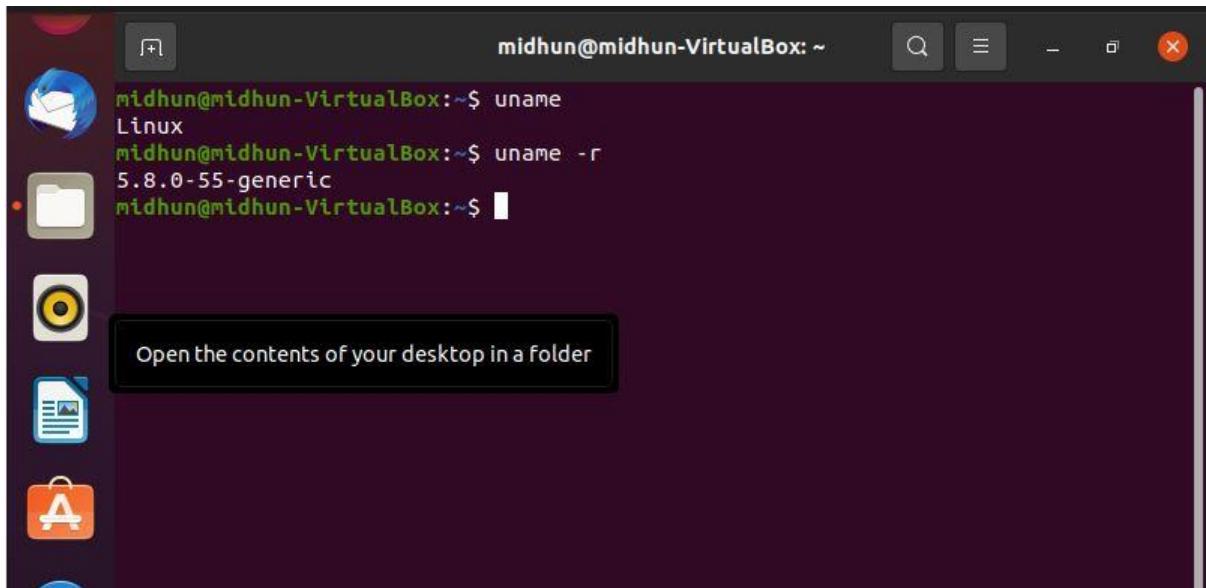
```
midhun@midhun-VirtualBox:~$ paste file1 file2
mouse    motherboard
keyboard      cpu
desktop
hello nice to meet you
midhun@midhun-VirtualBox:~$
```

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

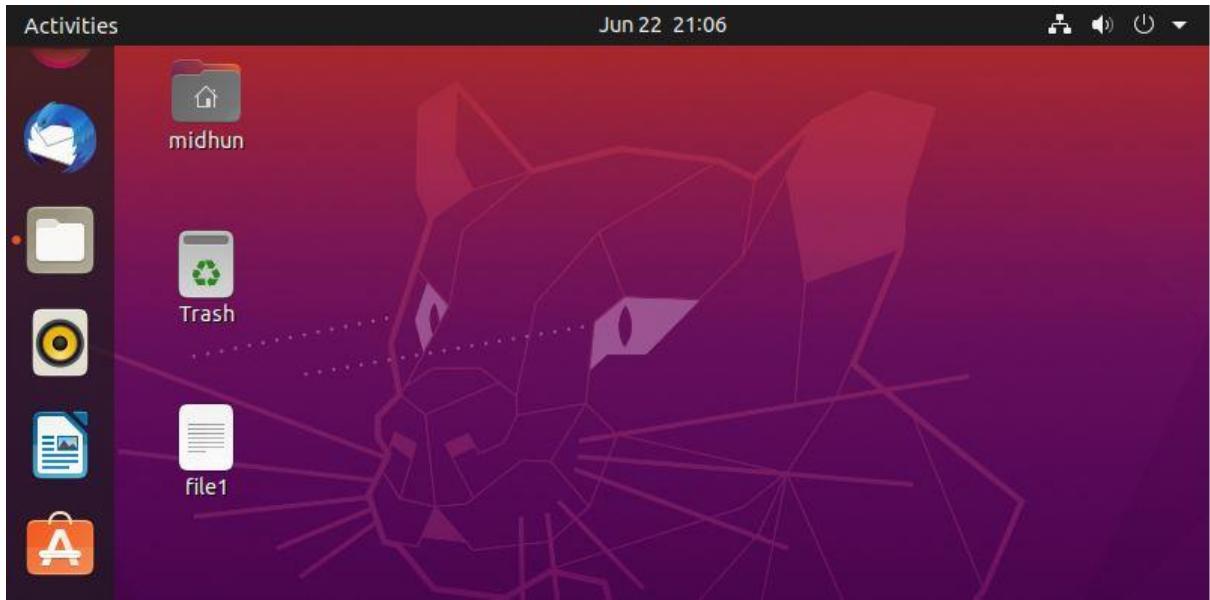
```
midhun@midhun-VirtualBox:~$ uname
Linux
midhun@midhun-VirtualBox:~$ uname -r
5.8.0-55-generic
midhun@midhun-VirtualBox:~$
```

The desktop interface includes a dock with icons for a mail client, file manager, terminal, and browser. A tooltip is visible, stating "Open the contents of your desktop in a folder".

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>



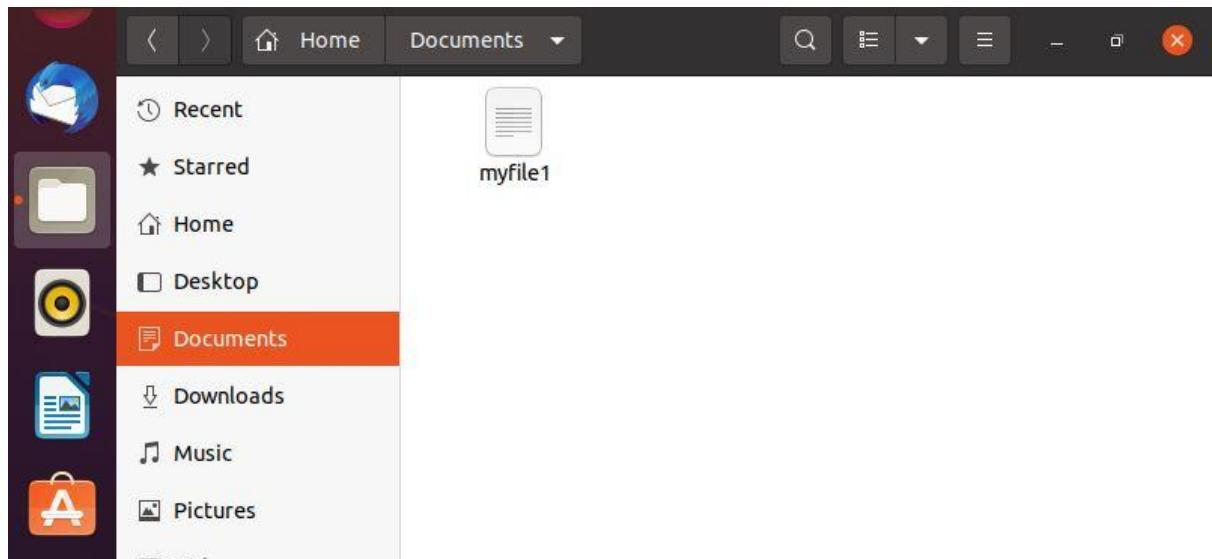
11.locate

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.

```
midhun@midhun-VirtualBox:~$ find /home/ -name file1
/home/midhun/file1
/home/midhun/Desktop/file1
midhun@midhun-VirtualBox:~$
```

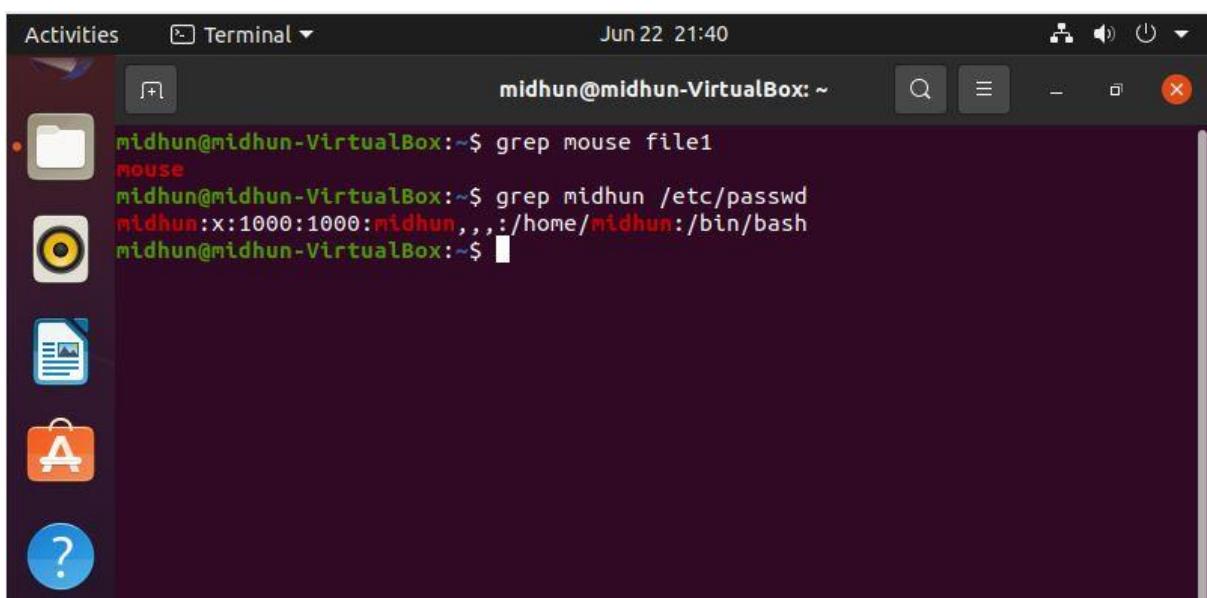
A screenshot of a terminal window. The prompt shows the user is logged in as 'midhun' on a 'VirtualBox' host. The user has run the command 'find /home/ -name file1', which has found two files: 'file1' in the user's home directory and another 'file1' in the 'Desktop' directory within their home directory. The terminal window has a dark background with light-colored text and icons.

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 showing a terminal window. The terminal window is titled 'Terminal' and has the command 'midhun@midhun-VirtualBox: ~'. The terminal displays two grep commands:
1. 'grep mouse file1' which finds the word 'mouse' in the file 'file1'.
2. 'grep midhun /etc/passwd' which shows the user entry for 'midhun' in the passwd file, including the home directory '/home/midhun' and the shell '/bin/bash'.
The desktop interface includes a dock with icons for Home, File Manager, Terminal, Dash, and Help.

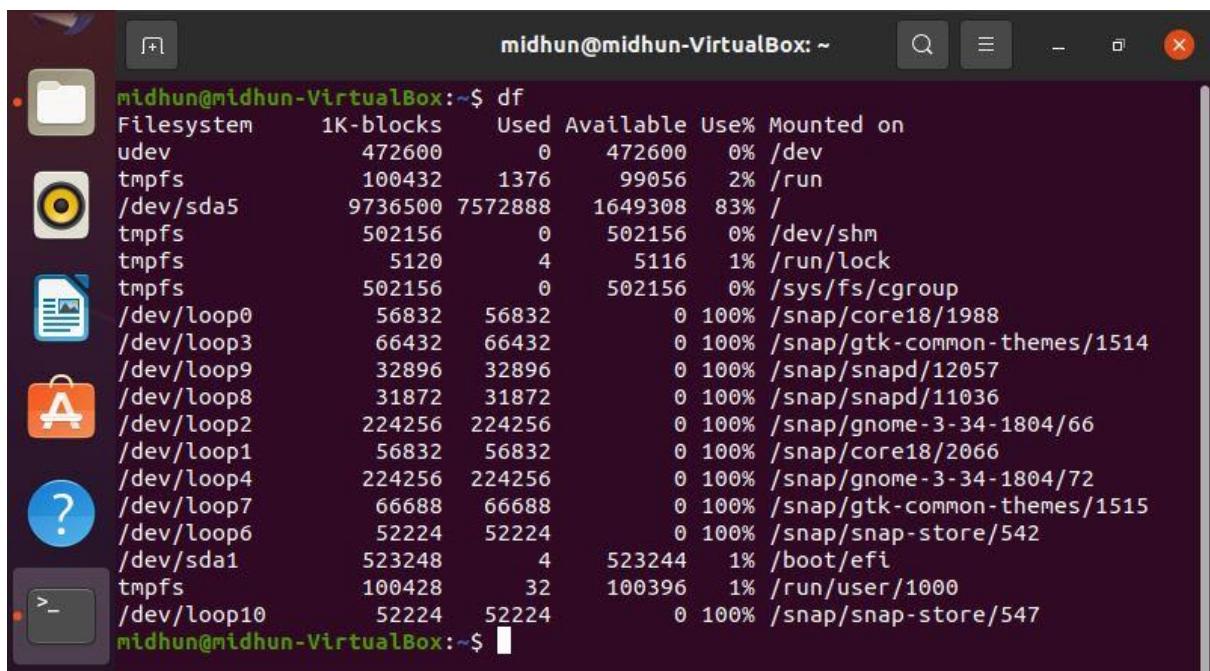
```
midhun@midhun-VirtualBox:~$ grep mouse file1
mouse
midhun@midhun-VirtualBox:~$ grep midhun /etc/passwd
midhun:x:1000:1000:midhun,,,,:/home/midhun:/bin/bash
midhun@midhun-VirtualBox:~$
```

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 terminal window titled "midhun@midhun-VirtualBox: ~". The window shows the output of the "df" command. The output is a table with the following columns: Filesystem, 1K-blocks, Used, Available, Use%, and Mounted on. The table lists various file systems, including udev, tmpfs, /dev/sda5, and several loop devices. The /dev/sda5 entry shows 9736500 1K-blocks, 7572888 used, 1649308 available, and 83% usage. The mounted on column shows paths like /, /dev/shm, /run/lock, /sys/fs/cgroup, and various snap directories.

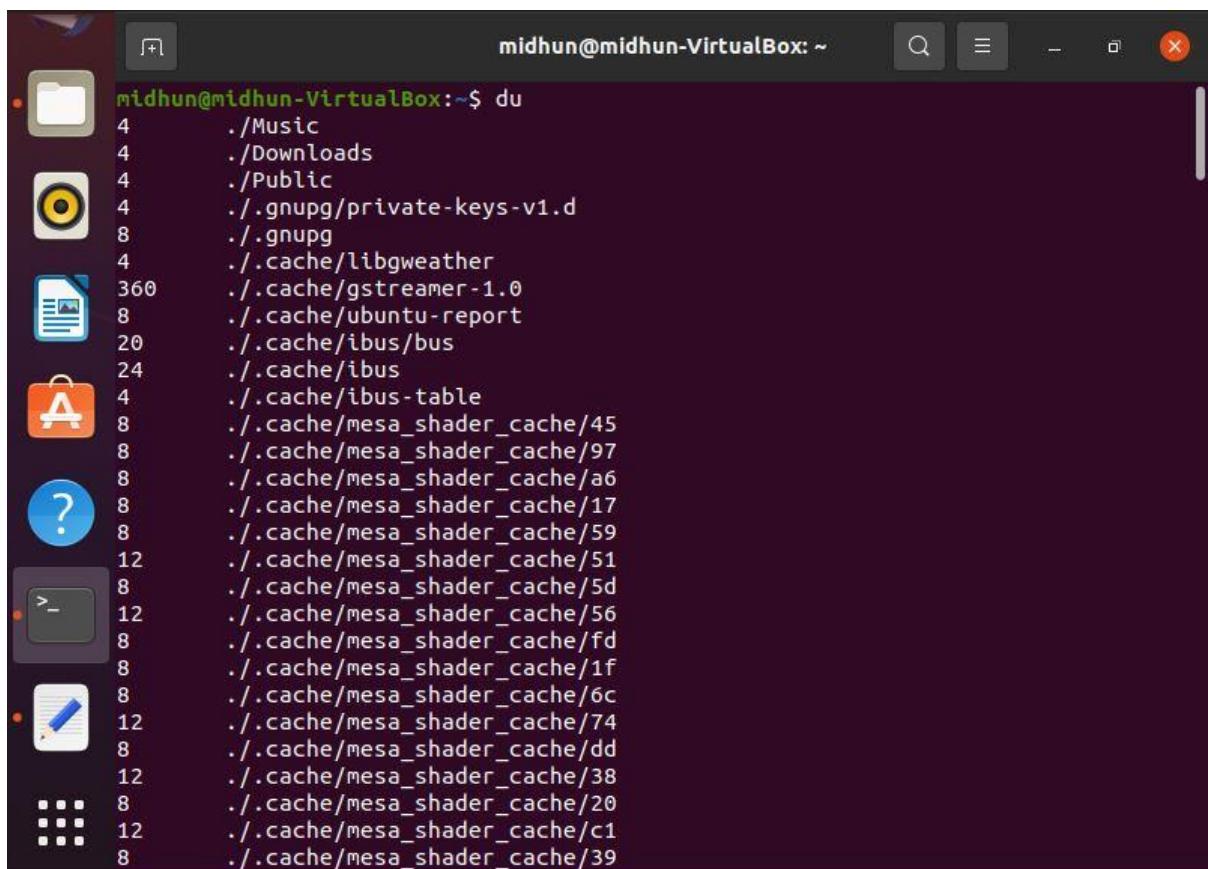
Filesystem	1K-blocks	Used	Available	Use%	Mounted on
udev	472600	0	472600	0%	/dev
tmpfs	100432	1376	99056	2%	/run
/dev/sda5	9736500	7572888	1649308	83%	/
tmpfs	502156	0	502156	0%	/dev/shm
tmpfs	5120	4	5116	1%	/run/lock
tmpfs	502156	0	502156	0%	/sys/fs/cgroup
/dev/loop0	56832	56832	0	100%	/snap/core18/1988
/dev/loop3	66432	66432	0	100%	/snap/gtk-common-themes/1514
/dev/loop9	32896	32896	0	100%	/snap/snapd/12057
/dev/loop8	31872	31872	0	100%	/snap/snapd/11036
/dev/loop2	224256	224256	0	100%	/snap/gnome-3-34-1804/66
/dev/loop1	56832	56832	0	100%	/snap/core18/2066
/dev/loop4	224256	224256	0	100%	/snap/gnome-3-34-1804/72
/dev/loop7	66688	66688	0	100%	/snap/gtk-common-themes/1515
/dev/loop6	52224	52224	0	100%	/snap/snap-store/542
/dev/sda1	523248	4	523244	1%	/boot/efi
tmpfs	100428	32	100396	1%	/run/user/1000
/dev/loop10	52224	52224	0	100%	/snap/snap-store/547

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.



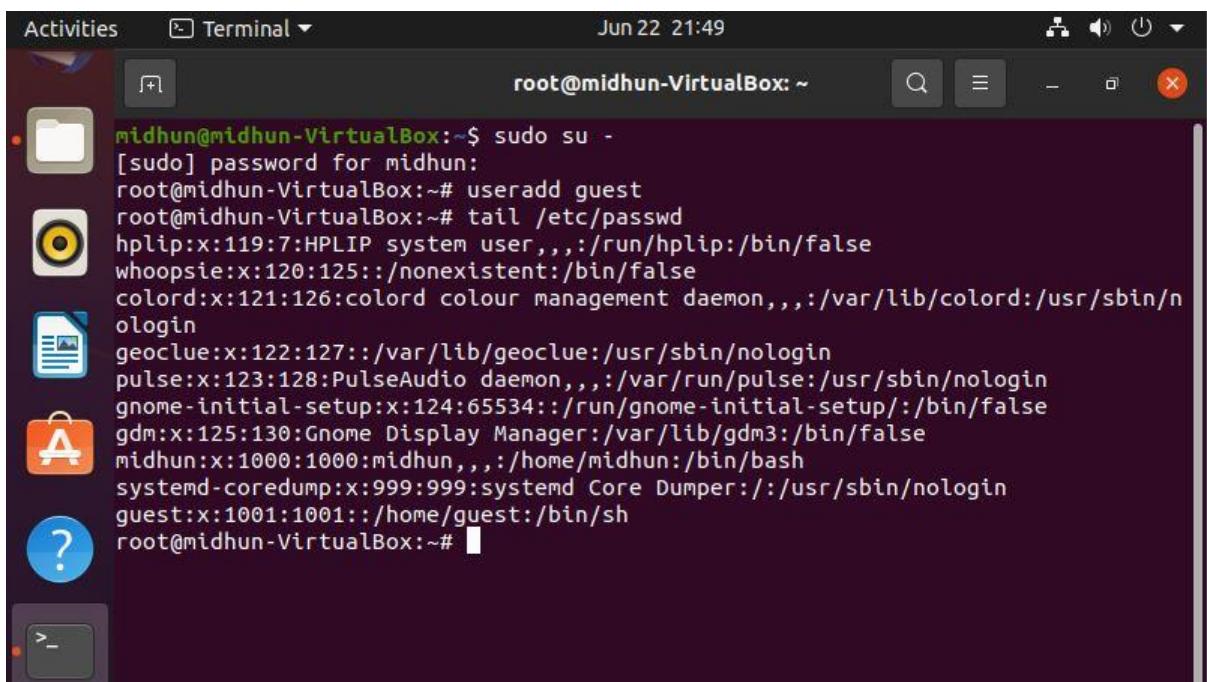
A screenshot of a terminal window titled "midhun@midhun-VirtualBox: ~". The window shows the command "du" being run, which lists the disk usage for various directories. The output is as follows:

```
midhun@midhun-VirtualBox:~$ du
4      ./Music
4      ./Downloads
4      ./Public
4      ./gnupg/private-keys-v1.d
8      ./gnupg
4      ./cache/libgweather
360     ./cache/gstreamer-1.0
8      ./cache/ubuntu-report
20     ./cache/ibus/bus
24     ./cache/ibus
4      ./cache/ibus-table
8      ./cache/mesa_shader_cache/45
8      ./cache/mesa_shader_cache/97
8      ./cache/mesa_shader_cache/a6
8      ./cache/mesa_shader_cache/17
8      ./cache/mesa_shader_cache/59
12     ./cache/mesa_shader_cache/51
8      ./cache/mesa_shader_cache/5d
12     ./cache/mesa_shader_cache/56
8      ./cache/mesa_shader_cache/fd
8      ./cache/mesa_shader_cache/1f
8      ./cache/mesa_shader_cache/6c
12     ./cache/mesa_shader_cache/74
8      ./cache/mesa_shader_cache/dd
12     ./cache/mesa_shader_cache/38
8      ./cache/mesa_shader_cache/20
12     ./cache/mesa_shader_cache/c1
8      ./cache/mesa_shader_cache/39
```

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.



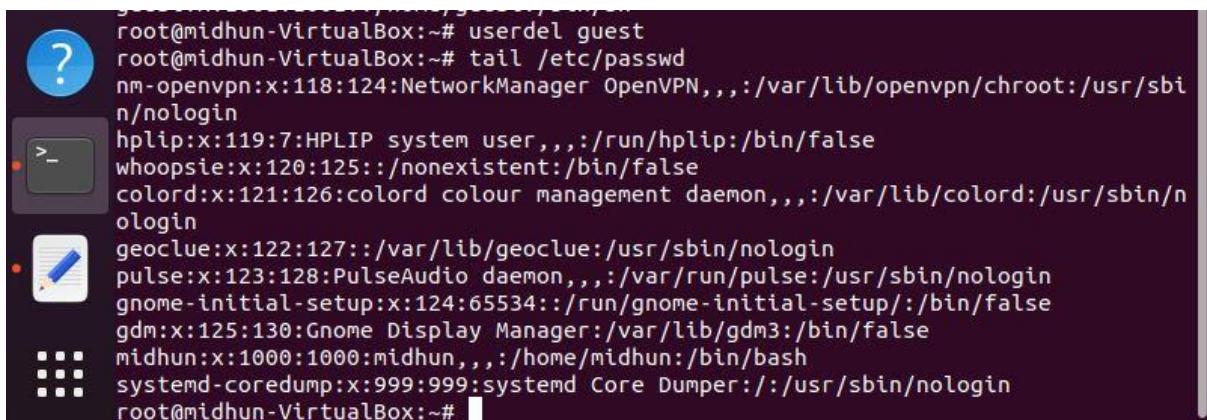
The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Terminal" and the prompt is "root@midhun-VirtualBox: ~". The terminal displays the following command and its output:

```
midhun@midhun-VirtualBox:~$ sudo su -
[sudo] password for midhun:
root@midhun-VirtualBox:~# useradd guest
root@midhun-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
midhun:x:1000:1000:midhun,,,:/home/midhun:/bin/bash
systemd-coredump:x:999:999:system Core Dumper:/:/usr/sbin/nologin
guest:x:1001:1001::/home/guest:/bin/sh
root@midhun-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.



```
root@midhun-VirtualBox:~# userdel guest
root@midhun-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
midhun:x:1000:1000:midhun,,,:/home/midhun:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
root@midhun-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: sudovisudo. 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.

Activities Terminal Jun 22 21:52

```
midhun@midhun-VirtualBox:~$ sudo useradd guest
midhun@midhun-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
midhun:x:1000:1000:midhun,,,:/home/midhun:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
guest:x:1001:1001::/home/guest:/bin/sh
midhun@midhun-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.

```
cp file1.txt Desktop/  
mv file1.txt Documents/
```

20. passwd

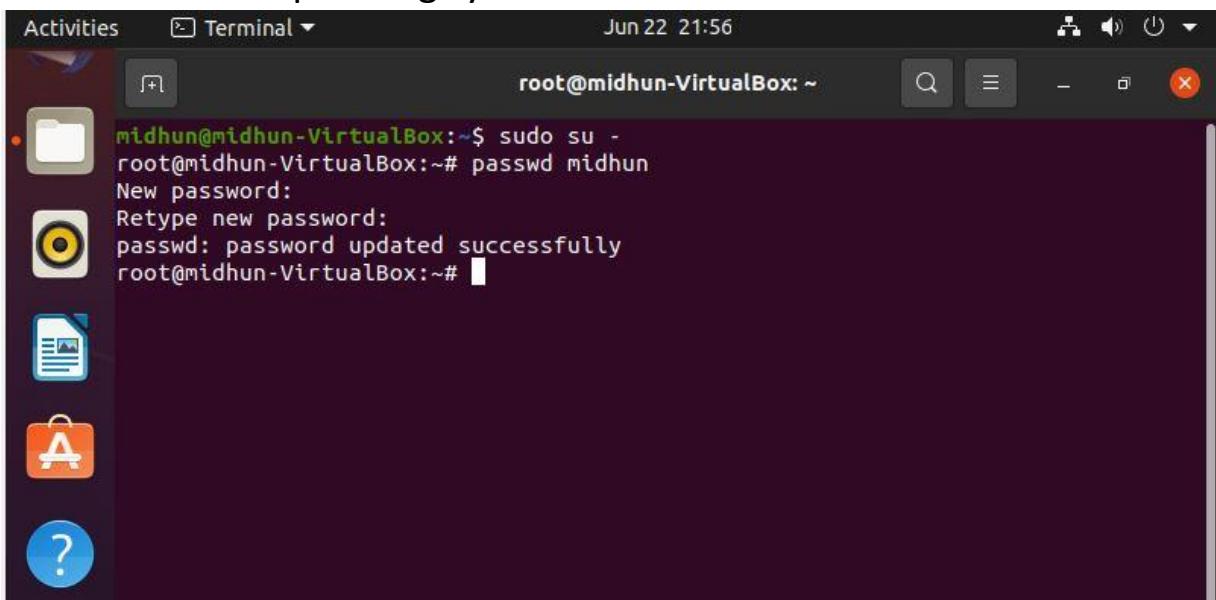
The passwd command changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account. passwd also changes the account or associated password validity period.

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 is a dock with icons for Home, Dash, Files, Activities, Terminal, and Help. The main window is a terminal window titled 'Terminal'. The title bar shows 'root@midhun-VirtualBox: ~' and the date 'Jun 22 21:56'. The terminal content is:

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

```
midhun@midhun-VirtualBox:~/Desktop$ usermod -u 2000 midhun
usermod: user midhun is currently used by process 746
midhun@midhun-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.

```
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd amruta1
groupadd: group 'amruta1' already exists
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd amruta2
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd amruta3
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd amruta4
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd amruta5
midhun@midhun-VirtualBox:~/Desktop$ compgen -g amruta
amruta1
amruta2
amruta3
amruta4
amruta5
```

3. groups

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

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

```
midhun@midhun-VirtualBox:~/Desktop$ compgen -g amruta
amruta1
amruta2
amruta3
amruta4
amruta5
midhun@midhun-VirtualBox:~/Desktop$ sudo groupdel amruta2
midhun@midhun-VirtualBox:~/Desktop$ compgen -g amruta
amruta1
amruta3
amruta4
amruta5
midhun@midhun-VirtualBox:~/Desktop$ █
```

5. groupmod

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

```
midhun@midhun-VirtualBox:~/Desktop$ sudo groupdel amruta2
midhun@midhun-VirtualBox:~/Desktop$ compgen -g amruta
amruta1
amruta3
amruta4
amruta5
midhun@midhun-VirtualBox:~/Desktop$ sudo groupmod -n new_group amruta3
midhun@midhun-VirtualBox:~/Desktop$ compgen -g midhun
midhun
midhun@midhun-VirtualBox:~/Desktop$ compgen -g amruta
amruta1
amruta4
amruta5
midhun@midhun-VirtualBox:~/Desktop$ compgen -g new_group
new_group
midhun@midhun-VirtualBox:~/Desktop$ █
```

6. chmod

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

```
midhun@midhun-VirtualBox:~/Desktop$ chmod +rwx file1  
midhun@midhun-VirtualBox:~/Desktop$
```

7. chown

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

```
midhun@midhun-VirtualBox:~/Desktop$ chown midhun file1  
midhun@midhun-VirtualBox:~/Desktop$
```

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.

```
midhun@midhun-VirtualBox:~/Desktop$ id midhun  
uid=1000(midhun) gid=1000(midhun) groups=1000(midhun),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.

```
midhun@midhun-VirtualBox:~/Desktop$ ps -a  
 PID TTY      TIME CMD  
 783 tty2    00:00:09 Xorg  
 896 tty2    00:00:00 gnome-session-b  
2432 pts/0    00:00:00 ps
```

10. top

- top command is used to show the Linux processes.

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

top - 15:33:01 up 38 min, 1 user, load average: 0.02, 0.03, 0.10												
Tasks: 169 total, 1 running, 168 sleeping, 0 stopped, 0 zombie												
%Cpu(s): 5.9 us, 1.7 sy, 0.0 ni, 64.4 id, 28.0 wa, 0.0 hi, 0.0 si, 0.0 st												
MiB Mem : 980.8 total, 65.9 free, 596.6 used, 318.2 buff/cache												
MiB Swap: 448.5 total, 311.9 free, 136.6 used. 232.8 avail Mem												
PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND	
1033	midhun	20	0	3419348	219276	61088	S	7.6	21.8	0:33.32	gnome++	
10	root	20	0	0	0	0	I	0.3	0.0	0:02.13	rcu_sc+	
783	midhun	20	0	539000	33480	18788	S	0.3	3.3	0:10.12	Xorg	
1961	midhun	20	0	823084	38324	25948	S	0.3	3.8	0:04.96	gnome++	
2434	midhun	20	0	20488	3632	3120	R	0.3	0.4	0:00.05	top	
1	root	20	0	168796	10684	6908	S	0.0	1.1	0:09.40	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+	
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_per+	
9	root	20	0	0	0	0	S	0.0	0.0	0:00.55	ksoftti+	
11	root	rt	0	0	0	0	S	0.0	0.0	0:00.04	migrat+	
12	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	kaudittd	
21	root	20	0	0	0	0	S	0.0	0.0	0:00.00	khungt+	

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.

```
midhun@midhun-VirtualBox:~/Desktop$ cat >> fruits
apple
mango
grape

^C
midhun@midhun-VirtualBox:~/Desktop$ cat fruits
apple
mango
grape

midhun@midhun-VirtualBox:~/Desktop$ wc fruits
 5 3 20 fruits
midhun@midhun-VirtualBox:~/Desktop$ wc -l fruits
5 fruits
midhun@midhun-VirtualBox:~/Desktop$ wc -w fruits
3 fruits
midhun@midhun-VirtualBox:~/Desktop$ wc -c fruits
20 fruits
midhun@midhun-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

```
midhun@midhun-VirtualBox:~/Desktop$ ls
file1 fruits vegetables
midhun@midhun-VirtualBox:~/Desktop$ tar cf archive.tar fruits vegetables
midhun@midhun-VirtualBox:~/Desktop$ ls archive.tar
archive.tar
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar file1 fruits vegetables
midhun@midhun-VirtualBox:~/Desktop$ tar tf archive.tar
fruits
vegetables/
midhun@midhun-VirtualBox:~/Desktop$ mkdir extract
midhun@midhun-VirtualBox:~/Desktop$ cd extract
midhun@midhun-VirtualBox:~/Desktop/extract$ pwd
/home/midhun/Desktop/extract
midhun@midhun-VirtualBox:~/Desktop/extract$ tar xf /home/midhun/archive.tar
tar: /home/midhun/archive.tar: Cannot open: No such file or directory
tar: Error is not recoverable: exiting now
midhun@midhun-VirtualBox:~/Desktop/extract$ xf /home/midhun/Desktop/archive.tar
xf: command not found
midhun@midhun-VirtualBox:~/Desktop/extract$ tar xf /home/midhun/Desktop/archive.tar
fruits vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ sudo tar czf mca1.tar.gz /etc
[sudo] password for midhun:
tar: Removing leading `/' from member names
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$
```

Compressing files using gzip, bz2, xz

```
midhun@midhun-VirtualBox:~/Desktop/extract$ tar xf /home/midhun/Desktop/archive
.tar
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ sudo tar czf mca1.tar.gz /etc
[sudo] password for midhun:
tar: Removing leading `/' from member names
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ cd..
cd..: command not found
midhun@midhun-VirtualBox:~/Desktop/extract$ cd ..
midhun@midhun-VirtualBox:~/Desktop$ cd midhun
bash: cd: midhun: No such file or directory
midhun@midhun-VirtualBox:~/Desktop$ cd extract
midhun@midhun-VirtualBox:~/Desktop/extract$ sudo tar cjf regmca.tar.gz /etc
tar: Removing leading `/' from member names
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz regmca.tar.gz vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ sudo tar cJf regmca.tar.bzz fruits
vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz regmca.tar.bzz regmca.tar.gz vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ sudo tar cJf regmca.tar.bzz fruits
vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ ls
fruits mca1.tar.gz regmca.tar.bzz regmca.tar.bzz regmca.tar.gz vegetables
midhun@midhun-VirtualBox:~/Desktop/extract$ mkdir lab
midhun@midhun-VirtualBox:~/Desktop/extract$
```

Extracting using gz

```
midhun@midhun-VirtualBox:~/Desktop/extract$ mkdir lab
midhun@midhun-VirtualBox:~/Desktop/extract$ cd lab
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ ls
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ pwd
/home/midhun/Desktop/extract/lab
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ tar xzf ^C
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ tar xzf /home/midhun/extract/mca1.tar.gz
tar (child): /home/midhun/extract/mca1.tar.gz: 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
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ tar xzf /home/midhun/Desktop/extract/mca1.tar.gz
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ ls
etc
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ ls etc
acpi          host.conf      popularity-contest.conf
adduser.conf   hostid        ppp
alsa          hostname      profile
alternatives   hosts         profile.d
anacrontab    hosts.allow   protocols
apg.conf       hosts.deny   pulse
apm           hp            python3
apparmor      ifplugd      python3.8
apparmor.d    init          rc0.d
apport         init.d       rc1.d
appstream.conf initramfs-tools rc2.d
```

Extracting using bz2

```
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ tar xJf /home/midhun/Desktop/extract/regmca.tar.bz2
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ ls
etc fruits vegetables
midhun@midhun-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.

```
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits
apple
mango
grape

midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits |head -4
apple
mango
grape

midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits |head -2
apple
mango
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits |head -2| tail -3
apple
mango
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits
apple
mango
grape

midhun@midhun-VirtualBox:~/Desktop/extract/lab$ cat fruits |head -2| tail -5
```

5. ssh

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

```
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ sudo apt install openssh-client
[sudo] password for midhun:
Reading package lists... Done
Building dependency tree
Reading state information... Done
openSSH-client is already the newest version (1:8.2p1-4ubuntu0.2).
openSSH-client set to manually installed.
The following package was automatically installed and is no longer required:
  distro-info
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 41 not upgraded.
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ ssh localhost
ssh: connect to host localhost port 22: Connection refused
midhun@midhun-VirtualBox:~/Desktop/extract/lab$ sudo apt install openssh-server
ii
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  distro-info
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ii ncurses-term openssh-server openssh-sftp-server ssh-import-id
```

```
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/eQYLwaR+NEA9TqVKOUc9HbWVTnA root@midhun-VirtualBox
(RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:QoDt27vsoDvJY340FwilN7Fn7pkKNOUqJIsUQqfqWxY 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.

Q.No Questions

1. Lab Assignment Managing Files, Creating Users and Groups Using Command-line tools

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

b. Create six files with name of the form snapX.mp3

c. Create six files with name of the form filmX.mp3 (In each set, replace X with the numbers 1 through 6)

```
midhun@midhun-VirtualBox:~/Desktop$ touch song2.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch song.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch song3.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch song4.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch song5.mp3
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar  file1  song2.mp3  song4.mp3  song.mp3
extract      fruits  song3.mp3  song5.mp3  vegetables
midhun@midhun-VirtualBox:~/Desktop$ █
```

```
midhun@midhun-VirtualBox:~/Desktop$ touch snap1.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch snap2.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch film1.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch film2.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch film3.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch film4.mp3
midhun@midhun-VirtualBox:~/Desktop$ touch film5.mp3
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar  film1.mp3  film4.mp3  snap1.mp3  snap4.mp3  song3.mp3  song.mp3
extract      film2.mp3  film5.mp3  snap2.mp3  snap5.mp3  song4.mp3  vegetables
file1       film3.mp3  fruits    snap3.mp3  song2.mp3  song5.mp3
midhun@midhun-VirtualBox:~/Desktop$ █
```

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.

```
midhun@midhun-VirtualBox:~/Desktop$ mv song.mp3 ./Music/
midhun@midhun-VirtualBox:~/Desktop$ mv song3.mp3 ./Music/
mv: missing destination file operand after 'song3.mp3./Music/'
Try 'mv --help' for more information.
midhun@midhun-VirtualBox:~/Desktop$ mv song3.mp3 ./Music/
midhun@midhun-VirtualBox:~/Desktop$ mv song4.mp3 ./Music/
midhun@midhun-VirtualBox:~/Desktop$ mv song5.mp3 ./Music/
midhun@midhun-VirtualBox:~/Desktop$ ls -R Music
Music:
song2.mp3 song3.mp3 song4.mp3 song5.mp3 song.mp3
midhun@midhun-VirtualBox:~/Desktop$ mv snap1.mp3 ./Pictures/
midhun@midhun-VirtualBox:~/Desktop$ mv snap2.mp3 ./Pictures/
midhun@midhun-VirtualBox:~/Desktop$ mv snap3.mp3 ./Pictures/
midhun@midhun-VirtualBox:~/Desktop$ mv snap4.mp3 ./Pictures/
midhun@midhun-VirtualBox:~/Desktop$ mv snap5.mp3 ./Pictures/
midhun@midhun-VirtualBox:~/Desktop$ ls -R Pictures
Pictures:
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3
midhun@midhun-VirtualBox:~/Desktop$ mv film1.mp3 ./Videos/
midhun@midhun-VirtualBox:~/Desktop$ mv film2.mp3 ./Videos/
midhun@midhun-VirtualBox:~/Desktop$ mv film3.mp3 ./Videos/
midhun@midhun-VirtualBox:~/Desktop$ mv Film4.mp3 ./Videos/
mv: cannot stat 'Film4.mp3': No such file or directory
midhun@midhun-VirtualBox:~/Desktop$ mv film4.mp3 ./Videos/
midhun@midhun-VirtualBox:~/Desktop$ mv film5.mp3 ./Videos/
midhun@midhun-VirtualBox:~/Desktop$ ls -R Videos
Videos:
film1.mp3 film2.mp3 film3.mp3 film4.mp3 film5.mp3
midhun@midhun-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.

```
midhun@midhun-VirtualBox:~/Desktop$ mkdir {friends,family,work}
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar family friends Music vegetables work
extract file1 fruits Pictures Videos
midhun@midhun-VirtualBox:~/Desktop$ █
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ mkdir {friends,family,work}
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar family friends Music vegetables work
extract file1 fruits Pictures Videos
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song1.mp3 friends
cp: cannot stat 'Music/song1.mp3': No such file or directory
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song.mp3 friends
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song2.mp3 friends
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song3.mp3 friends
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song4.mp3 friends
midhun@midhun-VirtualBox:~/Desktop$ cp Music/song5.mp3 friends
midhun@midhun-VirtualBox:~/Desktop$ ls -R friends
friends:
song2.mp3 song3.mp3 song4.mp3 song5.mp3 song.mp3
midhun@midhun-VirtualBox:~/Desktop$ cp Pictures/snap1.mp3 family
midhun@midhun-VirtualBox:~/Desktop$ cp Pictures/snap2.mp3 family
midhun@midhun-VirtualBox:~/Desktop$ cp Pictures/snap3.mp3 family
midhun@midhun-VirtualBox:~/Desktop$ cp Pictures/snap4.mp3 family
midhun@midhun-VirtualBox:~/Desktop$ cp Pictures/snap5.mp3 family
midhun@midhun-VirtualBox:~/Desktop$ ls -R family
family:
snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3
```

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

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

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

```
midhun@midhun-VirtualBox:~/Desktop$ rm -r family friends
midhun@midhun-VirtualBox:~/Desktop$ ls
archive.tar extract file1 fruits Music Pictures vegetables Videos work
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ ls -al>allfiles.txt
midhun@midhun-VirtualBox:~/Desktop$ ls
allfiles.txt  extract  fruits  Pictures  Videos
archive.tar  file1    Music   vegetables work
midhun@midhun-VirtualBox:~/Desktop$ ls -al
total 56
drwxr-xr-x  8 midhun midhun  4096 Aug 17 21:35 .
drwxr-xr-x 16 midhun midhun  4096 Aug 13 16:57 ..
-rw-rw-r--  1 midhun midhun   662 Aug 17 21:35 allfiles.txt
-rw-rw-r--  1 midhun midhun 10240 Aug 13 15:57 archive.tar
drwxrwxr-x  4 midhun midhun  4096 Aug 13 16:12 extract
-rwxrwxr-x  1 midhun midhun    46 Jun 22 20:58 file1
-rw-rw-r--  1 midhun midhun   20 Aug 13 15:52 fruits
drwxrwxr-x  2 midhun midhun  4096 Aug 17 21:10 Music
drwxrwxr-x  2 midhun midhun  4096 Aug 17 21:12 Pictures
drwxrwxr-x  2 midhun midhun  4096 Aug 13 15:46 vegetables
drwxrwxr-x  2 midhun midhun  4096 Aug 17 21:16 Videos
drwxrwxr-x  2 midhun midhun  4096 Aug 17 21:21 work
midhun@midhun-VirtualBox:~/Desktop$
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ date
Tuesday 17 August 2021 09:36:15 PM IST
```

9. Add the user Juliet

```
midhun@midhun-VirtualBox:~/Desktop$ sudo useradd juliet
[sudo] password for midhun:
midhun@midhun-VirtualBox:~/Desktop$
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ cat /etc/passwd
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ sudo passwd juliet
[sudo] password for midhun:
New password:
Retype new password:
passwd: password updated successfully
midhun@midhun-VirtualBox:~/Desktop$
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd -g 30000 shakespeare
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd -g 50000 artists
```

13. Create a supplementary group called artists.

```
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd -g 30000 shakespeare
midhun@midhun-VirtualBox:~/Desktop$ sudo groupadd -g 50000 artists
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,midhun
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:midhun
floppy:x:25:
tape:x:26:
sudo:x:27:midhun
audio:x:29:pulse
dip:x:30:midhun
www-data:x:33:
backup:x:34:
operator:x:37:
list:x:38:
irc:x:39:
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ sudo usermod -a -G shakespeare juliet
midhun@midhun-VirtualBox:~/Desktop$ groups juliet
juliet : juliet shakespeare
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ id juliet
uid=1001(juliet) gid=1006(juliet) groups=1006(juliet),30000(shakespeare)
midhun@midhun-VirtualBox:~/Desktop$
```

17. Add Romeo and Hamlet to the Shakespeare group

```
midhun@midhun-VirtualBox:~/Desktop$ sudo usermod -a -G shakespeare romeo
midhun@midhun-VirtualBox:~/Desktop$ sudo usermod -a -G shakespeare hamlet
midhun@midhun-VirtualBox:~/Desktop$ groups romeo
romeo : romeo shakespeare
midhun@midhun-VirtualBox:~/Desktop$ groups hamlet
hamlet : hamlet shakespeare
```

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

```
midhun@midhun-VirtualBox:~/Desktop$ sudo usermod -a -G artists reba
midhun@midhun-VirtualBox:~/Desktop$ sudo usermod -a -G artists dolly
midhun@midhun-VirtualBox:~/Desktop$ groups reba
reba : reba artists
midhun@midhun-VirtualBox:~/Desktop$ groups dolly
dolly : dolly artists
midhun@midhun-VirtualBox:~/Desktop$
```

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

```
bluetooth:x:112:
ssl-cert:x:113:
uidd:x:114:
tcpdump:x:115:
avahi-autoipd:x:116:
rtkit:x:117:
ssh:x:118:
netdev:x:119:
lpadmin:x:120:midhun
avahi:x:121:
scanner:x:122:saned
saned:x:123:
nm-openvpn:x:124:
whoopsie:x:125:
colord:x:126:
geoclue:x:127:
pulse:x:128:
pulse-access:x:129:
gdm:x:130:
lxde:x:131:midhun
midhun:x:1000:
sambashare:x:132:midhun
systemd-coredump:x:999:
mlocate:x:133:
amruta1:x:1001:
```

20. Attempt to remove user Dolly.

```
midhun@midhun-VirtualBox:~/Desktop$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,midhun
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
kmem:x:15:
dialout:x:20:
fax:x:21:
voice:x:22:
cdrom:x:24:midhun
floppy:x:25:
tape:x:26:
sudo:x:27:midhun
audio:x:29:pulse
dip:x:30:midhun
www-data:x:33:
```

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.

```
midhun@midhun-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=38.5 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=2 ttl=55 time=36.1 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=3 ttl=55 time=36.2 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=4 ttl=55 time=37.5 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=5 ttl=55 time=36.6 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=6 ttl=55 time=36.8 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=7 ttl=55 time=36.5 ms
64 bytes from edge-star-mini-shv-01-bom1.facebook.com (157.240.16.35): icmp_seq
=8 ttl=55 time=36.1 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
```

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.

```
midhun@midhun-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)  0.489 ms  0.376 ms  0.333 ms
2 * * *
3 * * *
4 * * *
5 * * *
```

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.

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

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

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.

```
midhun@midhun-VirtualBox:~/Desktop$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0 0.0.0.0:ssh              0.0.0.0:*
tcp     0      0 localhost:ipp             0.0.0.0:*
tcp     0      0 localhost:mysql            0.0.0.0:*
tcp     0      0 localhost:domain           0.0.0.0:*
tcp6    0      0 [::]:ssh                 [::]:*
tcp6    0      0 ip6-localhost:ipp          [::]:*
tcp6    0      0 [::]:http                [::]:*
udp     0      0 0.0.0.0:45963            0.0.0.0:*
udp     0      0 localhost:domain           0.0.0.0:*
udp     0      0 0.0.0.0:631              0.0.0.0:*
udp     0      0 0.0.0.0:mdns              0.0.0.0:*
udp6   0      0 [::]:46217               [::]:*
```

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.

```
midhun@midhun-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
```

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.

```
midhun@midhun-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::5e9e:60dd:394f:4de7 prefixlen 64 scopeid 0x20<link>
              ether 08:00:27:1d:d7:c5 txqueuelen 1000 (Ethernet)
              RX packets 509 bytes 312563 (312.5 KB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 589 bytes 56749 (56.7 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 275 bytes 22397 (22.3 KB)
              RX errors 0 dropped 0 overruns 0 frame 0
              TX packets 275 bytes 22397 (22.3 KB)
              TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

WINDOWS

1. ping

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\hp>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=35ms 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
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 = 35ms, Average = 34ms

C:\Users\hp>
```

2. route

```
C:\Users\hp>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.
```

3. tracert

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

Tracing route to star-mini.c10r.facebook.com [157.240.15.35]
over a maximum of 30 hops:

 1   1 ms    1 ms    1 ms  192.168.18.1
 2   3 ms    3 ms    3 ms  100.65.128.1
 3   3 ms    5 ms    3 ms  192.168.20.5
 4   4 ms    4 ms    4 ms  182.73.157.189
 5   47 ms   50 ms   53 ms  182.79.135.16
 6   50 ms   50 ms   51 ms  ae20.pr02.sin6.tfbnw.net [103.4.96.218]
 7   48 ms   47 ms   48 ms  po104.psw04.sin6.tfbnw.net [129.134.55.137]
 8   49 ms   48 ms   48 ms  157.240.37.67
 9   51 ms   50 ms   51 ms  edge-star-mini-shv-03-sin6.facebook.com [157.
.15.35]

Trace complete.
```

4. netstat

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

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135           user:0                LISTENING
  TCP    0.0.0.0:445           user:0                LISTENING
  TCP    0.0.0.0:1025          user:0                LISTENING
  TCP    0.0.0.0:1026          user:0                LISTENING
  TCP    0.0.0.0:1027          user:0                LISTENING
  TCP    0.0.0.0:1028          user:0                LISTENING
  TCP    0.0.0.0:1029          user:0                LISTENING
  TCP    0.0.0.0:1030          user:0                LISTENING
  TCP    0.0.0.0:5357          user:0                LISTENING
  TCP    0.0.0.0:8336          user:0                LISTENING
  TCP    0.0.0.0:61406          user:0                LISTENING
  TCP    127.0.0.1:5354         user:0                LISTENING
  TCP    127.0.0.1:8335         user:0                LISTENING
  TCP    127.0.0.1:21896        user:0                LISTENING
  TCP    127.0.0.1:22303        user:23783              ESTABLISHED
  TCP    127.0.0.1:23783        user:22303              ESTABLISHED
  TCP    127.0.0.1:27017         user:0                LISTENING
  TCP    127.0.0.1:39378        user:0                LISTENING
```

5. ipconfig

```
C:\Users\hp>ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 3:
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . .

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

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

Wireless LAN adapter Wi-Fi:
  Connection-specific DNS Suffix . . .
```

6. nslookup

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

Non-authoritative answer:
Name:   google.com
Addresses: 2404:6800:4009:82a::200e
          172.217.163.206
```

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\hp>hostname  
user
```

2. getmac

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

```
C:\Users\hp>getmac  
  
Physical Address      Transport Name  
=====  =====  
C4-46-19-19-B1-8C  \Device\Tcpip_{0D4A2401-3451-4D82-B04B-1C9AB9164B7E}  
C8-0A-A9-B5-5E-D5  Media disconnected  
70-F3-95-31-F1-53  Media disconnected  
0A-00-27-00-00-1B  \Device\Tcpip_{A32AE3A3-7E1B-471E-8044-A5284B9570F4}
```

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\hp>arp -a  
  
Interface: 192.168.18.71 --- 0x3  
Internet Address      Physical Address          Type  
192.168.18.1           fc-1b-d1-8e-89-53    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 --- 0x1b  
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\hp>nbtstat -r
NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server    = 0
Registered By Broadcast    = 18
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 a maximum of 30 hops:
  0  user [192.168.18.71]
  1  192.168.18.1
  2  100.65.128.1
  3  100.65.20.5
  4  172.16.1.9
  5  10.1.1.254
  6  103.27.170.158
  7  pte-psw01.bomi.tfbnw.net [157.240.53.65]
  8  157.240.30.85
  9  edge-star-mini-shv-01-bomi.facebook.com [157.240.16.35]

Computing statistics for 225 seconds...
Source to Here  This Node>Link          Address
Hop  RTT    Lost/Sent = Pet Lost/Sent = Pet   Address
  0          0/ 100 = 0x 0/ 100 = 0x user [192.168.18.71]
  1  1ms    0/ 100 = 0x 0/ 100 = 0x 192.168.18.1
  2  5ms    0/ 100 = 0x 0/ 100 = 0x 100.65.128.1
  3  5ms    0/ 100 = 0x 0/ 100 = 0x 100.65.20.5
  4  4ms    0/ 100 = 0x 0/ 100 = 0x 172.16.1.9
  5  27ms   0/ 100 = 0x 0/ 100 = 0x 10.1.1.254
  6  ---    100/ 100 =100: 97/ 100 = 97% 103.27.170.158
  7  ---    100/ 100 =100: 99/ 100 = 99% pte-psw01.bomi.tfbnw.net [157.240.53.65]
  8  ---    100/ 100 =100: 99/ 100 = 99% 157.240.30.85
  9  35ms   1/ 100 = 1x 0/ 100 = 0x 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:

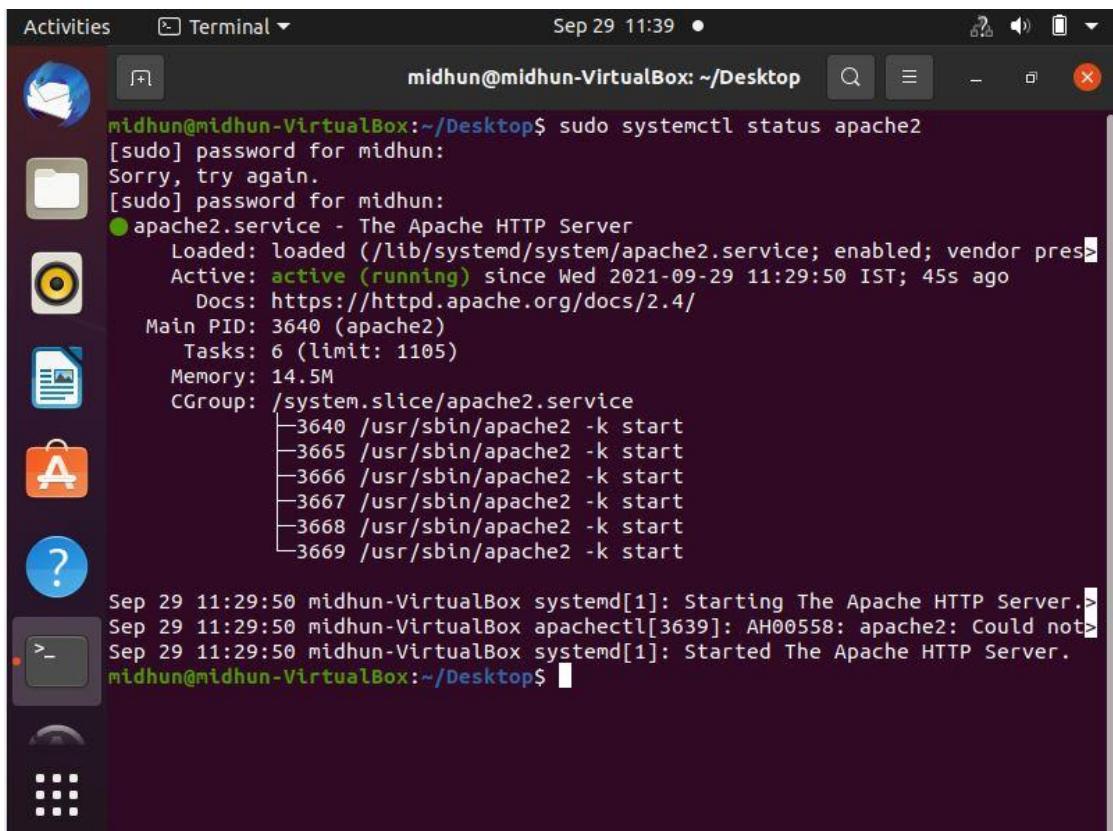
```
sudo apt install apache2
```

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

```
sudosystemctl status apache2
```

- if it is not working

```
sudosystemctl start apache2
```



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

```
Activities Terminal Sep 29 11:39 •
midhun@midhun-VirtualBox:~/Desktop$ sudo systemctl status apache2
[sudo] password for midhun:
Sorry, try again.
[sudo] password for midhun:
● apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres
    Active: active (running) since Wed 2021-09-29 11:29:50 IST; 45s ago
      Docs: https://httpd.apache.org/docs/2.4/
        Main PID: 3640 (apache2)
          Tasks: 6 (limit: 1105)
            Memory: 14.5M
          CGroup: /system.slice/apache2.service
                  ├─3640 /usr/sbin/apache2 -k start
                  ├─3665 /usr/sbin/apache2 -k start
                  ├─3666 /usr/sbin/apache2 -k start
                  ├─3667 /usr/sbin/apache2 -k start
                  ├─3668 /usr/sbin/apache2 -k start
                  └─3669 /usr/sbin/apache2 -k start

Sep 29 11:29:50 midhun-VirtualBox systemd[1]: Starting The Apache HTTP Server.>
Sep 29 11:29:50 midhun-VirtualBox apachectl[3639]: AH00558: apache2: Could not>
Sep 29 11:29:50 midhun-VirtualBox systemd[1]: Started The Apache HTTP Server.
midhun@midhun-VirtualBox:~/Desktop$
```

Install mariadb

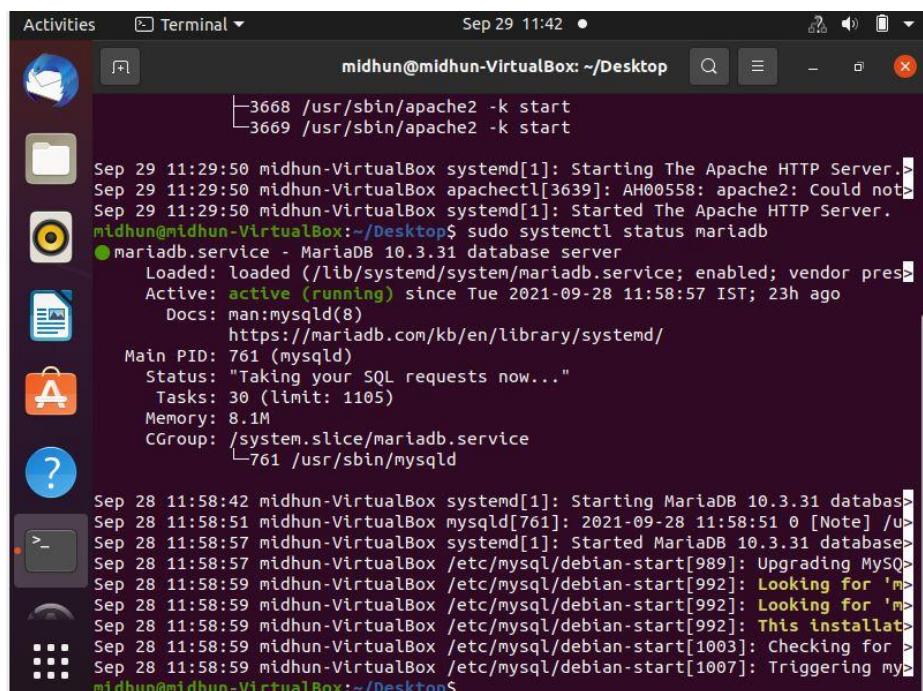
- **Install mariaDB**

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

- **Check mariadb Installation**

```
sudo systemctl status mysql
```

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



The screenshot shows a terminal window titled "midhun@midhun-VirtualBox: ~/Desktop". The terminal displays the following command and its output:

```
midhun@midhun-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 Tue 2021-09-28 11:58:57 IST; 23h ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 761 (mysqld)
      Status: "Taking your SQL requests now..."
        Tasks: 30 (limit: 1105)
       Memory: 8.1M
      CGroup: /system.slice/mariadb.service
              └─761 /usr/sbin/mysqld

Sep 28 11:58:42 midhun-VirtualBox systemd[1]: Starting MariaDB 10.3.31 database>
Sep 28 11:58:51 midhun-VirtualBox mysqld[761]: 2021-09-28 11:58:51 0 [Note] /u>
Sep 28 11:58:57 midhun-VirtualBox systemd[1]: Started MariaDB 10.3.31 database>
Sep 28 11:58:57 midhun-VirtualBox /etc/mysql/debian-start[989]: Upgrading MySQL>
Sep 28 11:58:59 midhun-VirtualBox /etc/mysql/debian-start[992]: Looking for 'm>
Sep 28 11:58:59 midhun-VirtualBox /etc/mysql/debian-start[992]: Looking for 'm>
Sep 28 11:58:59 midhun-VirtualBox /etc/mysql/debian-start[992]: This installat>
Sep 28 11:58:59 midhun-VirtualBox /etc/mysql/debian-start[1003]: Checking for >
Sep 28 11:58:59 midhun-VirtualBox /etc/mysql/debian-start[1007]: Triggering my>
```

The terminal window is part of a desktop environment with icons for various applications like a file manager, browser, and system tools.

Install PHP

- **Install PHP**

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

- **Restart apache2**

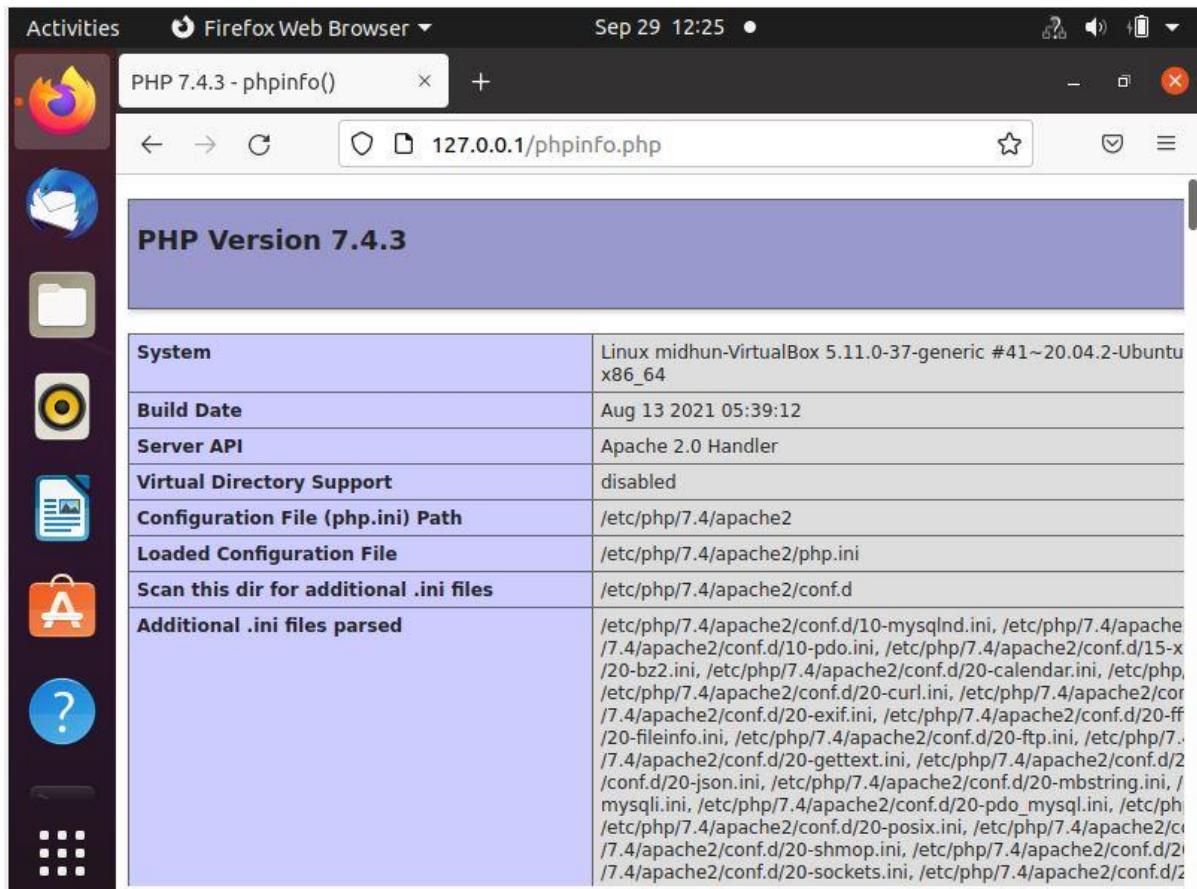
```
sudo systemctl restart apache2
```

- **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
```

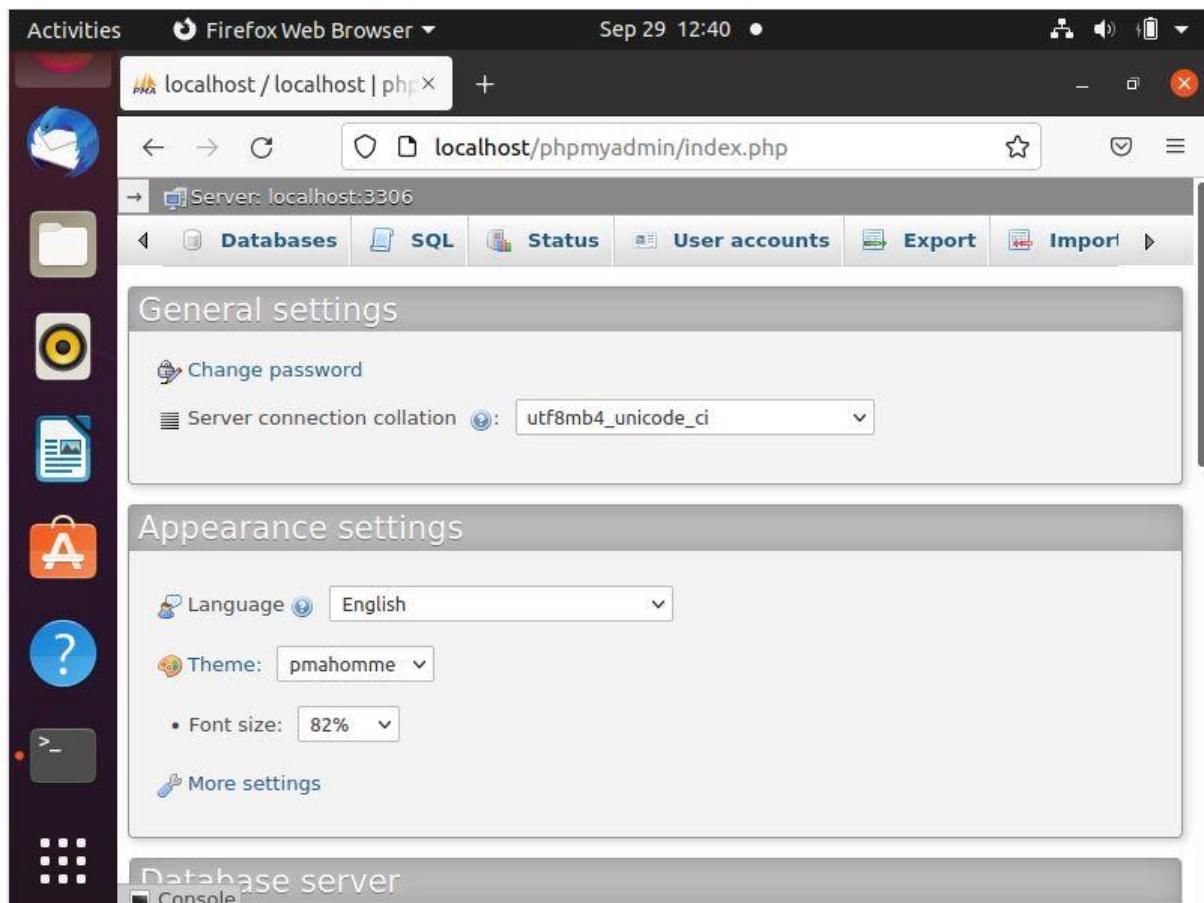
(It ask for webserver select apache2, select db configuration and set password)

- **Restart apache2**

```
sudo systemctl restart apache2
```

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

<http://localhost/phpmyadmin>



Activities Terminal Sep 29 12:42

```
midhun@midhun-VirtualBox: ~/Desktop
php-mbstring is already the newest version (2:7.4+75).
php-zip is already the newest version (2:7.4+75).
phpmyadmin is already the newest version (4:4.9.5+dfsg1-2).
The following packages were automatically installed and are no longer required:
  distro-info linux-headers-5.11.0-25-generic linux-headers-5.8.0-55-generic
  linux-hwe-5.11-headers-5.11.0-25 linux-hwe-5.8-headers-5.8.0-55
  linux-image-5.11.0-25-generic linux-image-5.8.0-55-generic
  linux-modules-5.11.0-25-generic linux-modules-5.8.0-55-generic
  linux-modules-extra-5.11.0-25-generic linux-modules-extra-5.8.0-55-generic
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 131 not upgraded.
midhun@midhun-VirtualBox:~/Desktop$ sudo systemctl restart apache2
midhun@midhun-VirtualBox:~/Desktop$ sudo nano /etc/apache2/apache2.conf
sudo: nano/etc/apache2/apache2.conf: command not found
midhun@midhun-VirtualBox:~/Desktop$ sudo nano /etc/apache2/apache2.conf
midhun@midhun-VirtualBox:~/Desktop$ sudo systemctl restart apache2
midhun@midhun-VirtualBox:~/Desktop$ sudo mysql
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 36
Server version: 10.3.31-MariaDB-0ubuntu0.20.04.1 Ubuntu 20.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

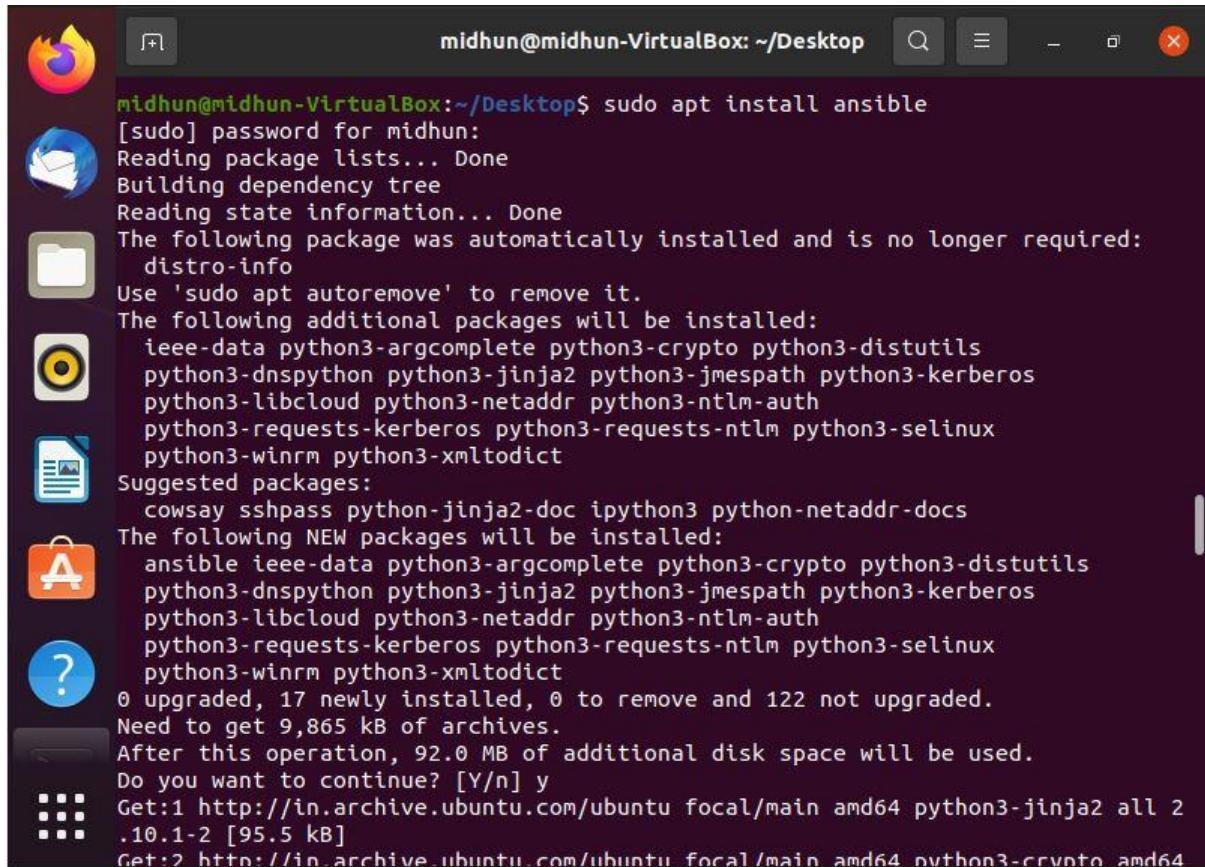
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> ALTER USER root@localhost IDENTIFIED BY "midhun97477";
Query OK, 0 rows affected (0.171 sec)

MariaDB [(none)]>
```

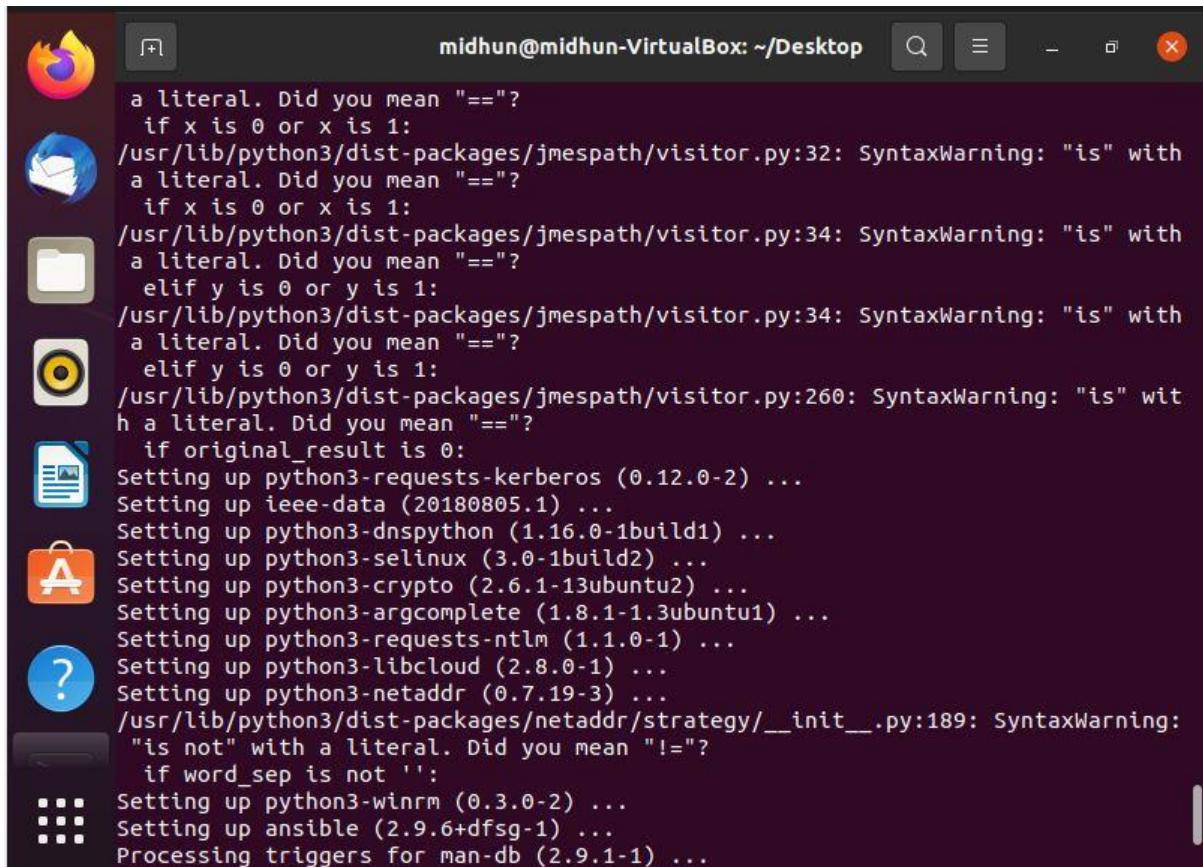
Installation

Step1: sudo apt install ansible



A screenshot of a terminal window titled "midhun@midhun-VirtualBox: ~/Desktop". The terminal is displaying the output of the command "sudo apt install ansible". The output shows the package being installed, along with dependencies like python3-argcomplete, python3-crypto, and python3-distutils. It also lists suggested packages such as cowsay and sshpass. The terminal indicates that 17 new packages will be installed, and the user is prompted to continue with "Do you want to continue? [Y/n] y". The final lines show the download of two files from the Ubuntu archive.

```
midhun@midhun-VirtualBox:~/Desktop$ sudo apt install ansible
[sudo] password for midhun:
Reading package lists... Done
Building dependency tree...
Reading state information... Done
The following package was automatically installed and is no longer required:
  distro-info
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  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-xmldict
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-xmldict
0 upgraded, 17 newly installed, 0 to remove and 122 not upgraded.
Need to get 9,865 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
```



midhun@midhun-VirtualBox: ~/Desktop

```
a literal. Did you mean "=="?
  if x is 0 or x is 1:
/usr/lib/python3/dist-packages/jmespath/visitor.py:32: SyntaxWarning: "is" with
a literal. Did you mean "=="?
  if x is 0 or x is 1:
/usr/lib/python3/dist-packages/jmespath/visitor.py:34: SyntaxWarning: "is" with
a literal. Did you mean "=="?
  elif y is 0 or y is 1:
/usr/lib/python3/dist-packages/jmespath/visitor.py:34: SyntaxWarning: "is" with
a literal. Did you mean "=="?
  elif y is 0 or y is 1:
/usr/lib/python3/dist-packages/jmespath/visitor.py:260: SyntaxWarning: "is" wit
h 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-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) ...
```

Installation check

Step2:ansible –version

```
midhun@midhun-VirtualBox:~/Desktop$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/midhun/.ansible/plugins/modules', '/u
  sr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Jun  2 2021, 10:49:15) [GCC 9.4.0]
midhun@midhun-VirtualBox:~/Desktop$
```

tcpdump installation:

- sudo apt install tcpdump

```
midhun@midhun-VirtualBox:~/Desktop$ sudo apt install tcpdump
[sudo] password for midhun:
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.
The following package was automatically installed and is no longer required:
  distro-info
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 122 not upgraded.
```

- sudotcpdump

```
midhun@midhun-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
12:39:33.991596 IP midhun-VirtualBox.40506 > chilipepper.canonical.com.ntp: NTP
v4, Client, length 48
12:39:34.082989 IP midhun-VirtualBox.48266 > 192.168.207.204.domain: 37945+ PTR
? 198.89.189.91.in-addr.arpa. (44)
12:39:34.175728 IP 192.168.207.204.domain > midhun-VirtualBox.48266: 37945 1/0/
0 PTR chilipepper.canonical.com. (83)
12:39:34.176508 IP midhun-VirtualBox.32854 > 192.168.207.204.domain: 43560+ PTR
? 15.2.0.10.in-addr.arpa. (40)
12:39:34.179313 IP 192.168.207.204.domain > midhun-VirtualBox.32854: 43560 NXDo
main 0/0/0 (40)
12:39:34.185742 IP chilipepper.canonical.com.ntp > midhun-VirtualBox.40506: NTP
v4, Server, length 48
12:39:34.199713 IP midhun-VirtualBox.38216 > 192.168.207.204.domain: 1329+ PTR?
  204.207.168.192.in-addr.arpa. (46)
12:39:34.259710 IP 192.168.207.204.domain > midhun-VirtualBox.38216: 1329 NXDom
```

- tcpdump -D

```
midhun@midhun-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]
```

- sudotcpdump –i enp0s3

```
midhun@midhun-VirtualBox:~/Desktop$ sudo tcpdump -i enp0s3
[sudo] password for midhun:
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
```

- **sudotcpdump -c 5**

```
midhun@midhun-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
```

- **sudotcpdump -I enp0s3 -c 5 port 80**

```
midhun@midhun-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
14:24:50.826074 IP midhun-VirtualBox.59688 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 1526018429, win 64240, options [mss 1460,sackOK,TS val 4113051949 ecr 0,nop,wscale 7], length 0
14:24:51.846545 IP midhun-VirtualBox.59688 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 1526018429, win 64240, options [mss 1460,sackOK,TS val 4113052970 ecr 0,nop,wscale 7], length 0
14:24:53.862460 IP midhun-VirtualBox.59688 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 1526018429, win 64240, options [mss 1460,sackOK,TS val 4113054986 ecr 0,nop,wscale 7], length 0
```

- **sudotcpdump host 10.0.2.15**

```
midhun@midhun-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
14:25:50.768697 IP midhun-VirtualBox.52128 > 192.168.207.204.domain: 29834+ AAA
A? connectivity-check.ubuntu.com. (47)
14:25:50.771070 IP midhun-VirtualBox.57383 > 192.168.207.204.domain: 37558+ PTR
? 204.207.168.192.in-addr.arpa. (46)
14:25:50.772367 IP 192.168.207.204.domain > midhun-VirtualBox.52128: 29834 0/0/
0 (47)
14:25:50.774575 IP midhun-VirtualBox.35933 > 192.168.207.204.domain: 28959+ AAA
A? connectivity-check.ubuntu.com. (47)
14:25:50.777856 IP 192.168.207.204.domain > midhun-VirtualBox.35933: 28959 0/0/
0 (47)
14:25:50.810207 IP 192.168.207.204.domain > midhun-VirtualBox.57383: 37558 NXDo
main* 0/1/0 (105)
14:25:50.811510 IP midhun-VirtualBox.53954 > 192.168.207.204.domain: 13824+ PTR
? 15.2.0.10.in-addr.arpa. (40)
14:25:50.824703 IP 192.168.207.204.domain > midhun-VirtualBox.53954: 13824 NXDo
main 0/0/0 (40)
14:25:55.878465 ARP, Request who-has _gateway tell midhun-VirtualBox, length 28
14:25:55.879237 ARP, Reply _gateway is-at 52:54:00:12:35:02 (oui Unknown), leng
th 46
```

- **tcpdump -i eth1 icmp**

```
midhun@midhun-VirtualBox:~/Desktop$ sudo tcpdump -i eth1 icmp
tcpdump: eth1: No such device exists
(SIOCGIFHWADDR: No such device)
```

- **sudotcpdump -n -i enp0s3 -c 10 -w**

```
midhun@midhun-VirtualBox:~/Desktop$ sudo tcpdump -n -i enp0s3 -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 ]
```

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:

```
details you entered
Name: Midhun
college:amal jyothi college
user@user-VirtualBox:~$
```

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

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

OUTPUT:

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

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 commandline.

```
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

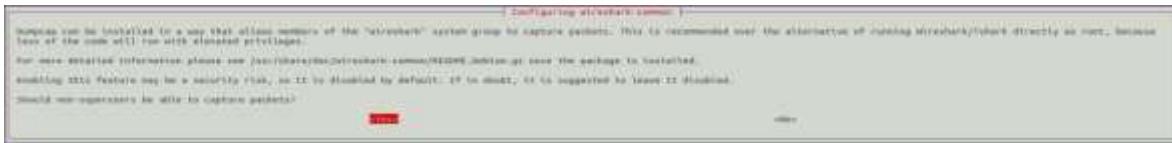
1. Command: sudo apt-get install wireshark

```
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 libqt5gui5 libqt5multimedias libqt5multimedias-plugins libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2lqlb 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 libqt5gui5 libqt5multimedias libqt5multimedias-plugins libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2lqlb 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]
```

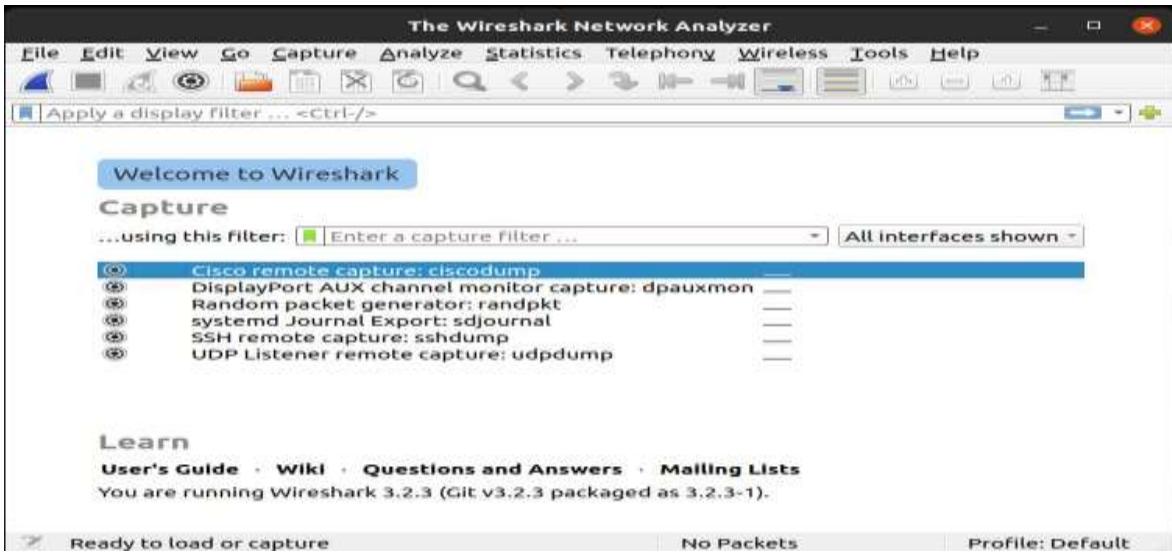
2. Command: sudo dpkg-reconfigure wireshark-common

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

3. Command: Select Yes and press enter



4. Open wireshark from the applist



Docker installation on Windows 10

Step-I

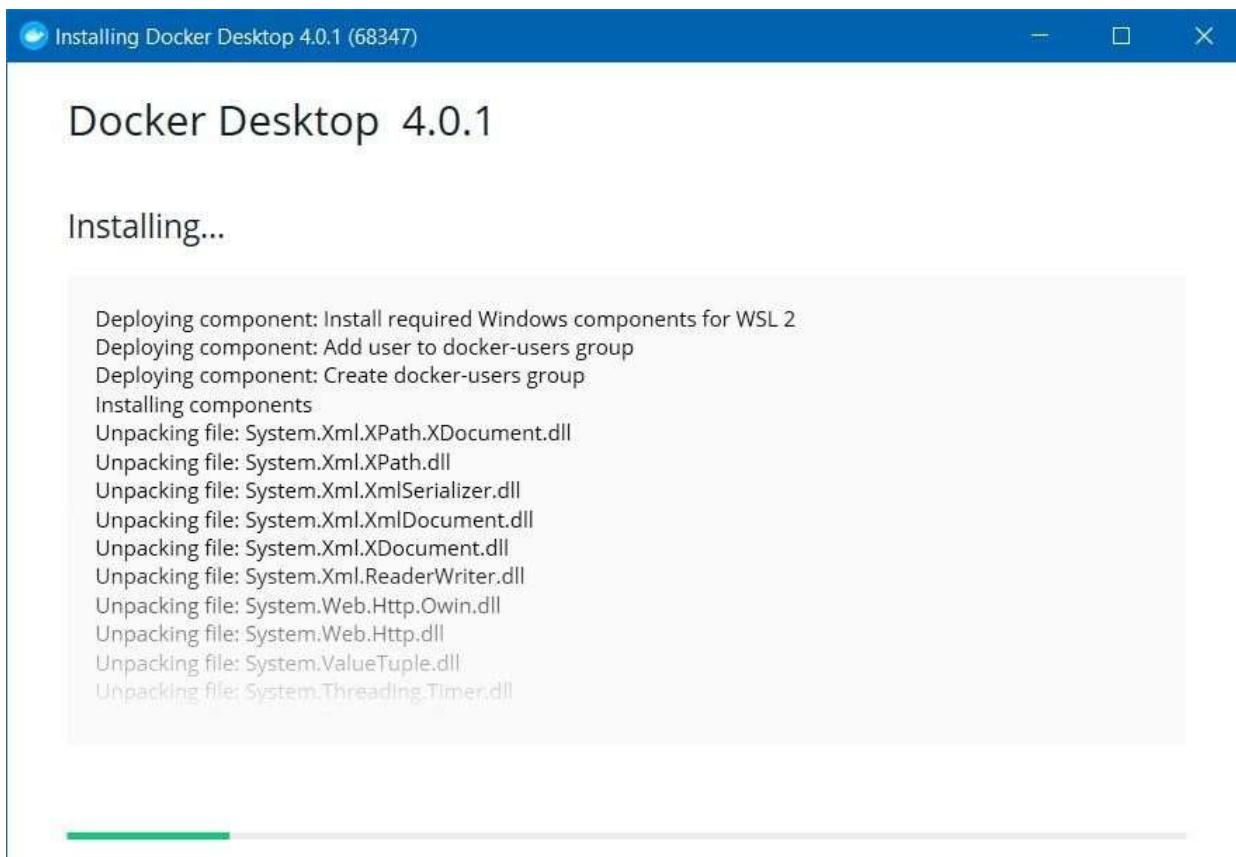
Download Docker desktop Installer for Windows from

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



Step-II

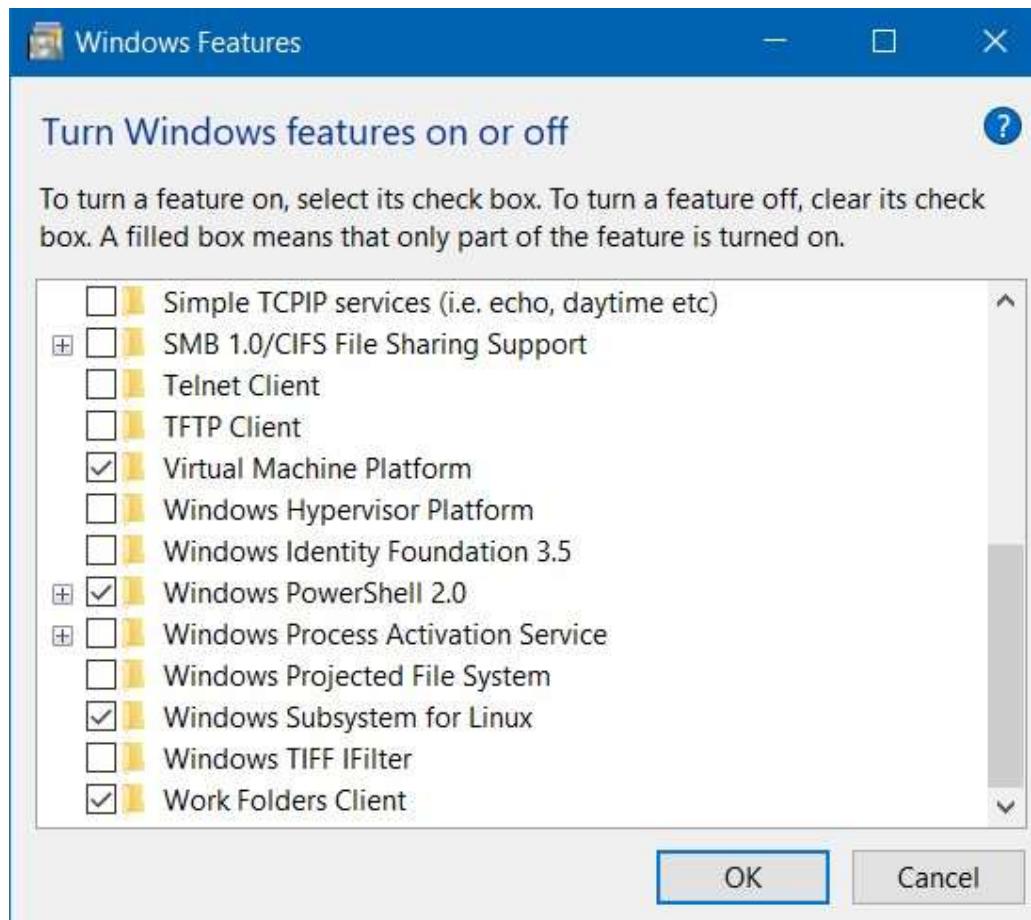
Open the .exe file and follow the steps after clicking install button.



Step-III

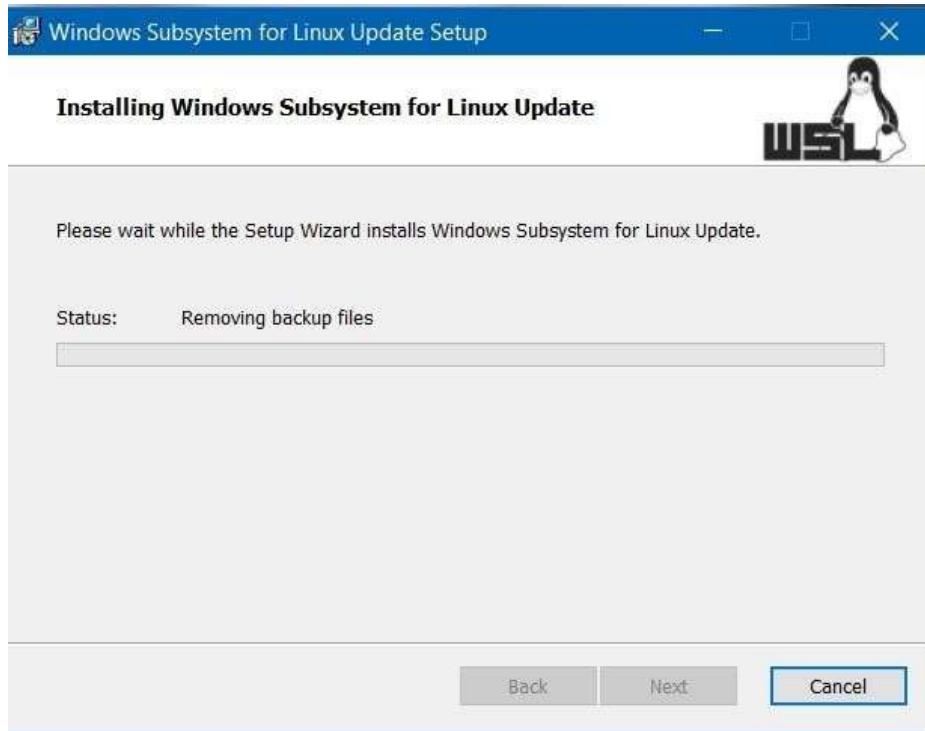
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



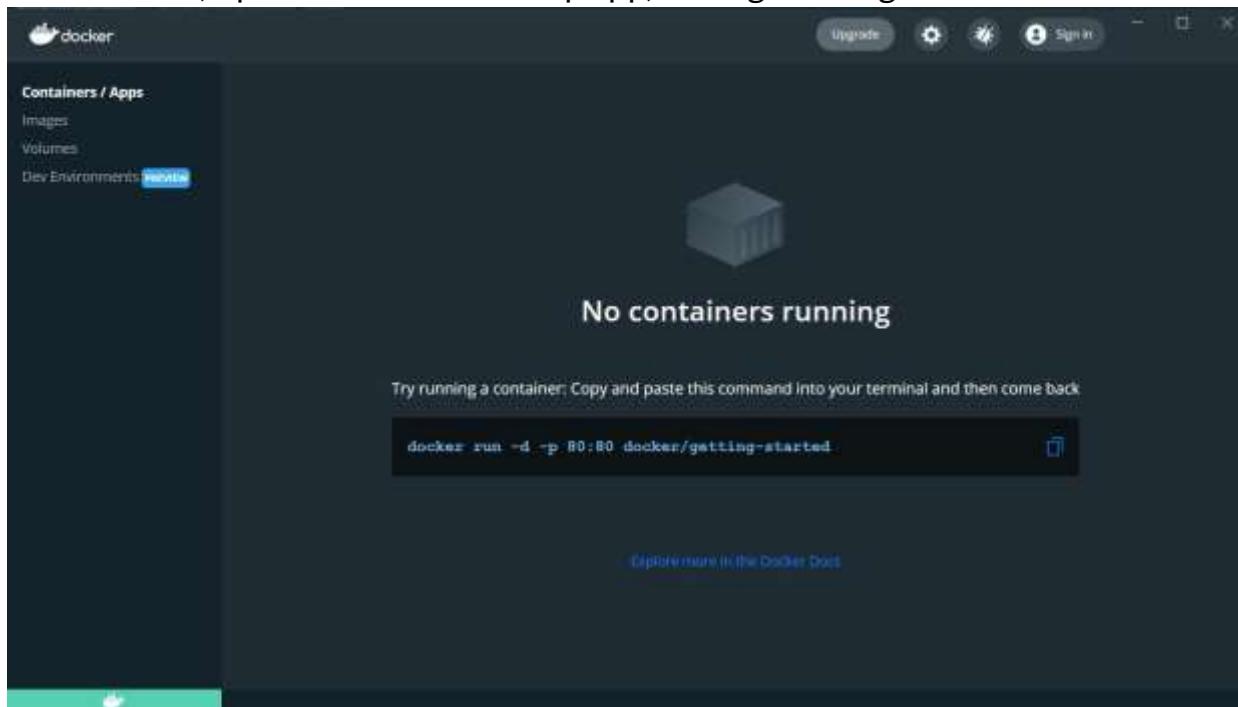
Step-IV

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 192.168.65.53: 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.

