

Networking & System Administration

Lab (20MCA136)

LAB RECORD

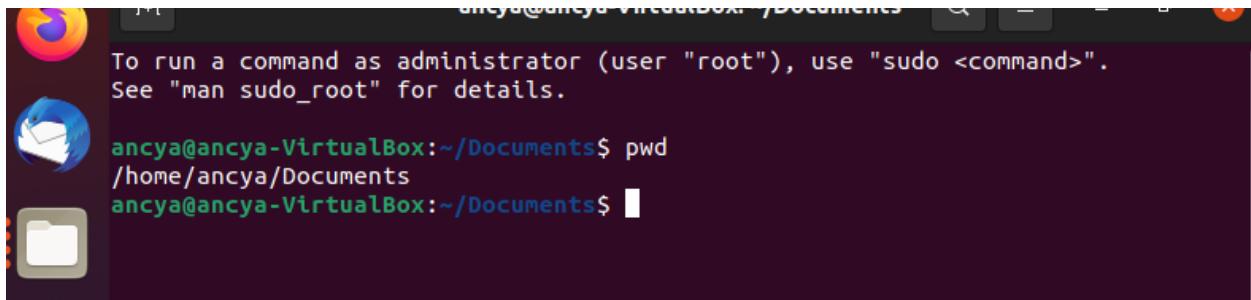
Submitted by: Ancy Alexander

S2-RMCA A BATCH

ROLL NO: 16

1)pwd

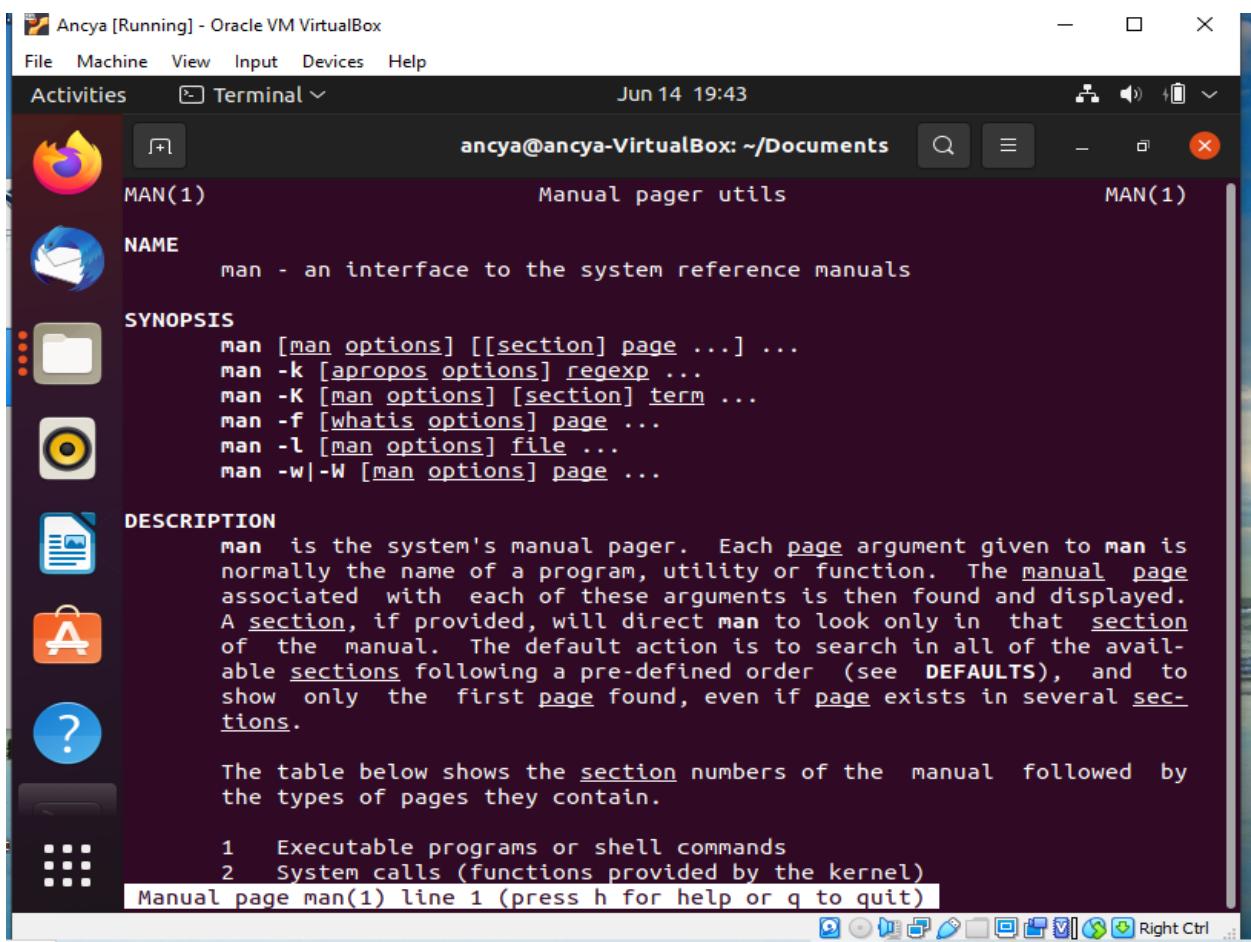
pwd command to find out the path of the current working directory (folder) you're in



The screenshot shows a terminal window with a dark background. At the top, there's a message from the system asking to run commands as root. Below that, the user's prompt is shown: `ancya@ancya-VirtualBox:~/Documents$`. The user then types `pwd`, and the terminal displays the current working directory: `/home/ancya/Documents`. The prompt changes to `ancya@ancya-VirtualBox:~/Documents$`.

2)man

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



The screenshot shows a terminal window with a dark background. The title bar indicates it's running on an Oracle VM VirtualBox machine. The user's prompt is `ancya@ancya-VirtualBox:~/Documents$`. The user has run the `man man` command, which displays the `MAN(1)` manual page. The page includes sections for `NAME`, `SYNOPSIS`, and `DESCRIPTION`. The `SYNOPSIS` section lists various command-line options for the `man` command. The `DESCRIPTION` section provides a detailed explanation of what the `man` command does, mentioning it's a manual pager and how it finds and displays pages. A note at the bottom explains the table of sections and their meanings. The terminal window also shows the status bar at the bottom with the message "Manual page man(1) line 1 (press h for help or q to quit)".

Ancya [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Jun 14 19:44

ancya@ancya-VirtualBox: ~/Documents

TAIL(1)

NAME
tail - output the last part of files

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

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

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

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

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

-f, --follow[={name|descriptor}]
output appended data as the file grows;
an absent option argument means 'descriptor'

-F same as --follow=name --retry

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

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

```
ancya@ancya-VirtualBox:~/Documents/files$ history
 1  pwd
 2* man ma
 3  man tail
 4  ls
 5  ls -i
 6  cd ..
 7  ls
 8  ls -i
 9  ls -R
10  ls -a
11  cd document
12  cd Documents
13  cd ~
14  cd Music/
15  cd ..
16  cd Documents/
17  mkdir files
18  ls
19  cd ..
20  mkdir files/file1
21  mkdir /files/file1
22  mkdir Documents/files/file1
23  cd Documents/
24  cd files/
25  ls
26  rmdir file1
27  ls
28  touch file1.txt
```

4) cd

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

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

```
ancya@ancya-VirtualBox:~$ cd Documents  
ancya@ancya-VirtualBox:~/Documents$ cd ~  
ancya@ancya-VirtualBox:~$ cd Music/  
ancya@ancya-VirtualBox:~/Music$ cd ..  
ancya@ancya-VirtualBox:~$ █
```

5) Mkdir

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

```
Mkdir: cannot create directory '/etc/file1': No such file or directory  
ancya@ancya-VirtualBox:~$ mkdir Documents/files/file1  
ancya@ancya-VirtualBox:~$ cd Documents/  
ancya@ancya-VirtualBox:~/Documents$ cd files/  
ancya@ancya-VirtualBox:~/Documents/files$ ls  
file1  
ancya@ancya-VirtualBox:~/Documents/files$ █
```

6) . rmdir

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

```
file1  
ancya@ancya-VirtualBox:~/Documents/files$ rmdir file1  
ancya@ancya-VirtualBox:~/Documents/files$ ls  
ancya@ancya-VirtualBox:~/Documents/files$ █
```

7) touch

The touch command allows you to create a blank new file through the Linux command line. • As an example, enter touch /home/username/Documents/Web.html to create an HTML file entitled Web under the Documents directory

```
ancya@ancya-VirtualBox:~/Documents/files$ touch file1.txt
ancya@ancya-VirtualBox:~/Documents/files$ touch file2.txt file3.txt
ancya@ancya-VirtualBox:~/Documents/files$ ls
file1.txt file2.txt file3.txt
ancya@ancya-VirtualBox:~/Documents/files$
```

8) rm

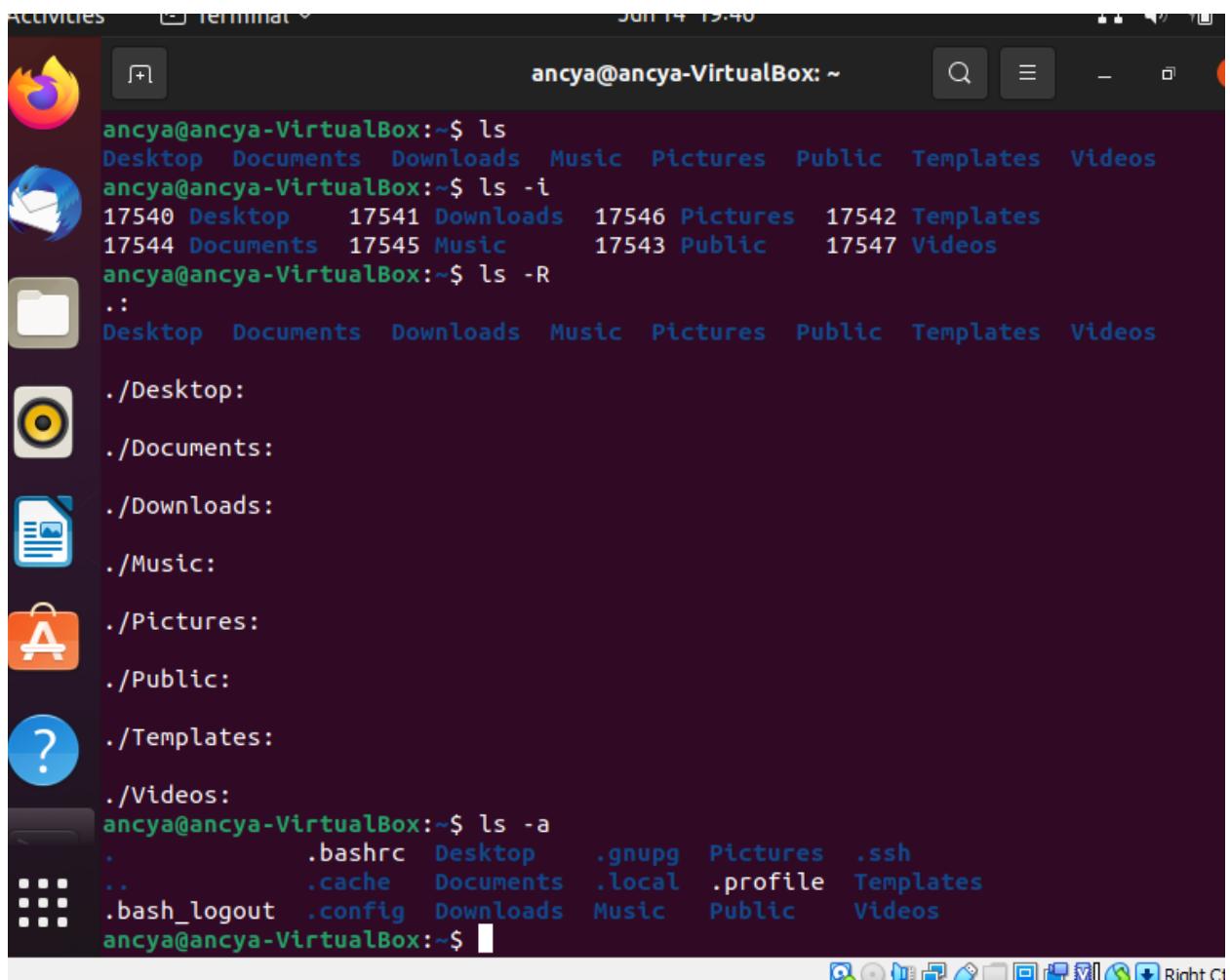
The rm command is used to delete directories and the contents within them. If you only want to delete the directory — as an alternative to rmdir — use rm -r. • Note: Be very careful with this command and double-check which directory you are in. This will delete everything and there is no undo. • To remove a file use rm filename

```
file1.txt file2.txt file3.txt
ancya@ancya-VirtualBox:~/Documents/files$ rm file3.txt
ancya@ancya-VirtualBox:~/Documents/files$ ls
file1.txt file2.txt
ancya@ancya-VirtualBox:~/Documents/files$
```

9. ls

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

- If you want to see the content of other directories, type ls and then the directory's path. For example, enter ls /home/username/Documents to view the content of Documents.
- There are variations you can use with the ls command:
- ls -R will list all the files in the sub-directories as well
- ls -l – long listing
- ls -a will show the hidden files
- ls -al will list the files and directories with detailed information like the permissions, size, owner, etc.
- ls -t lists files sorted in the order of “last modified”
- ls -r option will reverse the natural sorting order. Usually used in combination with other switches such as ls -tr. This will reverse the time-wise listing.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is "Activities terminal". The terminal session shows the following commands and output:

```
ancya@anca-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
ancya@anca-VirtualBox:~$ ls -i
17540 Desktop 17541 Downloads 17546 Pictures 17542 Templates
17544 Documents 17545 Music 17543 Public 17547 Videos
ancya@anca-VirtualBox:~$ ls -R
.:
Desktop Documents Downloads Music Pictures Public Templates Videos

./Desktop:
./Documents:
./Downloads:
./Music:
./Pictures:
./Public:
./Templates:
./Videos:
ancya@anca-VirtualBox:~$ ls -a
. .bashrc Desktop .gnupg Pictures .ssh
.. .cache Documents .local .profile Templates
.bash_logout .config Downloads Music Public Videos
ancya@anca-VirtualBox:~$
```

10)cat

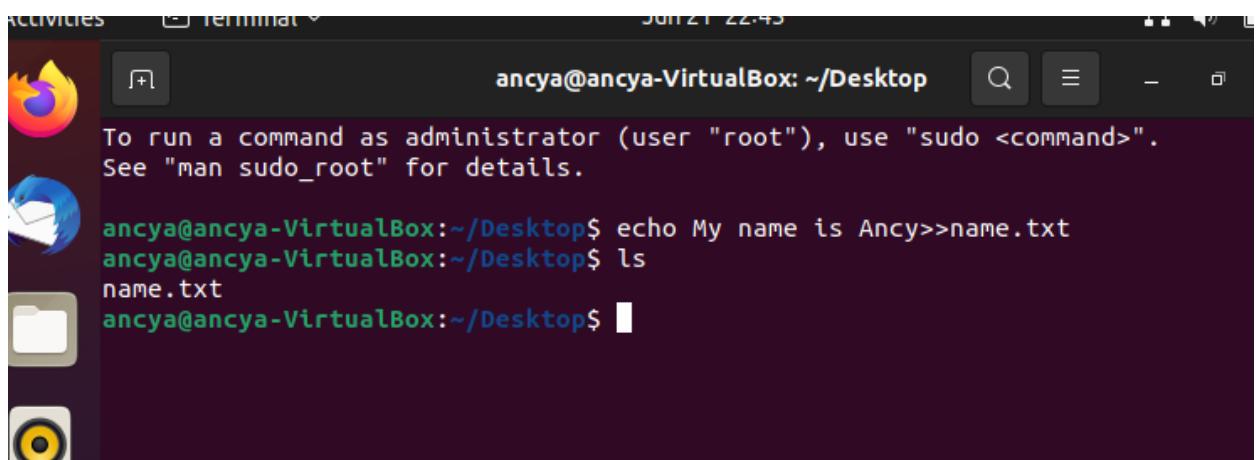
- cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout.
- To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.
- Here are other ways to use the cat command:
- cat > filename creates a new file
- cat filename1filename2>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

```
ancya@ancya-VirtualBox:~/Documents/files$ cat > file1.txt
Amal jyothi
Ancy
Ancy
ancya@ancya-VirtualBox:~/Documents/files$ cat > file2.txt
Alexander
ancya@ancya-VirtualBox:~/Documents/files$ cat file1.txt file2.txt
Amal jyothi
Ancy
Alexander
ancya@ancya-VirtualBox:~/Documents/files$ cat file1.txt,file2.txt>file3.txt
cat: file1.txt,file2.txt: No such file or directory
ancya@ancya-VirtualBox:~/Documents/files$ cat file3.txt
ancya@ancya-VirtualBox:~/Documents/files$ cat file1.txt file2.txt>file3.txt
ancya@ancya-VirtualBox:~/Documents/files$ cat file3.txt
Amal jyothi
Ancy
Alexander
ancya@ancya-VirtualBox:~/Documents/files$ cat file3.txt | tr a-z A-Z
AMAL JYOTHI
ANCY
ALEXANDER
ancya@ancya-VirtualBox:~/Documents/files$ cat file3.txt | tr A-Z a-z
amal jyothi
ancy
alexander
ancya@ancya-VirtualBox:~/Documents/files$
```

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 titled "terminal" with the command line "ancya@ancya-VirtualBox: ~/Desktop". The terminal displays the following text:

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

ancya@ancya-VirtualBox:~/Desktop$ echo My name is Ancy>>name.txt
ancya@ancya-VirtualBox:~/Desktop$ ls
name.txt
ancya@ancya-VirtualBox:~/Desktop$
```

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

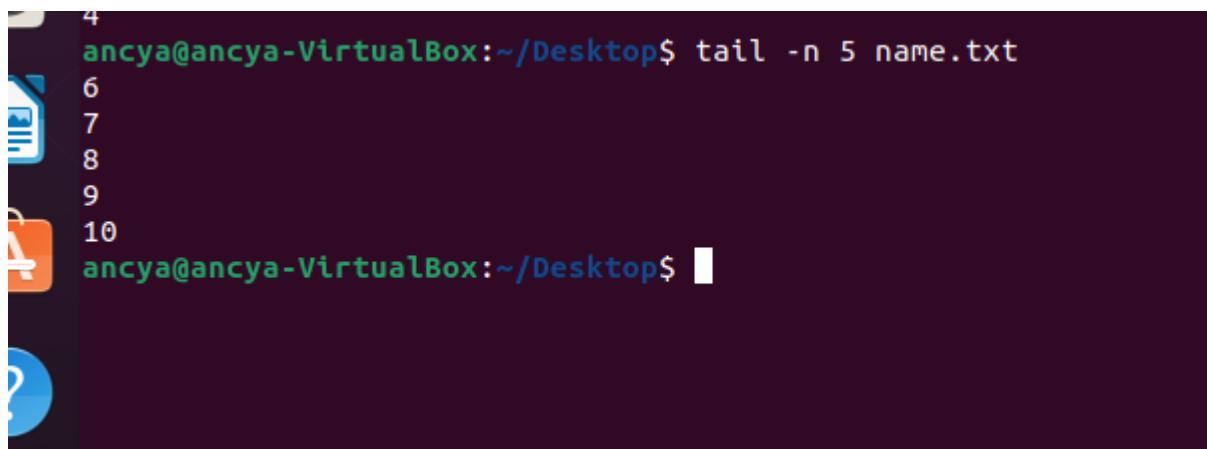
To change the number of lines displayed, use the -n option: head -n 5 /etc/passwd

```
name.txt
ancya@ancya-VirtualBox:~/Desktop$ head -n 5 name.txt
My name is Ancy
1
2
3
4
ancya@ancya-VirtualBox:~/Desktop$ █
```

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



```
4
ancya@ancya-VirtualBox:~/Desktop$ tail -n 5 name.txt
6
7
8
9
10
ancya@ancya-VirtualBox:~/Desktop$ █
```

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.

```
10
ancya@ancya-VirtualBox:~/Desktop$ read name
Ancy
ancya@ancya-VirtualBox:~/Desktop$ read name2
Alexander
ancya@ancya-VirtualBox:~/Desktop$ echo $name $name2
Ancy Alexander
ancya@ancya-VirtualBox:~/Desktop$ █
```

5.more

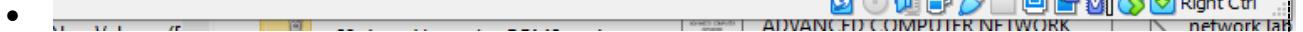
more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page. The syntax along with options and command is as follows. Another application 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.

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



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

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
:
```

ancya@ancya-VirtualBox:~/Desktop\$ less /etc/passwd

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.

```
ancya@ancya-VirtualBox:~/Desktop$ cut -b 1,2,3 name.txt
My
1
2
3
4
5
6
7
8
9
10
ancya@ancya-VirtualBox:~/Desktop$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop$ paste name.txt newfile.txt
My name is Ancy
1
2
3
4
5
6
7
8
9
10
ancya@ancya-VirtualBox:~/Desktop$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop$ uname  
Linux  
ancya@ancya-VirtualBox:~/Desktop$ uname -r  
5.11.0-18-generic  
ancya@ancya-VirtualBox:~/Desktop$
```

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>

```
ancya@ancya-VirtualBox:~/Desktop$ mkdir files
ancya@ancya-VirtualBox:~/Desktop$ ls
files name.txt newfile.txt
ancya@ancya-VirtualBox:~/Desktop$ cp name.txt files
ancya@ancya-VirtualBox:~/Desktop$ cd files
ancya@ancya-VirtualBox:~/Desktop/files$ ls
name.txt
ancya@ancya-VirtualBox:~/Desktop/files$
```

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 .

```
ancya@ancya-VirtualBox:~/Desktop/files$ locate name.txt
/home/ancya/Desktop/name.txt
/home/ancya/Desktop/files/name.txt
ancya@ancya-VirtualBox:~/Desktop/files$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop/files$ ls  
name.txt  newfile.txt  
ancya@ancya-VirtualBox:~/Desktop/files$ find name.txt  
name.txt  
ancya@ancya-VirtualBox:~/Desktop/files$ █
```

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.

```
ancya@ancya-VirtualBox:~/Desktop/files$ grep Ancy name.txt
My name is Ancy
ancya@ancya-VirtualBox:~/Desktop/files$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop/files$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
tmpfs            99556     1356     98200   2% /run
/dev/sda3        9735476  7709868   1511356  84% /
tmpfs            497772      0     497772   0% /dev/shm
tmpfs             5120       4      5116   1% /run/lock
tmpfs             4096       0      4096   0% /sys/fs/cgroup
/dev/sda2        524252     5340    518912   2% /boot/efi
tmpfs            99552      124     99428   1% /run/user/1000
ancya@ancya-VirtualBox:~/Desktop/files$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop$ cd ..
ancya@ancya-VirtualBox:~/Desktop$ du
8      ./files
16     .
ancya@ancya-VirtualBox:~/Desktop$
```

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.

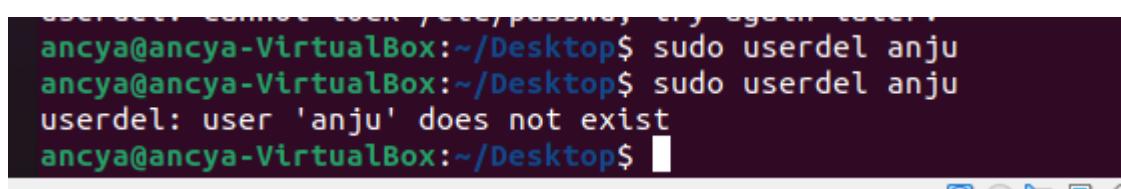
In Linux, a 'useradd' command is a low-level utility that is used for adding/creating user accounts in Linux and other Unix-like operating systems. The 'adduser' is much similar to useradd command, because it is just a symbolic link to it.

```
ancya@ancya-VirtualBox:~/Desktop$ sudo useradd anju
ancya@ancya-VirtualBox:~/Desktop$ sudo useradd anju
useradd: user 'anju' already exists
ancya@ancya-VirtualBox:~/Desktop$
```

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.



```
userdel: cannot lock /etc/passwd; try again later.
ancya@ancya-VirtualBox:~/Desktop$ sudo userdel anju
ancya@ancya-VirtualBox:~/Desktop$ sudo userdel anju
userdel: user 'anju' does not exist
ancya@ancya-VirtualBox:~/Desktop$ █
```

18. sudo

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

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

```
ancya@ancya-VirtualBox:~/Desktop$ sudo useradd anju
ancya@ancya-VirtualBox:~/Desktop$ sudo useradd anju
useradd: user 'anju' already exists
ancya@ancya-VirtualBox:~/Desktop$
```

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.

```
ancya@ancya-VirtualBox:~/Desktop$ ls
files name.txt newfile.txt
ancya@ancya-VirtualBox:~/Desktop$ mv newfile.txt files
ancya@ancya-VirtualBox:~/Desktop$ ls
files name.txt
ancya@ancya-VirtualBox:~/Desktop$ cd files
ancya@ancya-VirtualBox:~/Desktop/files$ ls
name.txt newfile.txt
ancya@ancya-VirtualBox:~/Desktop/files$
```

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.

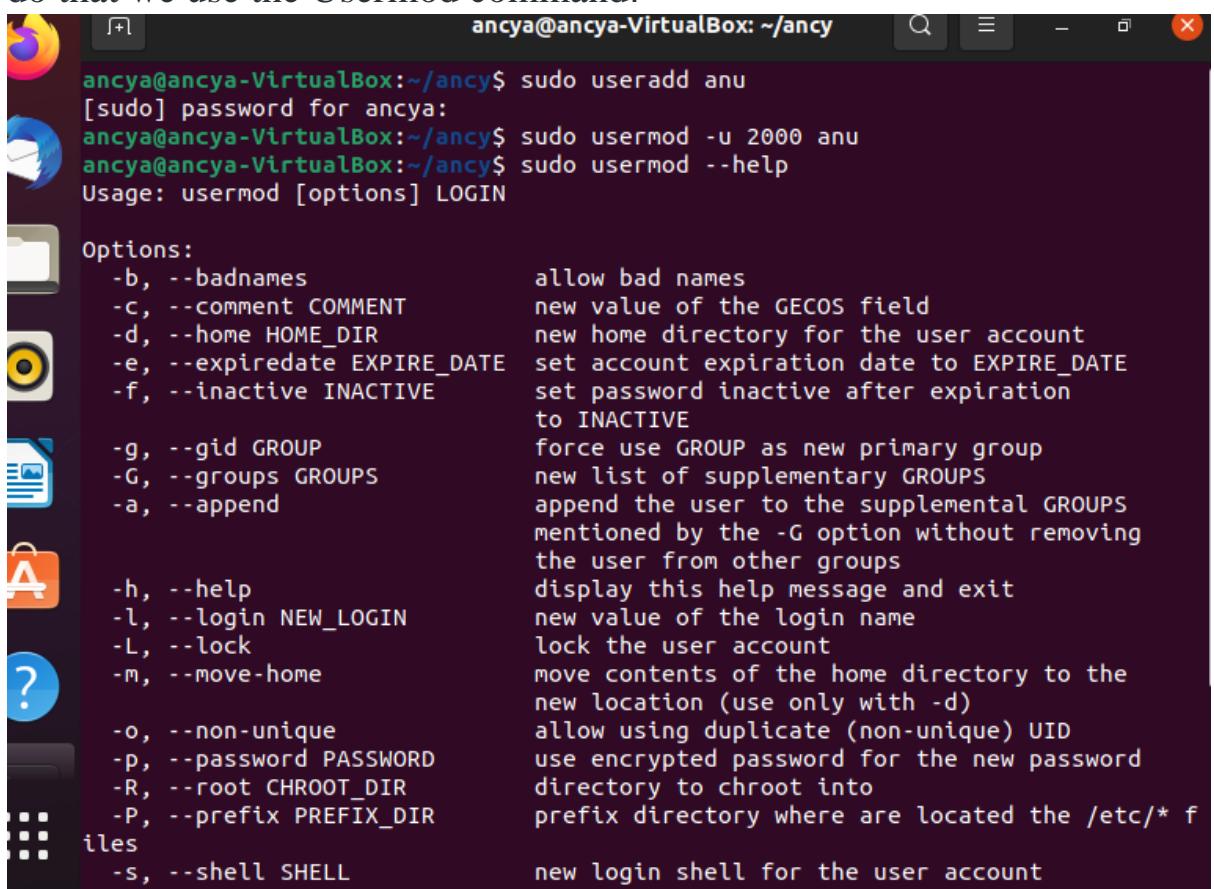
The passwd command sets and changes passwords for users. Use this command to change your own password or another user's password. You can also use the passwd command to change the full name (gecos) associated with your login name and the shell you use as an interface to the operating system.

```
ancya@ancya-VirtualBox:~/Desktop$ passwd ancy
Changing password for ancy.
Current password:
New password:
BAD PASSWORD: The password is the same as the old one
New password:
BAD PASSWORD: The password is shorter than 8 characters
New password: █
```

BASIC LINUX COMMANDS PART-3

1. usermode

usermod command or modify user is a command in Linux that 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 etc. so in order to do that we use the Usermod command.



The screenshot shows a terminal window with a dark background and light-colored text. The title bar reads "ancya@ancya-VirtualBox: ~/ancy". The terminal displays the following commands and their help output:

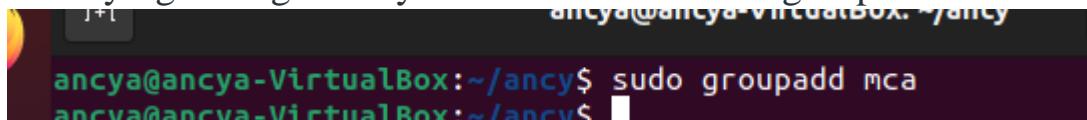
```
ancya@ancya-VirtualBox:~/ancy$ sudo useradd anu
[sudo] password for ancy:
ancya@ancya-VirtualBox:~/ancy$ sudo usermod -u 2000 anu
ancya@ancya-VirtualBox:~/ancy$ sudo usermod --help
Usage: usermod [options] LOGIN

Options:
  -b, --badnames          allow bad names
  -c, --comment COMMENT   new value of the GECOS field
  -d, --home HOME_DIR     new home directory for the user account
  -e, --expiredate EXPIRE_DATE set account expiration date to EXPIRE_DATE
  -f, --inactive INACTIVE  set password inactive after expiration
                           to INACTIVE
  -g, --gid GROUP          force use GROUP as new primary group
  -G, --groups GROUPS      new list of supplementary GROUPS
  -a, --append               append the user to the supplemental GROUPS
                             mentioned by the -G option without removing
                             the user from other groups
  -h, --help                display this help message and exit
  -l, --login NEW_LOGIN    new value of the login name
  -L, --lock                 lock the user account
  -m, --move-home            move contents of the home directory to the
                             new location (use only with -d)
  -o, --non-unique           allow using duplicate (non-unique) UID
  -p, --password PASSWORD   use encrypted password for the new password
  -R, --root CHROOT_DIR      directory to chroot into
  -P, --prefix PREFIX_DIR    prefix directory where are located the /etc/* f
                             iles
  -s, --shell SHELL          new login shell for the user account
```

2. groupadd

groupmod command in Linux is used to modify or change the existing group on Linux system. It can be handled by superuser or

root user. Basically, it modifies a group definition on the system by modifying the right entry in the database of the group.



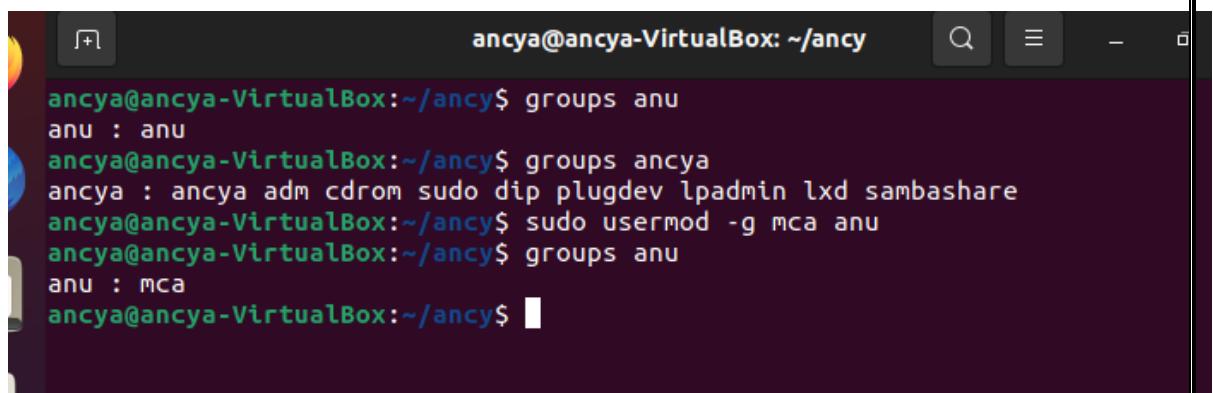
```
ancya@ancya-VirtualBox:~/ancy$ sudo groupadd mca
ancya@ancya-VirtualBox:~/ancy$
```

3. groups

In linux, there can be multiple users(those who use/operate the system), and groups are nothing but the collection of users. Groups make it easy to manage users with the same security and access privileges. A user can be part of different groups.

IMPORTANT POINTS:

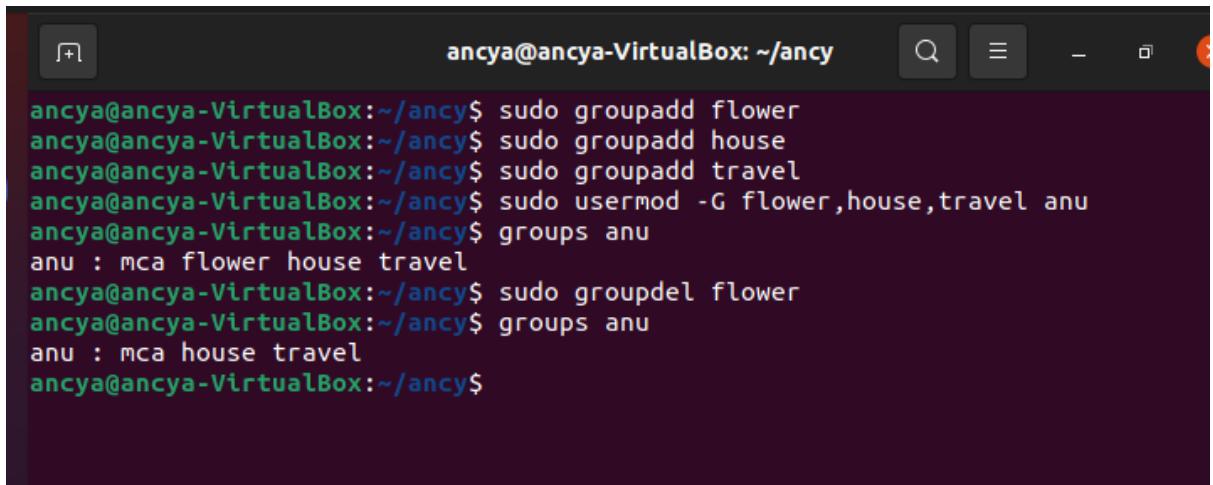
- Groups command prints the names of the primary and any supplementary groups for each given username, or the current process if no names are given.
- If more than one name is given, the name of each user is printed before the list of that user's groups and the username is separated from the group list by a colon.



```
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : anu
ancya@ancya-VirtualBox:~/ancy$ groups ancy
ancya : ancy adm cdrom sudo dip plugdev lpadmin lxd sambashare
ancya@ancya-VirtualBox:~/ancy$ sudo usermod -g mca anu
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : mca
ancya@ancya-VirtualBox:~/ancy$
```

4. groupdel

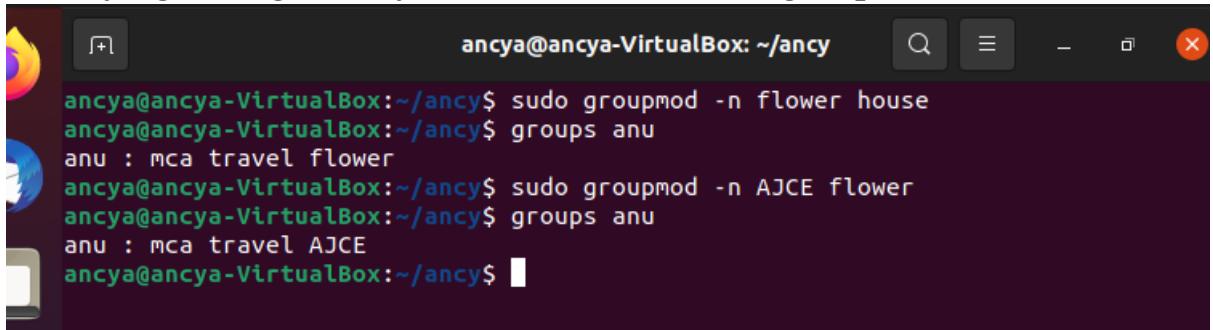
groupdel command is used to delete a existing group. It will delete all entry that refers to the group, modifies the system account files, and it is handled by superuser or root user.



```
ancya@ancya-VirtualBox:~/ancy$ sudo groupadd flower
ancya@ancya-VirtualBox:~/ancy$ sudo groupadd house
ancya@ancya-VirtualBox:~/ancy$ sudo groupadd travel
ancya@ancya-VirtualBox:~/ancy$ sudo usermod -G flower,house,travel anu
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : mca flower house travel
ancya@ancya-VirtualBox:~/ancy$ sudo groupdel flower
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : mca house travel
ancya@ancya-VirtualBox:~/ancy$
```

5. groupmod

groupmod command in Linux is used to modify or change the existing group on Linux system. It can be handled by superuser or root user. Basically, it modifies a group definition on the system by modifying the right entry in the database of the group.

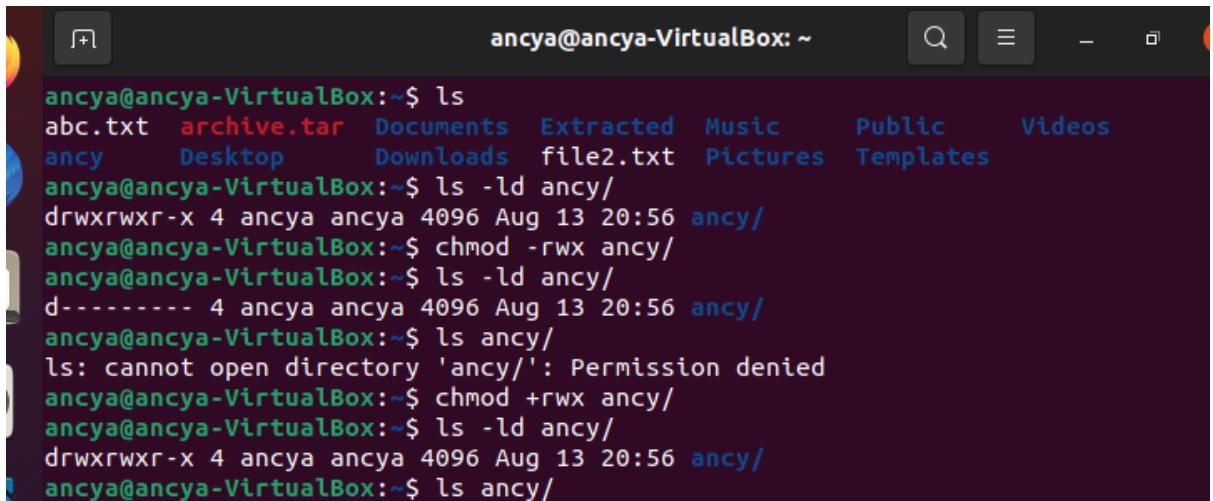


```
ancya@ancya-VirtualBox:~/ancy$ sudo groupmod -n flower house
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : mca travel flower
ancya@ancya-VirtualBox:~/ancy$ sudo groupmod -n AJCE flower
ancya@ancya-VirtualBox:~/ancy$ groups anu
anu : mca travel AJCE
ancya@ancya-VirtualBox:~/ancy$
```

6. chmod

In Unix-like operating systems, the **chmod** command is used to change the access mode of a file.

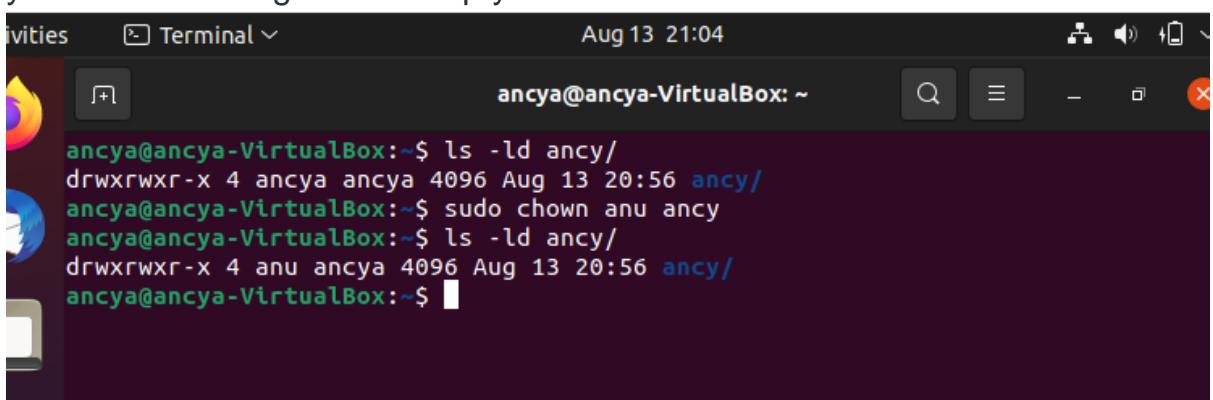
The name is an abbreviation of **change mode**.



```
ancya@ancya-VirtualBox:~$ ls
abc.txt archive.tar Documents Extracted Music Public Videos
ancy Desktop Downloads file2.txt Pictures Templates
ancya@ancya-VirtualBox:~$ ls -ld ancy/
drwxrwxr-x 4 ancy ancy 4096 Aug 13 20:56 ancy/
ancya@ancya-VirtualBox:~$ chmod -rwx ancy/
ancya@ancya-VirtualBox:~$ ls -ld ancy/
d----- 4 ancy ancy 4096 Aug 13 20:56 ancy/
ancya@ancya-VirtualBox:~$ ls ancy/
ls: cannot open directory 'ancy/': Permission denied
ancya@ancya-VirtualBox:~$ chmod +rwx ancy/
ancya@ancya-VirtualBox:~$ ls -ld ancy/
drwxrwxr-x 4 ancy ancy 4096 Aug 13 20:56 ancy/
ancya@ancya-VirtualBox:~$ ls ancy/
```

7. chown

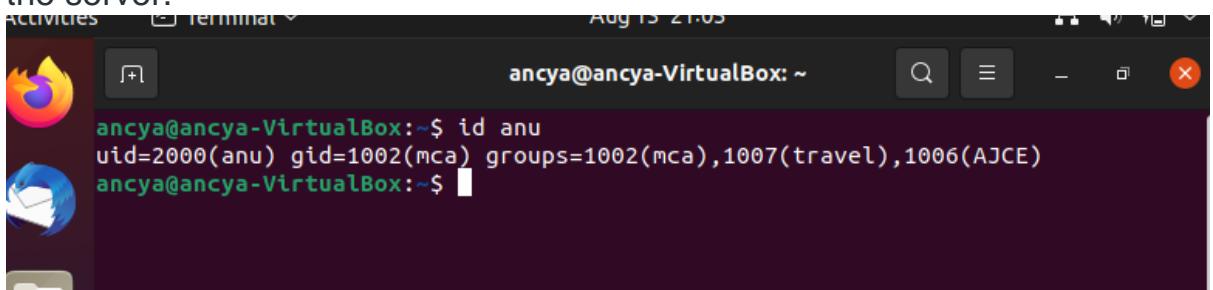
chown command is used to change the file Owner or group. Whenever you want to change ownership you can use chown command.



```
Activities Terminal Aug 13 21:04
ancya@ancya-VirtualBox:~$ ls -ld ancy/
drwxrwxr-x 4 ancy ancy 4096 Aug 13 20:56 ancy/
ancya@ancya-VirtualBox:~$ sudo chown anu ancy
ancya@ancya-VirtualBox:~$ ls -ld ancy/
drwxrwxr-x 4 anu ancy 4096 Aug 13 20:56 ancy/
ancya@ancya-VirtualBox:~$
```

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 or any other user in the server.

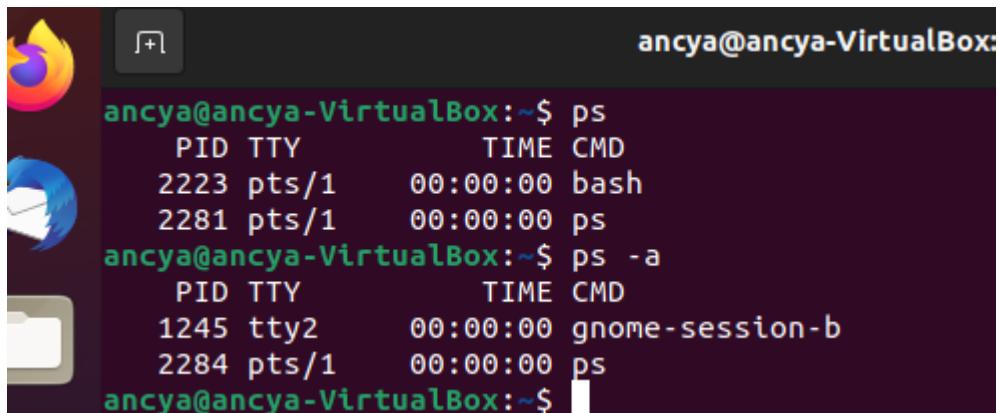


```
Activities Terminal Aug 13 21:05
ancya@ancya-VirtualBox:~$ id anu
uid=2000(anu) gid=1002(mca) groups=1002(mca),1007(travel),1006(AJCE)
ancya@ancya-VirtualBox:~$
```

9. ps

Abbreviation for “**Process Status**”. ps command is used to list the currently running processes and their PIDs along with some other information depends on different options. It reads the process information from the virtual files in /proc file-system. /proc

contains virtual files, this is the reason it's referred as a virtual file system.



The screenshot shows a terminal window with a dark background. On the left side, there are icons for a browser (Firefox), a file manager (Nautilus), and a terminal. The terminal window has a title bar with the text "ancya@ancya-VirtualBox:~\$". Inside the terminal, the user has run the "ps" command twice. The first "ps" command shows two processes: "bash" with PID 2223 and "ps" with PID 2281. The second "ps -a" command shows three processes: "gnome-session-b" with PID 1245 running on "tty2", "ps" with PID 2284 running on "pts/1", and the user's bash session. The terminal prompt "ancya@ancya-VirtualBox:~\$" is visible at the bottom.

```
ancya@ancya-VirtualBox:~$ ps
  PID TTY      TIME CMD
 2223 pts/1    00:00:00 bash
 2281 pts/1    00:00:00 ps
ancya@ancya-VirtualBox:~$ ps -a
  PID TTY      TIME CMD
 1245 tty2    00:00:00 gnome-session-b
 2284 pts/1    00:00:00 ps
ancya@ancya-VirtualBox:~$
```

10. top

top command is used to show the Linux processes. It provides a dynamic real-time view of the running system. Usually, this command shows the summary information of the system and the list of processes or threads which are currently managed by the Linux Kernel.

Activities Terminal Aug 13 21:10

```
ancya@ancya-VirtualBox: ~
top - 21:10:02 up 1:32, 2 users, load average: 0.48, 0.16, 0.09
Tasks: 184 total, 1 running, 182 sleeping, 0 stopped, 1 zombie
%Cpu(s): 1.4 us, 0.3 sy, 0.0 ni, 98.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 972.2 total, 83.6 free, 529.5 used, 359.1 buff/cache
MiB Swap: 448.4 total, 204.5 free, 244.0 used. 285.4 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
2053 ancy 20 0 250476 10888 6512 S 0.3 1.1 0:12.09 ibus-d+
2131 ancy 20 0 172800 7252 6416 S 0.3 0.7 0:04.52 ibus-e+
2433 ancy 20 0 488820 40500 28168 S 0.3 4.1 0:16.97 gnome-+
17776 ancy 20 0 23244 6068 5364 S 0.3 0.6 0:00.36 ssh
18268 ancy 20 0 21440 3892 3360 R 0.3 0.4 0:00.47 top
1 root 20 0 247764 10616 6500 S 0.0 1.1 0:06.25 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kthrea+
3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_pa+
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
9 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 mm_per+
10 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_ta+
11 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_ta+
12 root 20 0 0 0 0 S 0.0 0.0 0:00.52 ksoftti+
13 root 20 0 0 0 0 I 0.0 0.0 0:01.37 rcu_sc+
14 root rt 0 0 0 0 S 0.0 0.0 0:00.12 migrat+
15 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_i+
16 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
17 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtm+
18 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 netns
19 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 inet_f+
20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kauditd
```

BASIC LINUX COMMANDS

1. wc

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

The screenshot shows a Linux desktop environment with a dark theme. A terminal window is open at the top, displaying a command-line session:

```
ancya@ancya-VirtualBox:~$ ls
abc.txt  Documents  Music      Public      Videos
Desktop   Downloads  Pictures  Templates
ancya@ancya-VirtualBox:~$ wc abc.txt
4 5 34 abc.txt
ancya@ancya-VirtualBox:~$ wc -l abc.txt
4 abc.txt
ancya@ancya-VirtualBox:~$ wc -w abc.txt
5 abc.txt
ancya@ancya-VirtualBox:~$ wc -c abc.txt
34 abc.txt
ancya@ancya-VirtualBox:~$ cat >> file2.txt
hello
hai
^C
ancya@ancya-VirtualBox:~$ wc abc.txt file2.txt
4 5 34 abc.txt
2 2 10 file2.txt
6 7 44 total
ancya@ancya-VirtualBox:~$ wc -m file2.txt
10 file2.txt
ancya@ancya-VirtualBox:~$
```

The desktop dock on the left contains icons for various applications, including a browser, file manager, terminal, and system tools.

2. tar

The Linux ‘tar’ stands for tape archive, is used to create Archive and extract the Archive files

- Linux tar command to create compressed or uncompressed Archive files
- Options:

-c : Creates Archive

-x : Extract the archive

-f : creates archive with given filename

-t : displays or lists files in archived file

-u : archives and adds to an existing archive file

-v : Displays Verbose Information

-A : Concatenates the archive files

- z : zip, tells tar command that creates tar file using gzip
- j : filter archive tar file using tbzip
- W : Verify a archive file
- r : update or add file or directory in already existed .tar file

```
#tar cf archive.tar state.txt capital.txt //create archive file
#ls archive.tar
#tar tf /archive.tar // list contents of tar archive file
• Extract an archive created with tar
#mkdir backup
#cd backup
#tar xf /home/kaj/Documents/Kaj_Linux/archive.tar
```

- *Compression Types*

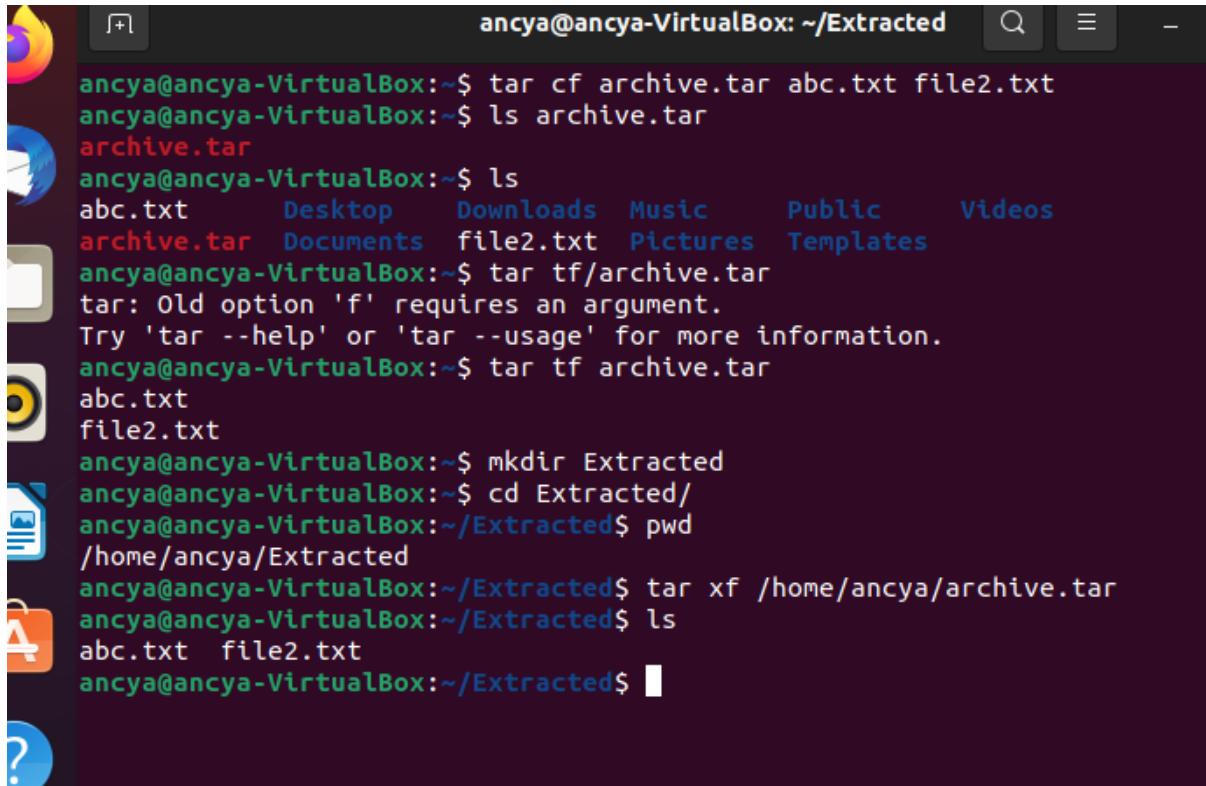
gzip(z),bzip2(j), xz(J)

```
#tar czf /abc.tar.gz /etc
#tar cjf /abcd.tar.bz2 /etc
#tar cJf /abcde.tar.xz /etc
```

- *Extract an archive*

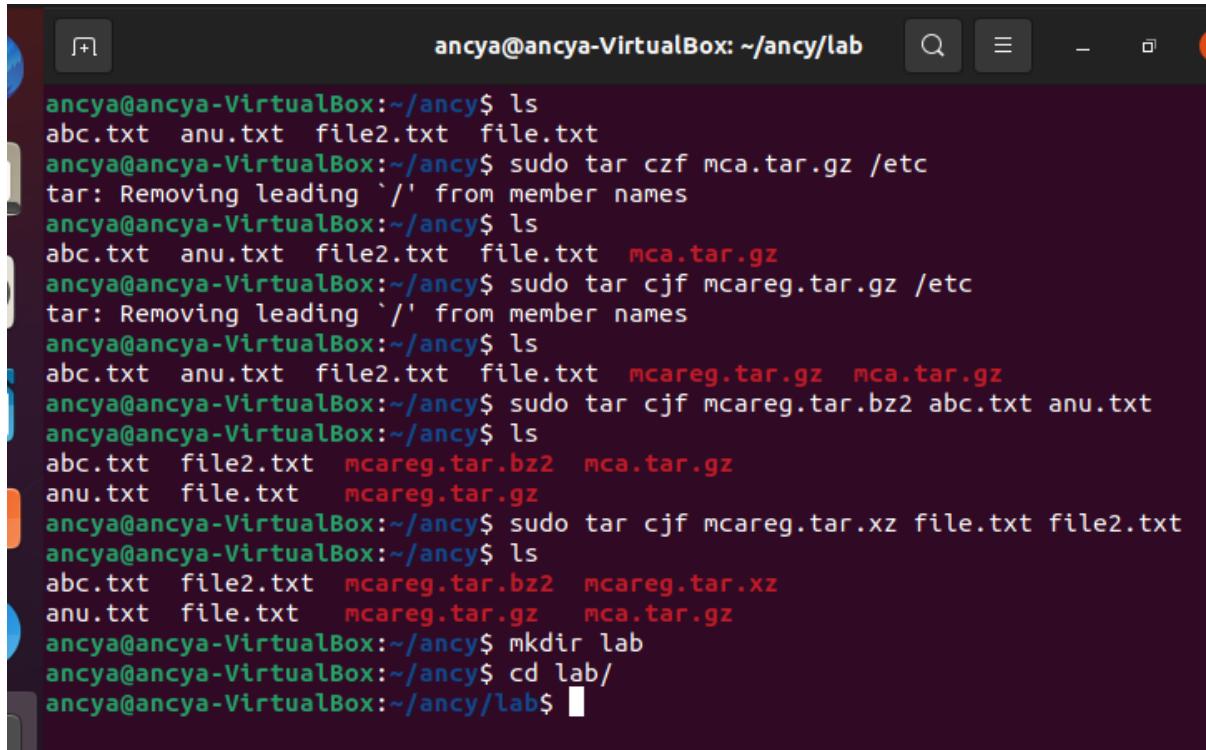
```
#mkdir backup1
#cd backup1
#tar xzf /abc.tar.gz
#mkdir backup2
#cd backup2
#tar xjf /abcd.tar.bz2
#mkdir backup3
#cd backup3
#tar xJf /abcde.tar.xz
```

- tar commands



```
ancya@ancya-VirtualBox:~/Extracted$ tar cf archive.tar abc.txt file2.txt
ancya@ancya-VirtualBox:~/Extracted$ ls archive.tar
archive.tar
ancya@ancya-VirtualBox:~/Extracted$ ls
abc.txt      Desktop   Downloads  Music      Public     Videos
archive.tar  Documents  file2.txt Pictures  Templates
ancya@ancya-VirtualBox:~/Extracted$ tar tf archive.tar
tar: Old option 'f' requires an argument.
Try 'tar --help' or 'tar --usage' for more information.
ancya@ancya-VirtualBox:~/Extracted$ tar tf archive.tar
abc.txt
file2.txt
ancya@ancya-VirtualBox:~/Extracted$ mkdir Extracted
ancya@ancya-VirtualBox:~/Extracted$ cd Extracted/
ancya@ancya-VirtualBox:~/Extracted$ pwd
/home/ancya/Extracted
ancya@ancya-VirtualBox:~/Extracted$ tar xf /home/ancya/archive.tar
ancya@ancya-VirtualBox:~/Extracted$ ls
abc.txt  file2.txt
ancya@ancya-VirtualBox:~/Extracted$
```

- Compressing using gz, bz2 and xz



```
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  anu.txt  file2.txt  file.txt
ancya@ancya-VirtualBox:~/ancy$ sudo tar czf mca.tar.gz /etc
tar: Removing leading '/' from member names
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  anu.txt  file2.txt  file.txt  mca.tar.gz
ancya@ancya-VirtualBox:~/ancy$ sudo tar cjf mcareg.tar.gz /etc
tar: Removing leading '/' from member names
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  anu.txt  file2.txt  file.txt  mcareg.tar.gz  mca.tar.gz
ancya@ancya-VirtualBox:~/ancy$ sudo tar cjf mcareg.tar.bz2 abc.txt anu.txt
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  file2.txt  mcareg.tar.bz2  mca.tar.gz
anu.txt  file.txt   mcareg.tar.gz
ancya@ancya-VirtualBox:~/ancy$ sudo tar cjf mcareg.tar.xz file.txt file2.txt
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  file2.txt  mcareg.tar.bz2  mcareg.tar.xz
anu.txt  file.txt   mcareg.tar.gz   mca.tar.gz
ancya@ancya-VirtualBox:~/ancy$ mkdir lab
ancya@ancya-VirtualBox:~/ancy$ cd lab/
ancya@ancya-VirtualBox:~/ancy/lab$
```

● Extract using gzip

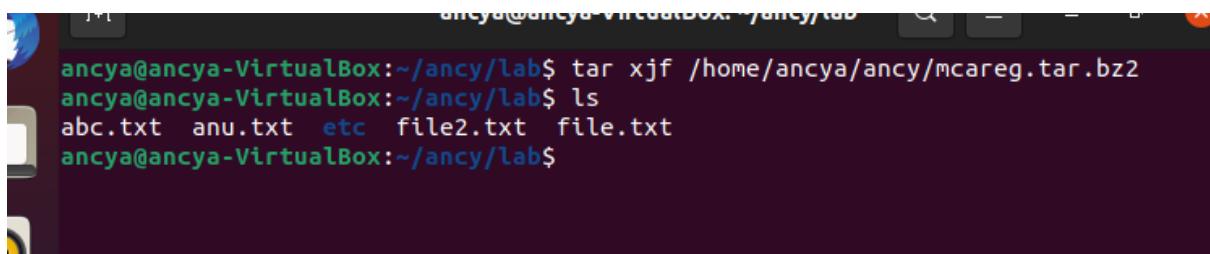
```
ancya@ancya-VirtualBox:~/ancy/lab$ tar xzf /home/ancya/ancy/mca.tar.gz
ancya@ancya-VirtualBox:~/ancy/lab$ ls
etc
ancya@ancya-VirtualBox:~/ancy/lab$ ls etc
acpi           hosts          profile.d
adduser.conf   hosts.allow   protocols
alsa           hosts.deny   pulse
alternatives   hp            python3
anacrontab     ifplugd      python3.9
apg.conf       init          rc0.d
apm            init.d        rc1.d
apparmor       initramfs-tools rc2.d
apparmor.d     inputrc      rc3.d
apport          insserv.conf.d rc4.d
appstream.conf ipp-usb      rc5.d
apt            iproute2     rc6.d
avahi          issue        rcS.d
bash.bashrc    issue.net    resolv.conf
bash_completion kernel       rmt
bash_completion.d kernel-img.conf rpc
bindresvport.blacklist kerneloops.conf rsyslog.conf
binfmt.d       ldap         rsyslog.d
bluetooth      ld.so.cache rygel.conf
brlapi.key     ld.so.conf  sane.d
brltty         ld.so.conf.d security
brltty.conf    legal        selinux
ca-certificates libao.conf  sensors3.conf
ca-certificates.conf libaudit.conf sensors.d
chatscripts    libblockdev services
```

- Extract using xz

Activities Terminal Aug 13 20:16

ancya@ancya-VirtualBox: ~/ancy/lab\$ ls
etc
ancya@ancya-VirtualBox: ~/ancy/lab\$ tar xjf /home/ancya/ancy/mcareg.tar.xz
ancya@ancya-VirtualBox: ~/ancy/lab\$ ls
etc file2.txt file.txt
ancya@ancya-VirtualBox: ~/ancy/lab\$

- Extract using bz2



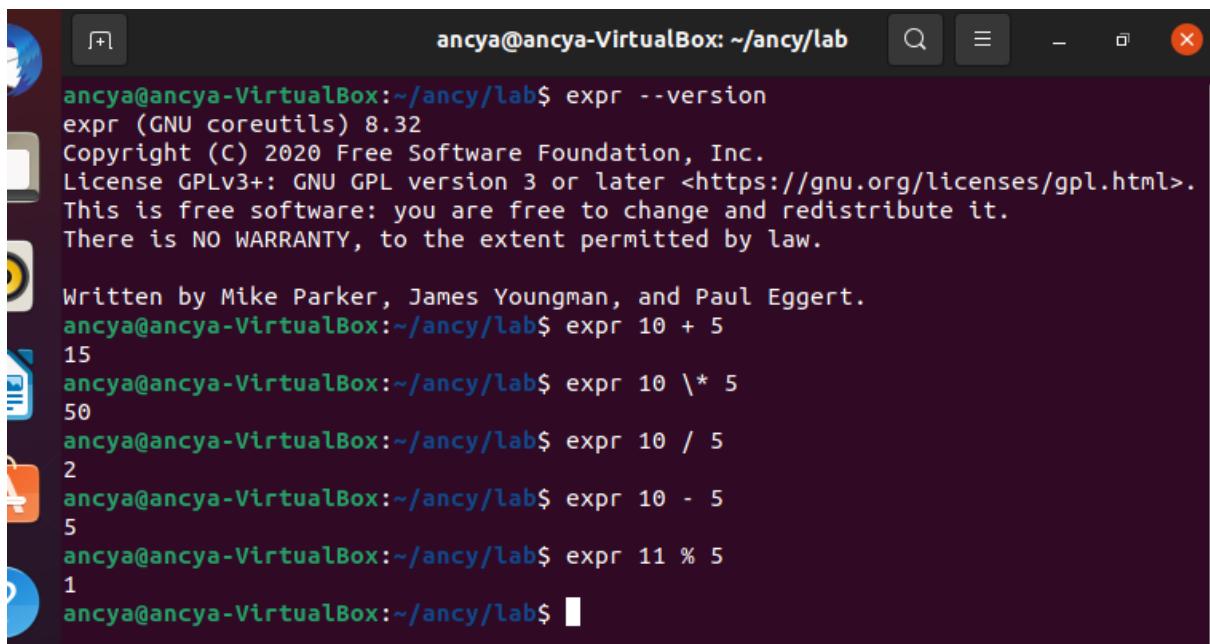
```
ancya@ancya-VirtualBox:~/ancy/lab$ tar xjf /home/ancya/ancy/mcareg.tar.bz2
ancya@ancya-VirtualBox:~/ancy/lab$ ls
abc.txt  anu.txt  etc  file2.txt  file.txt
ancya@ancya-VirtualBox:~/ancy/lab$
```

3. expr

The expr command evaluates a given expression and displays its corresponding output. It is used for:

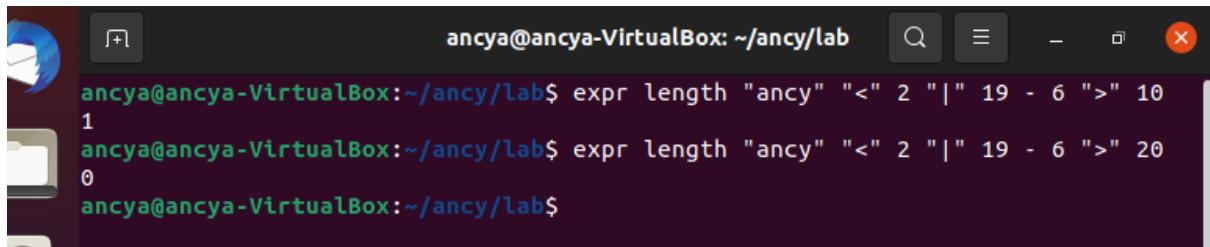
- Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
- Evaluating regular expressions, string operations like substring, length of strings etc.
- Performing operations on variables inside a shell script

```
#expr 10 + 2
```



```
ancya@ancya-VirtualBox:~/ancy/lab$ expr --version
expr (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Mike Parker, James Youngman, and Paul Eggert.
ancya@ancya-VirtualBox:~/ancy/lab$ expr 10 + 5
15
ancya@ancya-VirtualBox:~/ancy/lab$ expr 10 \* 5
50
ancya@ancya-VirtualBox:~/ancy/lab$ expr 10 / 5
2
ancya@ancya-VirtualBox:~/ancy/lab$ expr 10 - 5
5
ancya@ancya-VirtualBox:~/ancy/lab$ expr 11 % 5
1
ancya@ancya-VirtualBox:~/ancy/lab$
```



```
ancya@ancya-VirtualBox:~/ancy/lab$ expr length "ancy" "<" 2 " | " 19 - 6 ">" 10
1
ancya@ancya-VirtualBox:~/ancy/lab$ expr length "ancy" "<" 2 " | " 19 - 6 ">" 20
0
ancya@ancya-VirtualBox:~/ancy/lab$
```

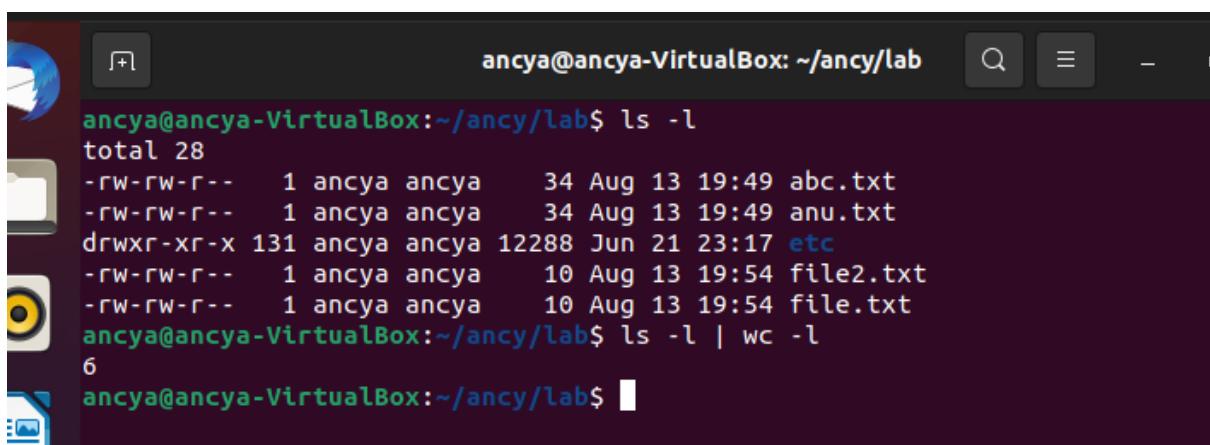
4. Redirections & Piping

A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing.

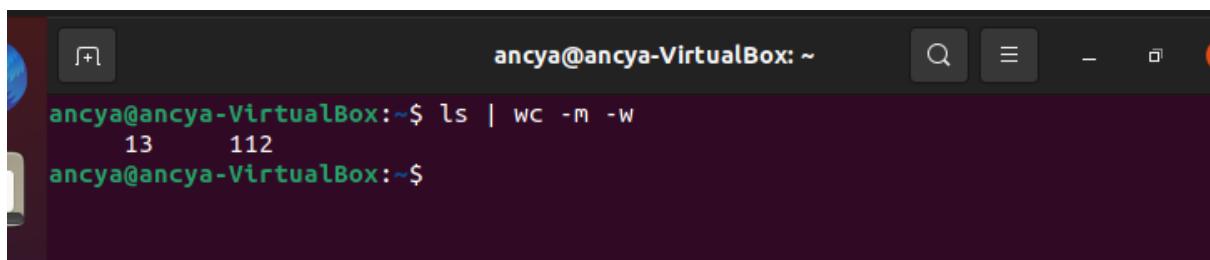
- Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and so on.

```
#ls -l | wc -l
```

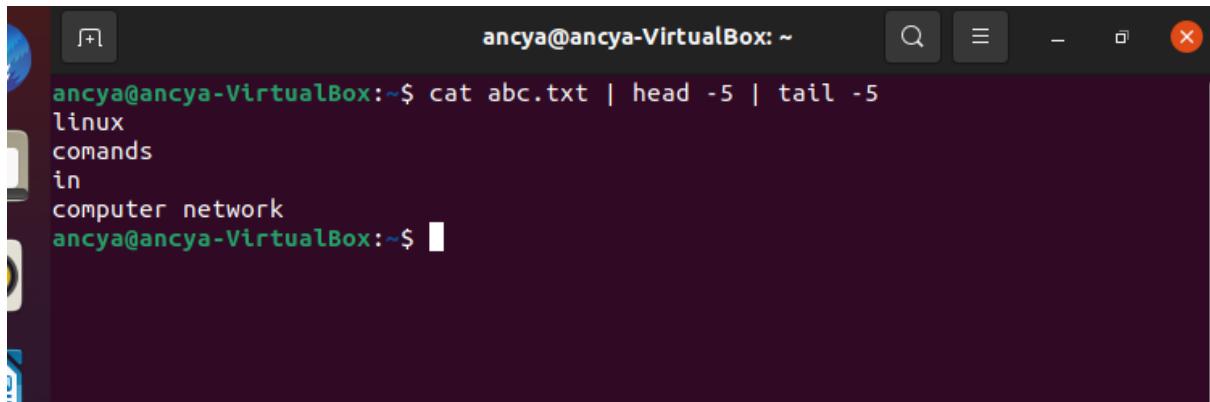
```
#cat /etc/passwd.txt | head -7 | tail -5
```



```
ancya@ancya-VirtualBox:~/ancy/lab$ ls -l
total 28
-rw-rw-r-- 1 ancy ancy 34 Aug 13 19:49 abc.txt
-rw-rw-r-- 1 ancy ancy 34 Aug 13 19:49 anu.txt
drwxr-xr-x 131 ancy ancy 12288 Jun 21 23:17 etc
-rw-rw-r-- 1 ancy ancy 10 Aug 13 19:54 file2.txt
-rw-rw-r-- 1 ancy ancy 10 Aug 13 19:54 file.txt
ancya@ancya-VirtualBox:~/ancy/lab$ ls -l | wc -l
6
ancya@ancya-VirtualBox:~/ancy/lab$
```



```
ancya@ancya-VirtualBox:~$ ls | wc -m -w
13 112
ancya@ancya-VirtualBox:~$
```



```
ancya@ancya-VirtualBox:~$ cat abc.txt | head -5 | tail -5
linux
commands
in
computer network
ancya@ancya-VirtualBox:~$
```

5. ssh

ssh stands for “**Secure Shell**”.

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

```
#ssh user_name@host(IP/Domain_name)
```

```
#ssh -X root@server1.example.com
```

```
Activities Terminal Aug 13 20:33  
ancya@ancya-VirtualBox:~$ sudo apt install openssh-client  
[sudo] password for ancy:  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
openssh-client is already the newest version (1:8.4p1-5ubuntu1).  
openssh-client set to manually installed.  
0 upgraded, 0 newly installed, 0 to remove and 117 not upgraded.  
ancya@ancya-VirtualBox:~$ ssh localhost  
ssh: connect to host localhost port 22: Connection refused  
ancya@ancya-VirtualBox:~$ sudo apt-get install openssh-server ii  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
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  
0 upgraded, 5 newly installed, 0 to remove and 117 not upgraded.  
Need to get 659 kB of archives.  
After this operation, 5,973 kB of additional disk space will be used.  
Do you want to continue? [Y/n] y  
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/universe amd64 ii amd64 1.8-2  
[15.3 kB]  
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 ncurses-term all 6  
.2+20201114-2build1 [249 kB]  
Get:3 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 openssh-sftp-server
```

```
ancya@ancya-VirtualBox:~$ ssh localhost  
The authenticity of host 'localhost (127.0.0.1)' can't be established.  
ECDSA key fingerprint is SHA256:Ha9/MHze04q80iVUNwERjhTp9w6bzjXNCG7654h8x  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts  
ancya@localhost's password:  
Welcome to Ubuntu 21.04 (GNU/Linux 5.11.0-18-generic x86_64)  
  
 * Documentation: https://help.ubuntu.com  
 * Management: https://landscape.canonical.com  
 * Support: https://ubuntu.com/advantage  
  
118 updates can be installed immediately.  
45 of these updates are security updates.  
To see these additional updates run: apt list --upgradable  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/*copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.
```

6. scp

SCP (secure copy) is a command-line utility that allows you to securely

- copy files and directories between two locations.
- With scp, you can copy a file or directory:
- From your local system to a remote system.
- From a remote system to your local system.
- Between two remote systems from your local system.
- Remote file system locations are specified in format [user@]host:/path

Syntax:

```
scp [OPTION] [user@]SRC_HOST:]file1 [user@]DEST_HOST:]file2
```

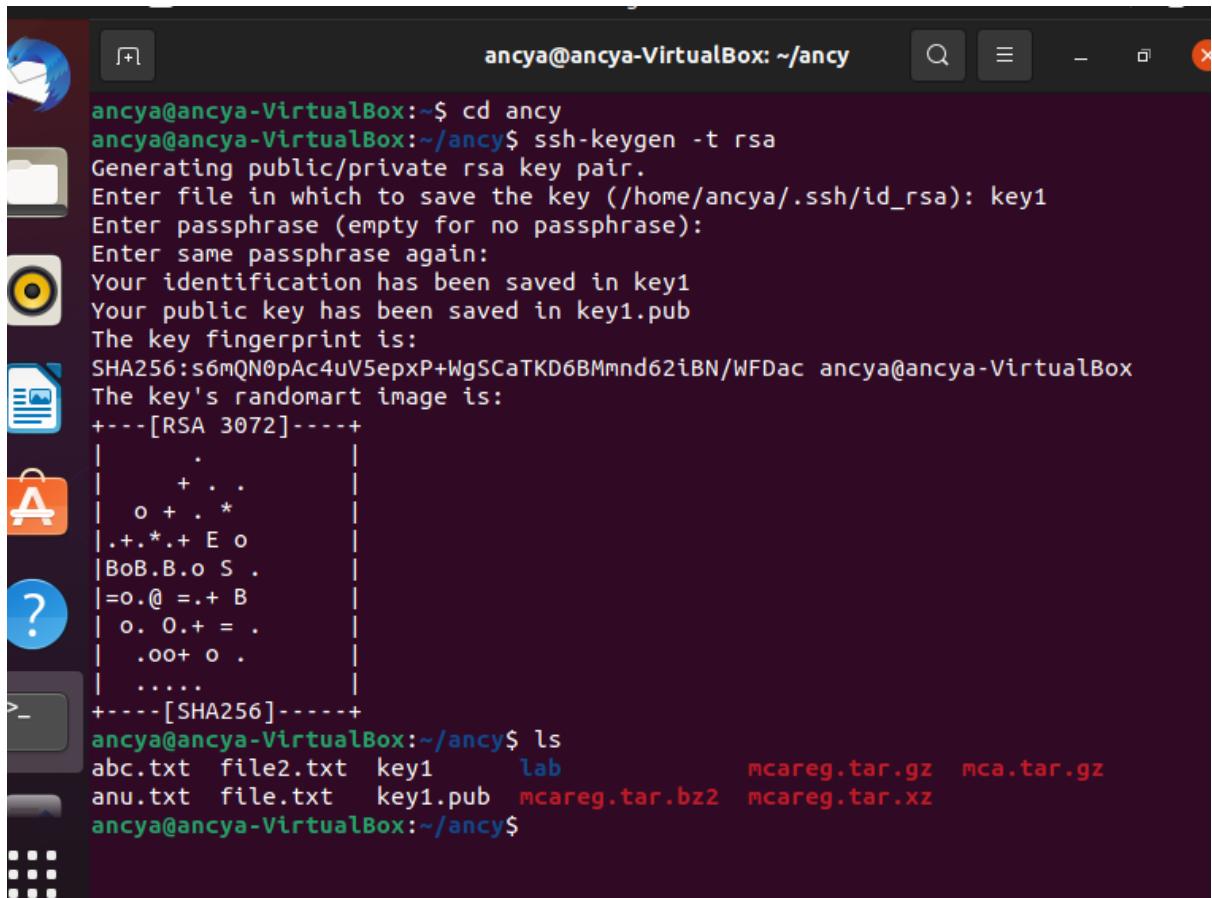
```
$scp /etc/yum.config /etc/hosts ServerX:/home/student
```

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

7. ssh-keygen

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

```
$ssh-keygen -t rsa
```



The screenshot shows a terminal window titled "ancya@ancya-VirtualBox: ~/ancy". The user runs the command "ssh-keygen -t rsa", which generates a public/private key pair. The user specifies the file path as "/home/ancya/.ssh/id_rsa" and sets a passphrase "key1". The public key is saved as "key1.pub". The key fingerprint is displayed as a long string of characters, followed by its SHA256 hash. Finally, the user lists the files in the current directory, showing the generated keys and their compressed versions.

```
ancya@ancya-VirtualBox:~$ cd ancy
ancya@ancya-VirtualBox:~/ancy$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ancya/.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:s6mQN0pAc4uV5epxP+lgSCaTKD6BMmnd62iBN/WFDac ancy@ancya-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
|          .       |
|         + ..     |
|        o + . *   |
| .+.*.+ E o   |
| BoB.B.o S .  |
| =o..@ =.+ B   |
| o. O.+ = .   |
| .oo+ o .     |
| ....          |
+---[SHA256]---+
ancya@ancya-VirtualBox:~/ancy$ ls
abc.txt  file2.txt  key1      lab           mcareg.tar.gz  mca.tar.gz
anu.txt  file.txt   key1.pub   mcareg.tar.bz2  mcareg.tar.xz
ancya@ancya-VirtualBox:~/ancy$
```

8. ssh-copy-id

The `ssh-copy-id` command allows you to install an SSH key on a remote server's authorized keys.

- This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

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

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

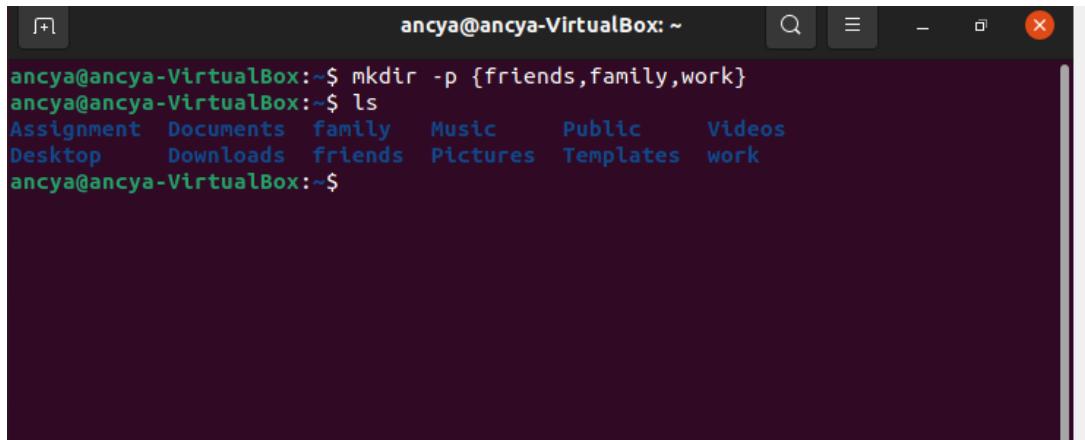
- 1.a. Create six files with name of the form songX.mp3
- b. Create six files with name of the form snapX.mp3
- c. Create six files with name of the form filmX.mp3 (In each set, replace X with the numbers 1 through 6)

```
ancya@ancya-VirtualBox:~$ mkdir Assignment
ancya@ancya-VirtualBox:~$ cd Assignment/
ancya@ancya-VirtualBox:~/Assignment$ touch song{1..6}.mp3
ancya@ancya-VirtualBox:~/Assignment$ ls
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
ancya@ancya-VirtualBox:~/Assignment$ touch snap{1..6}.mp3
ancya@ancya-VirtualBox:~/Assignment$ ls
snap1.mp3  snap2.mp3  snap3.mp3  snap4.mp3  snap5.mp3  snap6.mp3
snap2.mp3  snap4.mp3  snap6.mp3  snap2.mp3  snap4.mp3  snap6.mp3
ancya@ancya-VirtualBox:~/Assignment$ touch film{1..6}.mp3
ancya@ancya-VirtualBox:~/Assignment$ ls
film1.mp3  film2.mp3  film3.mp3  film4.mp3  film5.mp3  film6.mp3
film2.mp3  film5.mp3  snap2.mp3  snap5.mp3  song2.mp3  song5.mp3
film3.mp3  film6.mp3  snap3.mp3  snap6.mp3  song3.mp3  song6.mp3
ancya@ancya-VirtualBox:~/Assignment$
```

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.

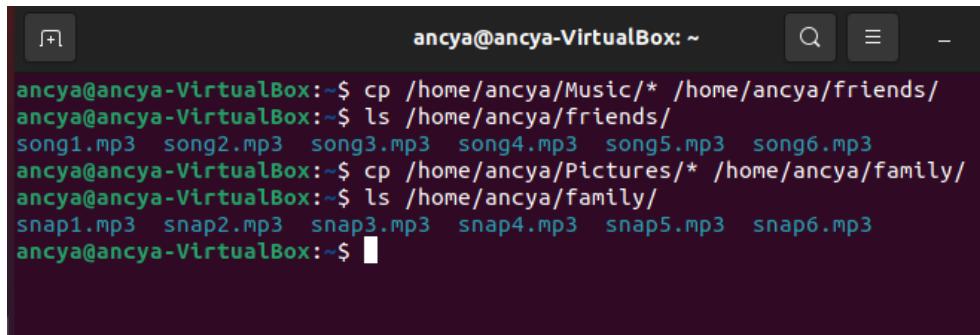
```
ancya@ancya-VirtualBox:~/Assignment$ mv song{1..6}.mp3 /home/ancya/Music/
ancya@ancya-VirtualBox:~/Assignment$ mv snap{1..6}.mp3 /home/ancya/Pictures/
ancya@ancya-VirtualBox:~/Assignment$ mv film{1..6}.mp3 /home/ancya/Videos/
ancya@ancya-VirtualBox:~/Assignment$ cd ..
ancya@ancya-VirtualBox:~$ cd Music/
ancya@ancya-VirtualBox:~/Music$ ls
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
ancya@ancya-VirtualBox:~/Music$ cd ..
ancya@ancya-VirtualBox:~$ ls Pictures/
snap1.mp3  snap2.mp3  snap3.mp3  snap4.mp3  snap5.mp3  snap6.mp3
ancya@ancya-VirtualBox:~$ ls Videos/
film1.mp3  film2.mp3  film3.mp3  film4.mp3  film5.mp3  film6.mp3
ancya@ancya-VirtualBox:~$
```

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



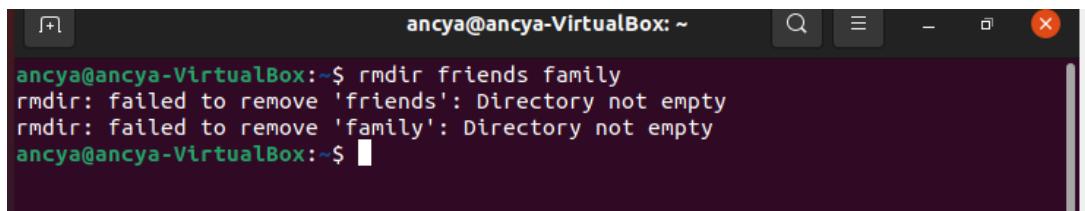
```
ancya@ancaya-VirtualBox:~$ mkdir -p {friends,family,work}
ancya@ancaya-VirtualBox:~$ ls
Assignment Documents family Music Public Videos
Desktop Downloads friends Pictures Templates work
ancya@ancaya-VirtualBox:~$
```

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



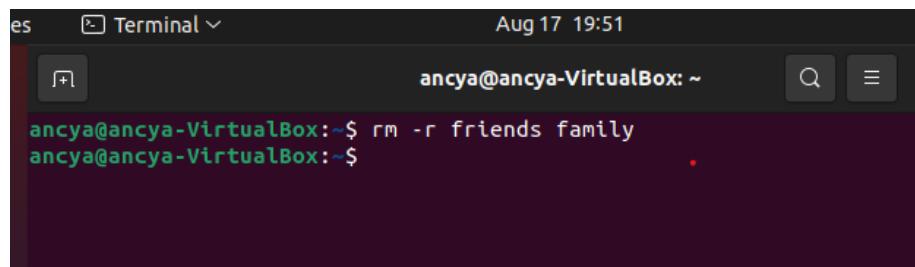
```
ancya@ancaya-VirtualBox:~$ cp /home/ancaya/Music/* /home/ancaya/friends/
ancaya@ancaya-VirtualBox:~$ ls /home/ancaya/friends/
song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
ancaya@ancaya-VirtualBox:~$ cp /home/ancaya/Pictures/* /home/ancaya/family/
ancaya@ancaya-VirtualBox:~$ ls /home/ancaya/family/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

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



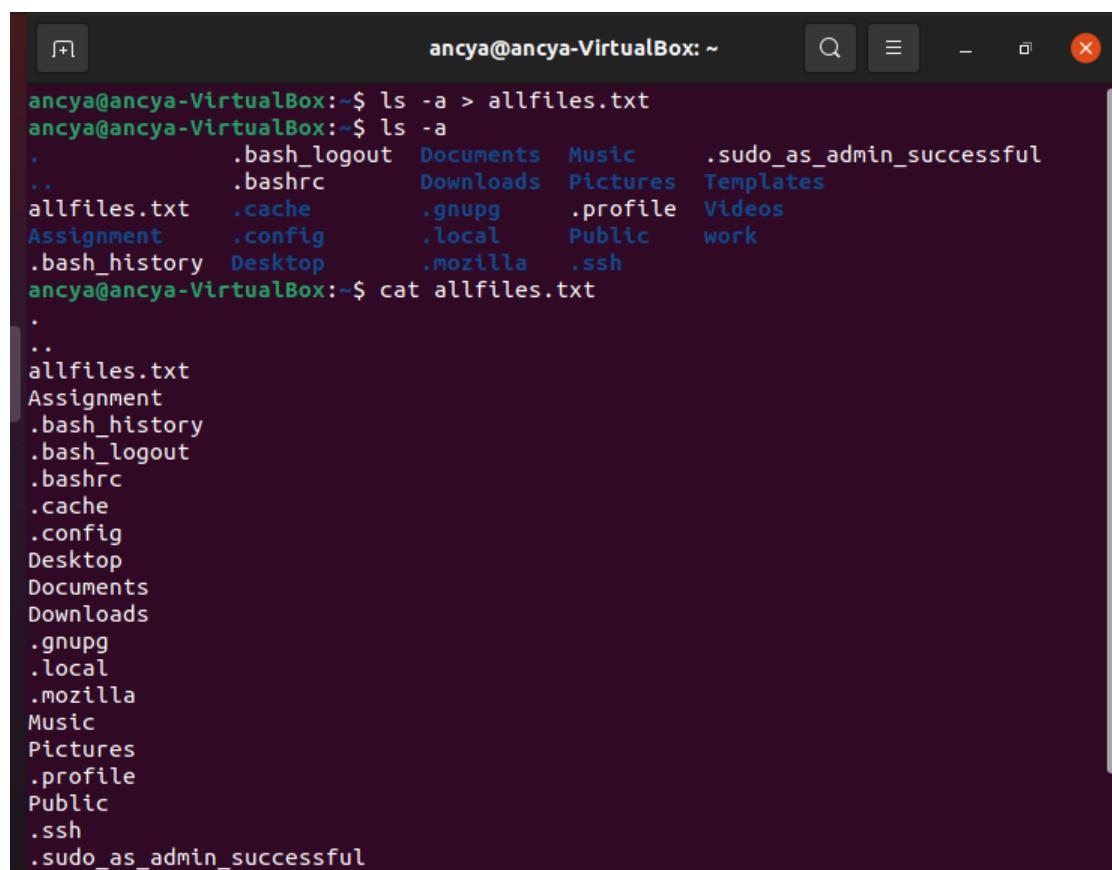
```
ancya@ancaya-VirtualBox:~$ rmdir friends family
rmdir: failed to remove 'friends': Directory not empty
rmdir: failed to remove 'family': Directory not empty
ancaya@ancaya-VirtualBox:~$
```

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



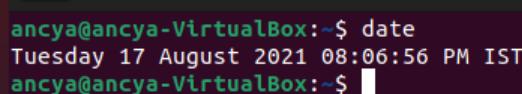
```
es Terminal ~ Aug 17 19:51
ancya@ancya-VirtualBox:~$ rm -r friends family
ancya@ancya-VirtualBox:~$ .
```

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



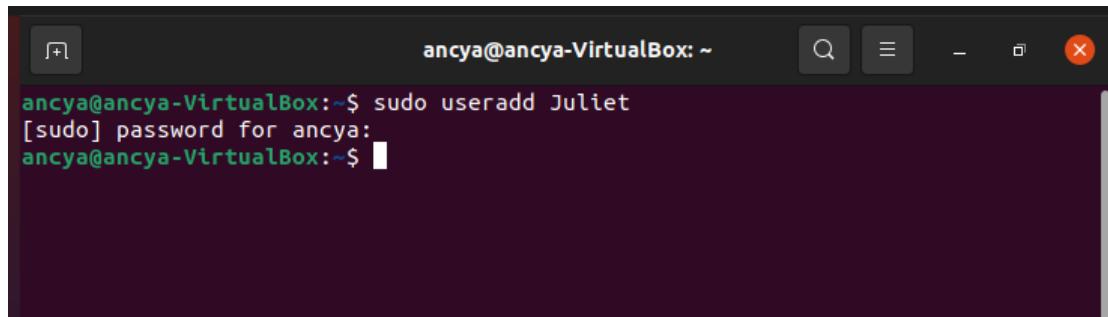
```
ancya@ancya-VirtualBox:~$ ls -a > allfiles.txt
ancya@ancya-VirtualBox:~$ ls -a
. bash_logout Documents Music .sudo_as_admin_successful
.. bashrc Downloads Pictures Templates
allfiles.txt cache gnupg .profile Videos
Assignment config local Public work
.bash_history Desktop mozilla .ssh
ancya@ancya-VirtualBox:~$ cat allfiles.txt
.
..
allfiles.txt
Assignment
.bash_history
.bash_logout
.bashrc
.cache
.config
Desktop
Documents
Downloads
.gnupg
.local
.mozilla
Music
Pictures
.profile
Public
.ssh
.sudo_as_admin_successful
```

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



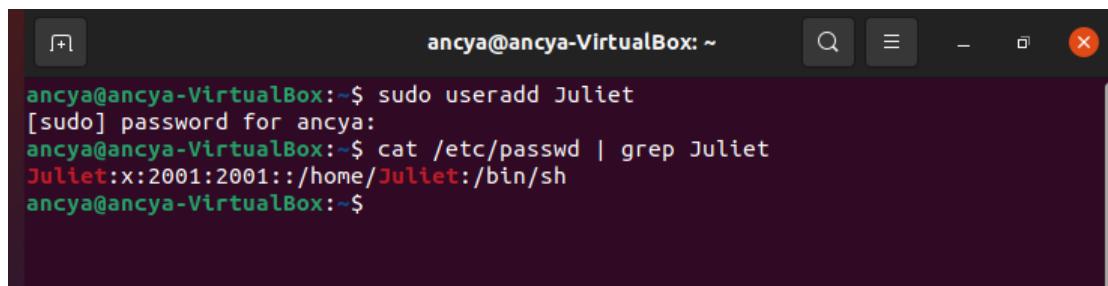
```
ancya@ancya-VirtualBox:~$ date
Tuesday 17 August 2021 08:06:56 PM IST
ancya@ancya-VirtualBox:~$
```

9. Add the user Juliet



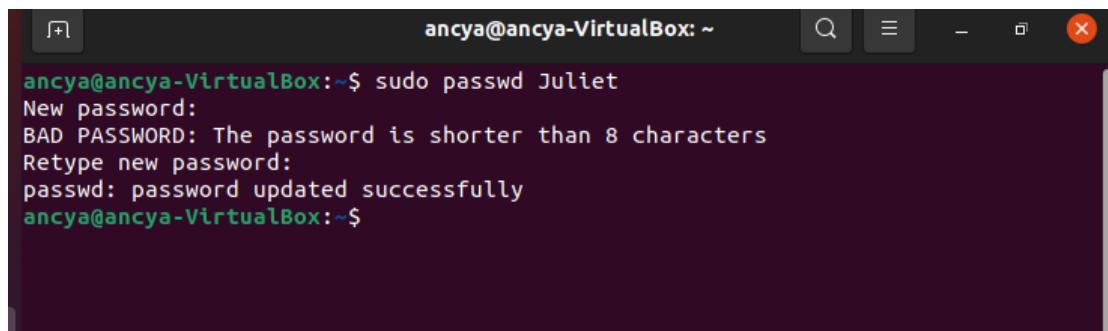
```
ancya@ancya-VirtualBox:~$ sudo useradd Juliet
[sudo] password for ancyah:
ancya@ancya-VirtualBox:~$
```

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



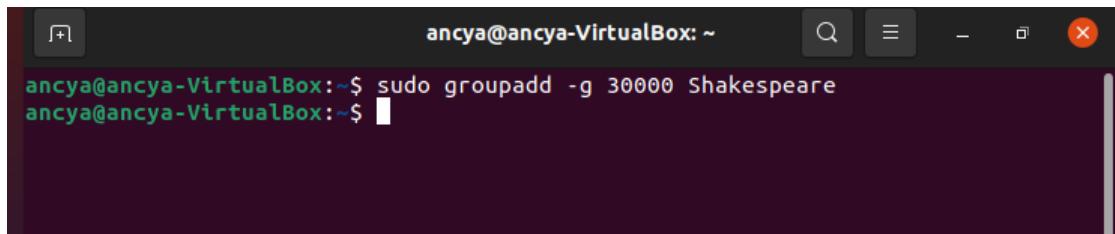
```
ancya@ancya-VirtualBox:~$ sudo useradd Juliet
[sudo] password for ancyah:
ancya@ancya-VirtualBox:~$ cat /etc/passwd | grep Juliet
Juliet:x:2001:2001::/home/Juliet:/bin/sh
ancya@ancya-VirtualBox:~$
```

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



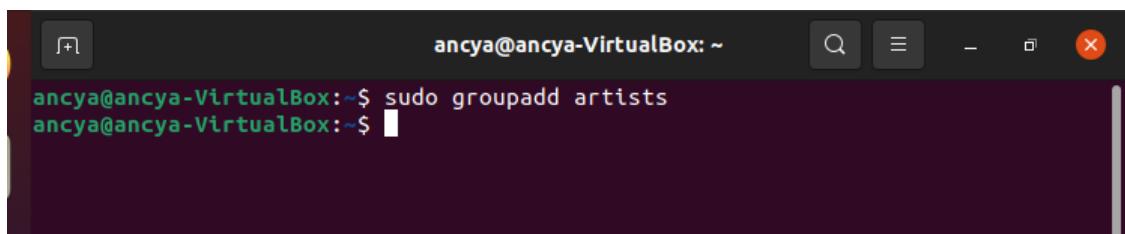
```
ancya@ancya-VirtualBox:~$ sudo passwd Juliet
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
ancya@ancya-VirtualBox:~$
```

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



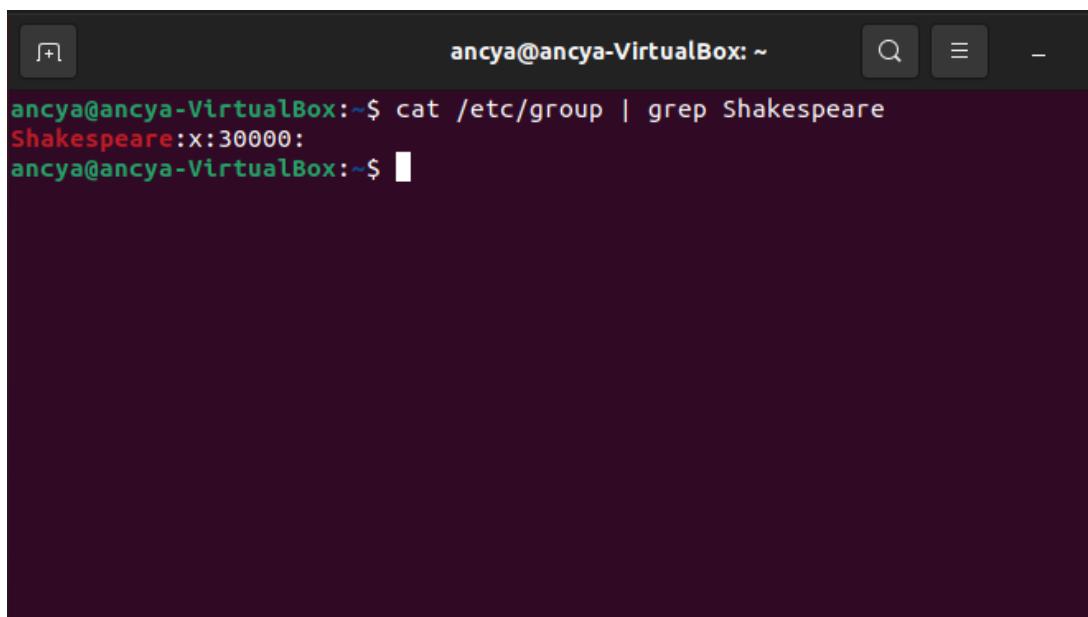
```
ancya@ancya-VirtualBox:~$ sudo groupadd -g 30000 Shakespeare
ancya@ancya-VirtualBox:~$
```

13. Create a supplementary group called artists.



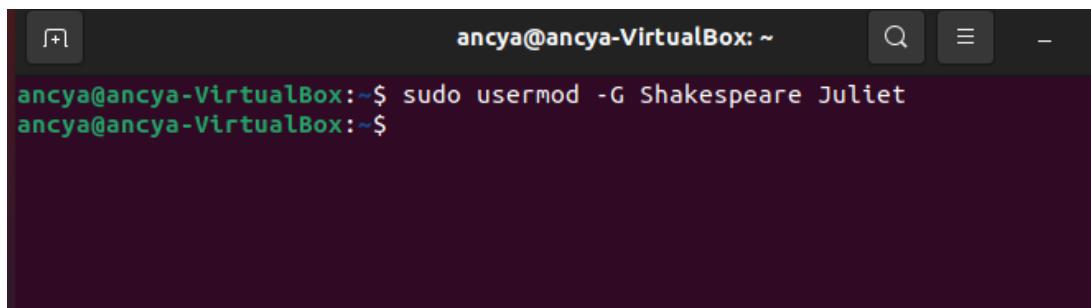
```
ancya@ancya-VirtualBox:~$ sudo groupadd artists
ancya@ancya-VirtualBox:~$
```

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



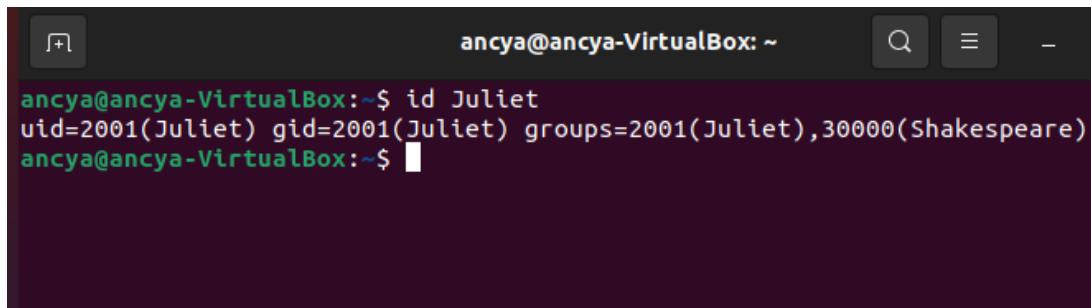
```
ancya@ancya-VirtualBox:~$ cat /etc/group | grep Shakespeare
Shakespeare:x:30000:
ancya@ancya-VirtualBox:~$
```

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



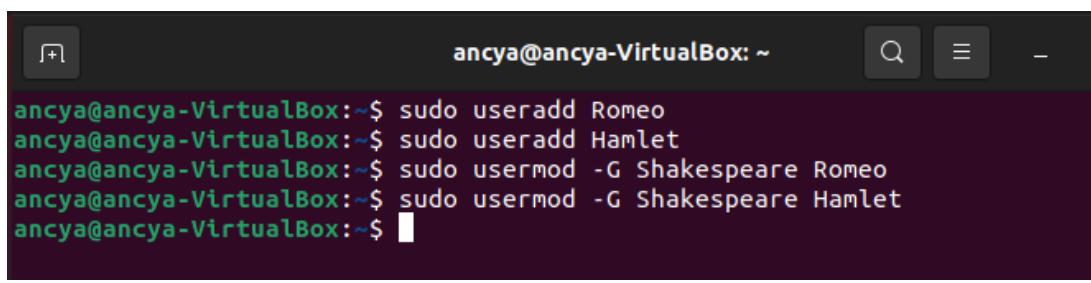
```
ancya@ancya-VirtualBox:~$ sudo usermod -G Shakespeare Juliet  
ancya@ancya-VirtualBox:~$
```

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



```
ancya@ancya-VirtualBox:~$ id Juliet  
uid=2001(Juliet) gid=2001(Juliet) groups=2001(Juliet),30000(Shakespeare)  
ancya@ancya-VirtualBox:~$
```

17. Add Romeo and Hamlet to the Shakespeare group



```
ancya@ancya-VirtualBox:~$ sudo useradd Romeo  
ancya@ancya-VirtualBox:~$ sudo useradd Hamlet  
ancya@ancya-VirtualBox:~$ sudo usermod -G Shakespeare Romeo  
ancya@ancya-VirtualBox:~$ sudo usermod -G Shakespeare Hamlet  
ancya@ancya-VirtualBox:~$
```

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

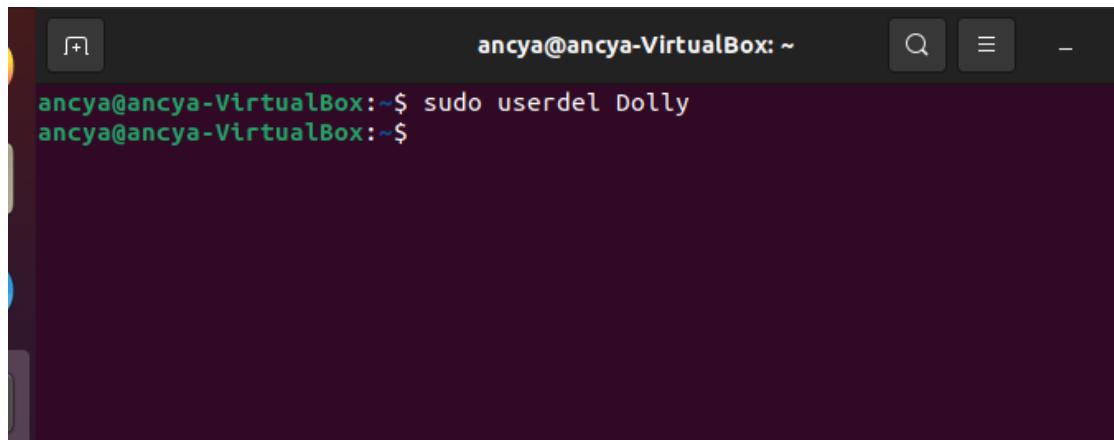
```
ancya@ancya-VirtualBox:~$ sudo useradd Reba
ancya@ancya-VirtualBox:~$ sudo useradd Dolly
ancya@ancya-VirtualBox:~$ sudo useradd Elvis
ancya@ancya-VirtualBox:~$ sudo usermod -G artists Reba
ancya@ancya-VirtualBox:~$ sudo usermod -G artists Dolly
ancya@ancya-VirtualBox:~$ sudo usermod -G artists Elvis
ancya@ancya-VirtualBox:~$
```

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

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

```
caravel:x:1007:anu
AJCE:x:1006:anu
Juliet:x:2001:
Shakespeare:x:30000:Juliet,Romeo,Hamlet
artists:x:30001:Reba,Dolly,Elvis
Romeo:x:2002:
Hamlet:x:2003:
Reba:x:2004:
Dolly:x:2005:
Elvis:x:2006:
```

20. Attempt to remove user Dolly.



A screenshot of a terminal window titled "ancya@ancya-VirtualBox: ~". The window contains the following text:
ancya@ancya-VirtualBox:~\$ sudo userdel Dolly
ancya@ancya-VirtualBox:~\$

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

Windows

- Ping

```
C:\Users\Ancy Alexander>ping google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=31ms TTL=119
Reply from 142.250.193.142: bytes=32 time=41ms TTL=119
Reply from 142.250.193.142: bytes=32 time=40ms TTL=119
Reply from 142.250.193.142: bytes=32 time=47ms TTL=119

Ping statistics for 142.250.193.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 47ms, Average = 39ms

C:\Users\Ancy Alexander>ping -a google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119

Ping statistics for 142.250.193.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms

C:\Users\Ancy Alexander>ping -t google.com

Pinging google.com [142.250.193.142] with 32 bytes of data:
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=22ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
Reply from 142.250.193.142: bytes=32 time=23ms TTL=119
```

```
Approximate round trip times in milli-seconds:  
    Minimum = 22ms, Maximum = 23ms, Average = 22ms  
Control-C  
^C  
C:\Users\Ancy Alexander>ping -j google.com  
  
Pinging google.com [142.250.193.142] with 32 bytes of data:  
General failure.  
General failure.  
General failure.  
General failure.  
  
Ping statistics for 142.250.193.142:  
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
  
C:\Users\Ancy Alexander>ping -4 google.com  
  
Pinging google.com [142.250.193.142] with 32 bytes of data:
```

- Route

0x Command Prompt

```
C:\Users\Ancy Alexander>route print
=====
Interface List
 10...0a 00 27 00 00 0a .....VirtualBox Host-Only Ethernet Adapter
  7...52 5b c2 b6 5d b7 .....Microsoft Wi-Fi Direct Virtual Adapter #7
  3...62 5b c2 b6 5d b7 .....Microsoft Wi-Fi Direct Virtual Adapter #8
  9...50 5b c2 b6 5d b7 .....Qualcomm Atheros QCA9377 Wireless Network Adapter
  1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0      0.0.0.0    192.168.1.1  192.168.1.6    50
         127.0.0.0    255.0.0.0   On-link        127.0.0.1    331
         127.0.0.1    255.255.255.255  On-link        127.0.0.1    331
 127.255.255.255  255.255.255.255  On-link        127.0.0.1    331
         192.168.1.0  255.255.255.0  On-link        192.168.1.6    306
         192.168.1.6  255.255.255.255  On-link        192.168.1.6    306
 192.168.1.255  255.255.255.255  On-link        192.168.1.6    306
 192.168.56.0    255.255.255.0  On-link        192.168.56.1   281
 192.168.56.1    255.255.255.255  On-link        192.168.56.1   281
 192.168.56.255  255.255.255.255  On-link        192.168.56.1   281
         224.0.0.0    240.0.0.0  On-link        127.0.0.1    331
         224.0.0.0    240.0.0.0  On-link        192.168.56.1   281
         224.0.0.0    240.0.0.0  On-link        192.168.1.6    306
 255.255.255.255  255.255.255.255  On-link        127.0.0.1    331
 255.255.255.255  255.255.255.255  On-link        192.168.56.1   281
 255.255.255.255  255.255.255.255  On-link        192.168.1.6    306
=====
Persistent Routes:
  None
=====
IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
  1     331 ::1/128            On-link
 10    281 fe80::/64           On-link
  9     306 fe80::/64           On-link
  9     306 fe80::2c6e:6ec:fc63:6150/128
                                On-link
```

```
None

C:\Users\Ancy Alexander>route print -4
=====
Interface List
10...0a 00 27 00 00 0a ....VirtualBox Host-Only Ethernet Adapter
 7...52 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #7
 3...62 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #8
 9...50 5b c2 b6 5d b7 ....Qualcomm Atheros QCA9377 Wireless Network Adapter
 1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway        Interface Metric
          0.0.0.0        0.0.0.0    192.168.1.1  192.168.1.6    50
         127.0.0.0      255.0.0.0   On-link        127.0.0.1    331
         127.0.0.1      255.255.255.255  On-link        127.0.0.1    331
 127.255.255.255      255.255.255.255  On-link        127.0.0.1    331
         192.168.1.0    255.255.255.0   On-link        192.168.1.6    306
         192.168.1.6    255.255.255.255  On-link        192.168.1.6    306
       192.168.1.255    255.255.255.255  On-link        192.168.1.6    306
         192.168.56.0    255.255.255.0   On-link        192.168.56.1    281
         192.168.56.1    255.255.255.255  On-link        192.168.56.1    281
 192.168.56.255      255.255.255.255  On-link        192.168.56.1    281
         224.0.0.0        240.0.0.0   On-link        127.0.0.1    331
         224.0.0.0        240.0.0.0   On-link        192.168.56.1    281
         224.0.0.0        240.0.0.0   On-link        192.168.1.6    306
 255.255.255.255    255.255.255.255  On-link        127.0.0.1    331
 255.255.255.255    255.255.255.255  On-link        192.168.56.1    281
 255.255.255.255    255.255.255.255  On-link        192.168.1.6    306
=====
Persistent Routes:
  None
None

C:\Users\Ancy Alexander>route print -6
=====
Interface List
10...0a 00 27 00 00 0a ....VirtualBox Host-Only Ethernet Adapter
 7...52 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #7
 3...62 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #8
 9...50 5b c2 b6 5d b7 ....Qualcomm Atheros QCA9377 Wireless Network Adapter
 1.....Software Loopback Interface 1
=====

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
 1    331 ::1/128        On-link
 10   281 fe80::/64      On-link
 9    306 fe80::/64      On-link
 9    306 fe80::2c6e:6ec:fc63:6150/128
                                On-link
 10   281 fe80::ccde:e978:30f0:b852/128
                                On-link
 1    331 ff00::/8       On-link
 10   281 ff00::/8       On-link
 9    306 ff00::/8       On-link
=====
Persistent Routes:
  None
C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>route print *157
=====
Interface List
 10...0a 00 27 00 00 0a ....VirtualBox Host-Only Ethernet Adapter
 7...52 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #7
 3...62 5b c2 b6 5d b7 ....Microsoft Wi-Fi Direct Virtual Adapter #8
 9...50 5b c2 b6 5d b7 ....Qualcomm Atheros QCA9377 Wireless Network Adapter
 1.....Software Loopback Interface 1
=====

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

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

C:\Users\Ancy Alexander>
```

- Tracert

```
C:\Users\Ancy Alexander>tracert 192.168.1.1

Tracing route to EARTH-1010.bbrouter [192.168.1.1]
over a maximum of 30 hops:
  1      4 ms      4 ms      3 ms  EARTH-1010.bbrouter [192.168.1.1]

Trace complete.
```

```
C:\Users\Ancy Alexander>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1   4 ms    7 ms    7 ms  EARTH-1010.bbrouter [192.168.1.1]
 2   15 ms   16 ms   21 ms  100.86.96.1
 3   21 ms   22 ms   21 ms  nsg-static-241.228.72.182.airtel.in [182.72.228.241]
 4   217 ms  217 ms  217 ms  116.119.52.163
 5   235 ms  302 ms  237 ms  ve951.core2.nyc6.he.net [184.105.64.178]
 6   247 ms  248 ms  248 ms  100ge13-1.core1.nyc4.he.net [184.105.64.177]
 7   244 ms  244 ms  244 ms  100ge16-1.core1.ash1.he.net [184.105.223.165]
 8   251 ms  252 ms  250 ms  100ge5-1.core2.ash1.he.net [72.52.92.226]
 9   *        *        *        Request timed out.
10  *        *        *        Request timed out.
11  *        *        *        Request timed out.
12  *        *        *        Request timed out.
13  *        *        *        Request timed out.
14  *        *        *        Request timed out.
15  *        *        *        Request timed out.
16  *        *        *        Request timed out.
17  *        *        *        Request timed out.
18  *        *        *        Request timed out.
19  *        *        *        Request timed out.
20  *        *        *        Request timed out.
21  *        *        *        Request timed out.
22  *        *        *        Request timed out.
23  *        *        *        Request timed out.
24  *        *        *        Request timed out.
25  *        *        *        Request timed out.
26  *        *        *        Request timed out.
27  *        *        *        Request timed out.
28  *        *        *        Request timed out.
29  *        *        *        Request timed out.
30  *        *        *        Request timed out.

Trace complete.
```

```
C:\Users\Ancy Alexander>tracert google.com

Tracing route to google.com [142.250.193.142]
over a maximum of 30 hops:

 1   4 ms    3 ms    4 ms  EARTH-1010.bbrouter [192.168.1.1]
 2   9 ms    8 ms    9 ms  100.86.96.1
 3   34 ms   23 ms   24 ms  10.1.6.18
 4   24 ms   23 ms   23 ms  72.14.212.92
 5   24 ms   23 ms   23 ms  216.239.54.67
 6   23 ms   22 ms   22 ms  142.251.55.225
 7   22 ms   23 ms   22 ms  maa05s25-in-f14.1e100.net [142.250.193.142]

Trace complete.
```

```
C:\Users\Ancy Alexander>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.192.35]
over a maximum of 30 hops:

 1   3 ms    4 ms    4 ms  EARTH-1010.bbrouter [192.168.1.1]
 2   8 ms    6 ms    6 ms  100.86.96.1
 3   23 ms   24 ms   26 ms  10.1.6.18
 4   23 ms   23 ms   23 ms  as32934.maa.extreme-ix.net [45.120.251.139]
 5   23 ms   25 ms   24 ms  po102.psw01.maa2.tfbnw.net [129.134.34.151]
 6   22 ms   22 ms   23 ms  173.252.67.235
 7   23 ms   22 ms   22 ms  edge-star-mini-shv-02-maa2.facebook.com [157.240.192.35]

Trace complete.
```

● Nslookup

```
C:\Users\Ancy Alexander>nslookup  
Default Server: EARTH-1010.bbrouter  
Address: 192.168.1.1  
  
> exit  
  
C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>nslookup google.com  
Server: EARTH-1010.bbrouter  
Address: 192.168.1.1  
  
Non-authoritative answer:  
Name: google.com  
Addresses: 2404:6800:4007:820::200e  
          142.250.193.142
```

```
C:\Users\Ancy Alexander>nslookup -q=MX google.com  
Server: EARTH-1010.bbrouter  
Address: 192.168.1.1  
  
Non-authoritative answer:  
google.com      MX preference = 30, mail exchanger = alt2.aspmx.l.google.com  
google.com      MX preference = 10, mail exchanger = aspmx.l.google.com  
google.com      MX preference = 20, mail exchanger = alt1.aspmx.l.google.com  
google.com      MX preference = 40, mail exchanger = alt3.aspmx.l.google.com  
google.com      MX preference = 50, mail exchanger = alt4.aspmx.l.google.com  
  
C:\Users\Ancy Alexander>
```

```
C:\Users\Ancy Alexander>nslookup -type=ns google.com  
Server: EARTH-1010.bbrouter  
Address: 192.168.1.1  
  
Non-authoritative answer:  
google.com      nameserver = ns2.google.com  
google.com      nameserver = ns1.google.com  
google.com      nameserver = ns4.google.com  
google.com      nameserver = ns3.google.com
```

● Ipconfig

```
C:\Users\Ancy Alexander>ipconfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::ccde:e978:30f0:b852%10
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix  . : bbrouter
  Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
  IPv4 Address. . . . . : 192.168.1.6
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.1.1
```

```
Default Gateway . . . . . : 192.168.1.1

C:\Users\Ancy Alexander>ipconfig /allcompartments

Windows IP Configuration

=====
Network Information for Compartment 1 (ACTIVE)
=====

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::ccde:e978:30f0:b852%10
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix  . : bbrouter
  Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
  IPv4 Address. . . . . : 192.168.1.6
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.1.1
```

```
C:\Users\Ancy Alexander>ipconfig /displaydns

Windows IP Configuration

1.0.0.127.in-addr.arpa
-----
Record Name . . . . . : 1.0.0.127.in-addr.arpa.
Record Type . . . . . : 12
Time To Live . . . . . : 245962
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : localhost

178.64.105.184.in-addr.arpa
-----
Record Name . . . . . : 178.64.105.184.in-addr.arpa
Record Type . . . . . : 12
Time To Live . . . . . : 20692
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : ve951.core2.nyc6.he.net

177.64.105.184.in-addr.arpa
-----
Record Name . . . . . : 177.64.105.184.in-addr.arpa
Record Type . . . . . : 12
Time To Live . . . . . : 20287
Data Length . . . . . : 8
Section . . . . . : Answer
PTR Record . . . . . : 100ge13-1.core1.nyc4.he.net

165.223.105.184.in-addr.arpa
-----
Record Name . . . . . : 165.223.105.184.in-addr.arpa
Record Type . . . . . : 12
Time To Live . . . . . : 20374
Data Length . . . . . : 8
Section . . . . . : Answer
```

```
C:\Users\Ancy Alexander>ipconfig /release

Windows IP Configuration

No operation can be performed on Local Area Connection* 15 while it has its media disconnected.
No operation can be performed on Local Area Connection* 16 while it has its media disconnected.

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::ccde:e978%30f0:b852%10
  IPv4 Address . . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 15:

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

Wireless LAN adapter Local Area Connection* 16:

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

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::2c6e:6ec:fc63:6150%9
  Default Gateway . . . . . :
```

- Netstat

```
C:\Users\Ancy Alexander>netstat  
  
Active Connections  
  
Proto Local Address          Foreign Address        State  
TCP   192.168.1.6:62291    20.198.162.78:https ESTABLISHED  
TCP   192.168.1.6:62292    40.119.205.193:https TIME_WAIT  
TCP   192.168.1.6:62294    maa05s28-in-f1:https ESTABLISHED  
TCP   192.168.1.6:62295    40.119.205.193:https TIME_WAIT  
TCP   192.168.1.6:62296    40.119.205.193:https TIME_WAIT  
TCP   192.168.1.6:62297    40.119.205.193:https TIME_WAIT  
TCP   192.168.1.6:62300    103.154.36.35:7747   SYN_SENT  
TCP   192.168.1.6:62300    relay-3e92535d:http  ESTABLISHED
```

```
C:\Users\Ancy Alexander>netstat -n 5  
  
Active Connections  
  
Proto Local Address          Foreign Address        State  
TCP   192.168.1.6:62291    20.198.162.78:443  ESTABLISHED  
TCP   192.168.1.6:62294    142.250.205.225:443 CLOSE_WAIT  
TCP   192.168.1.6:62300    168.119.147.171:80  ESTABLISHED  
TCP   192.168.1.6:62307    104.115.92.10:443  ESTABLISHED  
TCP   192.168.1.6:62308    20.190.145.141:443 TIME_WAIT  
TCP   192.168.1.6:62310    184.31.215.15:80  TIME_WAIT  
TCP   192.168.1.6:62311    20.44.229.112:443 TIME_WAIT  
TCP   192.168.1.6:62312    20.44.229.112:443 ESTABLISHED
```

```
Active Connections  
  
Proto Local Address          Foreign Address        State  
TCP   192.168.1.6:62291    20.198.162.78:443  ESTABLISHED  
TCP   192.168.1.6:62294    142.250.205.225:443 CLOSE_WAIT  
TCP   192.168.1.6:62300    168.119.147.171:80  ESTABLISHED  
TCP   192.168.1.6:62307    104.115.92.10:443  ESTABLISHED  
TCP   192.168.1.6:62308    20.190.145.141:443 TIME_WAIT  
TCP   192.168.1.6:62310    184.31.215.15:80  TIME_WAIT  
TCP   192.168.1.6:62311    20.44.229.112:443 TIME_WAIT  
TCP   192.168.1.6:62312    20.44.229.112:443 ESTABLISHED
```

```
Active Connections  
  
Proto Local Address          Foreign Address        State
```

```
C:\Users\Ancy Alexander>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	192.168.1.6:62291	20.198.162.78:443	ESTABLISHED
TCP	192.168.1.6:62294	142.250.205.225:443	ESTABLISHED
TCP	192.168.1.6:62300	168.119.147.171:80	ESTABLISHED
TCP	192.168.1.6:62307	104.115.92.10:443	ESTABLISHED
TCP	192.168.1.6:62308	20.190.145.141:443	ESTABLISHED
TCP	192.168.1.6:62309	52.182.143.210:443	TIME_WAIT
TCP	192.168.1.6:62310	184.31.215.15:80	ESTABLISHED
TCP	192.168.1.6:62311	20.44.229.112:443	ESTABLISHED

```
C:\Users\Ancy Alexander>netstat -a
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:80	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:135	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:443	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:445	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:3306	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:5040	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:7070	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49664	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49665	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49666	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49667	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49668	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:49675	LAPTOP-91K4TH1P:0	LISTENING
TCP	0.0.0.0:62300	LAPTOP-91K4TH1P:0	LISTENING
TCP	192.168.1.6:139	LAPTOP-91K4TH1P:0	LISTENING
TCP	192.168.1.6:62291	20.198.162.78:https	ESTABLISHED
TCP	192.168.1.6:62294	maa05s28-in-f1:https	CLOSE_WAIT
TCP	192.168.1.6:62300	relay-3e92535d:http	ESTABLISHED
TCP	192.168.1.6:62307	a104-115-92-10:https	ESTABLISHED
TCP	192.168.1.6:62310	a184-31-215-15:http	TIME_WAIT
TCP	192.168.1.6:62311	20.44.229.112:https	TIME_WAIT
TCP	192.168.1.6:62312	20.44.229.112:https	TIME_WAIT
TCP	192.168.1.6:62313	20.44.229.112:https	ESTABLISHED
TCP	192.168.56.1:139	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:80	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:135	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:443	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:445	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:3306	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:49664	LAPTOP-91K4TH1P:0	LISTENING
TCP	[::]:49665	LAPTOP-91K4TH1P:0	LISTENING

Linux

- Ping

```
ancya@ancya-VirtualBox:~$ ping google.com
PING google.com (142.250.193.142) 56(84) bytes of data.
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=118 time=25.1 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=118 time=42.2 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=118 time=25.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=118 time=23.8 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=118 time=24.6 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=6 ttl=118 time=23.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=7 ttl=118 time=24.4 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6010ms
rtt min/avg/max/mdev = 23.311/26.951/42.168/6.244 ms
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ ping -a google.com
PING google.com (142.250.193.142) 56(84) bytes of data.
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=1 ttl=118 time=23.5 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=2 ttl=118 time=24.3 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=3 ttl=118 time=24.6 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=4 ttl=118 time=24.9 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=5 ttl=118 time=24.4 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=6 ttl=118 time=24.1 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=7 ttl=118 time=23.5 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=8 ttl=118 time=23.9 ms
64 bytes from maa05s25-in-f14.1e100.net (142.250.193.142): icmp_seq=9 ttl=118 time=23.7 ms
^C
--- google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8010ms
```

```
ancya@ancya-VirtualBox:~$ ping -V
ping from iputils 20210202
ancya@ancya-VirtualBox:~$
```

```

ancya@ancya-VirtualBox:~$ ping -b google.com
PING google.com (142.250.195.206) 56(84) bytes of data.
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=1 ttl=118 time=24.1 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=2 ttl=118 time=24.4 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=3 ttl=118 time=24.3 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=4 ttl=118 time=24.3 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=5 ttl=118 time=23.5 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=6 ttl=118 time=23.2 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=7 ttl=118 time=32.1 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=8 ttl=118 time=24.2 ms
64 bytes from maa03s42-in-f14.1e100.net (142.250.195.206): icmp_seq=9 ttl=118 time=24.2 ms
^C
--- google.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8011ms
rtt min/avg/max/mdev = 23.249/24.941/32.098/2.558 ms
ancya@ancya-VirtualBox:~$
```

● Route

```

ancya@ancya-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U      100    0        0 enp0s3
link-local      0.0.0.0        255.255.0.0    U      1000   0        0 enp0s3
ancya@ancya-VirtualBox:~$
```

```

ancya@ancya-VirtualBox:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U      100    0        0 enp0s3
169.254.0.0     0.0.0.0        255.255.0.0    U      1000   0        0 enp0s3
ancya@ancya-VirtualBox:~$
```

```

ancya@ancya-VirtualBox:~$ route -Cn
Kernel IP routing cache
Source          Destination      Gateway        Flags Metric Ref    Use Iface
ancya@ancya-VirtualBox:~$
```

```

SOURCE          DESTINATION      GATEWAY        Flags Metric Ref    Use Iface
ancya@ancya-VirtualBox:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
ancya@ancya-VirtualBox:~$
```

● Traceroute

```
ancya@ancya-VirtualBox:~$ traceroute google.com
traceroute to google.com (142.250.193.142), 64 hops max
 1  10.0.2.2  0.430ms  0.332ms  0.288ms
 2  *  *  *
 3  *  *  *
 4  *  *  *
 5  *  *  *
 6  *  *  *
 7  *  *  *
 8  *  *  *
 9  *  *  *
10  *  *  *
11  *  *  *
12  *  *  *
13  *  *  *
14  *  *  *
15  *  *  *
16  *  *  *
17  *  *  *
18  *  *  *
19  *  *  *
20  *  *  *
21  *  *  *
22  *  *  *
23  *  *  *
```

```
ancya@ancya-VirtualBox:~$ traceroute -V
traceroute (GNU inetutils) 2.0
Copyright (C) 2021 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Elian Gidoni.
```

```
ancya@ancya-VirtualBox:~$ traceroute --port=PORT
traceroute: invalid port number `PORT'
ancya@ancya-VirtualBox:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.206
Name:   google.com
Address: 2404:6800:4007:820::200e

ancya@ancya-VirtualBox:~$
```

- NSlookup

```
ancya@ancya-VirtualBox:~$ nslookup -q=MX google.com
*** Invalid option: q-MX
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.238
Name:   google.com
Address: 2404:6800:4007:820::200e
```

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

Non-authoritative answer:
google.com
    origin = ns1.google.com
    mail addr = dns-admin.google.com
    serial = 396194125
    refresh = 900
    retry = 900
    expire = 1800
    minimum = 60

Authoritative answers can be found from:

ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ nslookup -type=a google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.238

ancya@ancya-VirtualBox:~$
```

- Ifconfig

```
ancya@ancya-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::f90c:bb69:56b1:caf5 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:e0:95:e6 txqueuelen 1000 (Ethernet)
            RX packets 616 bytes 211788 (211.7 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 759 bytes 95622 (95.6 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 397 bytes 40062 (40.0 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 397 bytes 40062 (40.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
ancya@ancya-VirtualBox:~$ ifconfig -a
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::f90c:bb69:56b1:caf5 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:e0:95:e6 txqueuelen 1000 (Ethernet)
            RX packets 616 bytes 211788 (211.7 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 759 bytes 95622 (95.6 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 397 bytes 40062 (40.0 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 397 bytes 40062 (40.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
ancya@ancya-VirtualBox:~$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      622      0      0 0       765      0      0      0 BMRU
lo        65536     397      0      0 0       397      0      0      0 LRU
ancya@ancya-VirtualBox:~$
```

```
ancya@ancya-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::f90c:bb69:56b1:caf5 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:e0:95:e6 txqueuelen 1000 (Ethernet)
            RX packets 622 bytes 212367 (212.3 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 765 bytes 96106 (96.1 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 397 bytes 40062 (40.0 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 397 bytes 40062 (40.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

ancya@ancya-VirtualBox:~$
```

● Netstat

```
ancya@ancya-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 ancy-a-VirtualBox:bootpc _gateway:bootps          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix    2      [ ]     DGRAM          22583   /run/user/1000/syste
md/notify
unix    3      [ ]     DGRAM          15447   /run/systemd/notify
unix    2      [ ]     DGRAM          15461   /run/systemd/journal
/syslog
unix   18      [ ]     DGRAM          15470   /run/systemd/journal
/dev-log
unix    8      [ ]     DGRAM          15472   /run/systemd/journal
/socket
unix    3      [ ]     STREAM   CONNECTED    25828
unix    3      [ ]     STREAM   CONNECTED    23823
unix    3      [ ]     STREAM   CONNECTED    22631   /run/systemd/journal
/stdout
unix    3      [ ]     STREAM   CONNECTED    17549
unix    3      [ ]     STREAM   CONNECTED    25739   /run/systemd/journal
/stdout
unix    2      [ ]     DGRAM          15821
unix    3      [ ]     STREAM   CONNECTED    28881   /run/systemd/journal
/stdout
unix    3      [ ]     STREAM   CONNECTED    25779   /run/user/1000/bus
unix    3      [ ]     STREAM   CONNECTED    27519
unix    3      [ ]     STREAM   CONNECTED    27181
unix    3      [ ]     STREAM   CONNECTED    25861   /run/user/1000/bus
```

```

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

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix    2      [ ]        DGRAM                    22583  /run/user/1000/systemd/notify
unix    3      [ ]        DGRAM                    15447  /run/systemd/notify
unix    2      [ ]        DGRAM                    15461  /run/systemd/journal
/syslog
unix    18     [ ]        DGRAM                    15470  /run/systemd/journal
/dev-log
unix    8      [ ]        DGRAM                    15472  /run/systemd/journal
/socket
unix    3      [ ]        STREAM     CONNECTED    25828
unix    3      [ ]        STREAM     CONNECTED    23823
unix    3      [ ]        STREAM     CONNECTED    22631  /run/systemd/journal
/stdout
unix    3      [ ]        STREAM     CONNECTED    17549
unix    3      [ ]        STREAM     CONNECTED    25739  /run/systemd/journal
/stdout
unix    2      [ ]        DGRAM                    15821
unix    3      [ ]        STREAM     CONNECTED    28881  /run/systemd/journal
/stdout
unix    3      [ ]        STREAM     CONNECTED    25779  /run/user/1000/bus
unix    3      [ ]        STREAM     CONNECTED    27519
unix    3      [ ]        STREAM     CONNECTED    27181
unix    3      [ ]        STREAM     CONNECTED    25861  /run/user/1000/bus

```

```

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

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node Path
unix    2      [ ]        DGRAM                    22583  /run/user/1000/systemd/notify
unix    3      [ ]        DGRAM                    15447  /run/systemd/notify
unix    2      [ ]        DGRAM                    15461  /run/systemd/journal
/syslog
unix    18     [ ]        DGRAM                    15470  /run/systemd/journal
/dev-log
unix    8      [ ]        DGRAM                    15472  /run/systemd/journal
/socket
unix    3      [ ]        STREAM     CONNECTED    25828
unix    3      [ ]        STREAM     CONNECTED    23823
unix    3      [ ]        STREAM     CONNECTED    22631  /run/systemd/journal
/stdout
unix    3      [ ]        STREAM     CONNECTED    17549
unix    3      [ ]        STREAM     CONNECTED    25739  /run/systemd/journal
/stdout
unix    2      [ ]        DGRAM                    15821
unix    3      [ ]        STREAM     CONNECTED    28881  /run/systemd/journal
/stdout
unix    3      [ ]        STREAM     CONNECTED    25779  /run/user/1000/bus
unix    3      [ ]        STREAM     CONNECTED    27519
unix    3      [ ]        STREAM     CONNECTED    27181

```

```

ancya@ancya-VirtualBox:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 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:*
tcp6     0      0 [::]:http            [::]:*
tcp6     0      0 [::]:ssh             [::]:*
tcp6     0      0 ip6-localhost:ipp    [::]:*
udp      0      0 localhost:domain        0.0.0.0:*
udp      0      0 ancya-VirtualBox:bootpc _gateway:bootps      ESTABLISHED
udp      0      0 0.0.0.0:631           0.0.0.0:*
udp      0      0 0.0.0.0:49373         0.0.0.0:*
udp      0      0 0.0.0.0:mdns          0.0.0.0:*
udp6     0      0 [::]:33381           [::]:*
udp6     0      0 [::]:mdns           [::]:*
raw6     0      0 [::]:ipv6-icmp       [::]:*                7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags     Type      State      I-Node  Path
unix    2      [ ACC ]   STREAM    LISTENING  23924  @/tmp/.ICE-unix/1476
unix    2      [ ACC ]   STREAM    LISTENING  24571  /tmp/.X11-unix/X1
unix    2      [ ACC ]   STREAM    LISTENING  27023  @/home/ancya/.cache/
ibus/dbus-vtHownA9
unix    2      [ ACC ]   STREAM    LISTENING  24560  @/tmp/.X11-unix/X0
unix    2      [ ACC ]   STREAM    LISTENING  24570  @/tmp/.X11-unix/X1
unix    2      [ ACC ]   STREAM    LISTENING  19716  /run/mysqld/mysqld.s

```

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

a). ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of

the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses. Windows devices maintain an ARP cache, which contains the results of recent ARP queries.

You can see the contents of this cache by using the ARP -A command. If you are

having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

```
Microsoft Windows [Version 10.0.19042.1165]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Ancy Alexander>arp -a

Interface: 192.168.1.2 --- 0x9
Internet Address      Physical Address      Type
192.168.1.1            bc-62-d2-1f-f9-b8    dynamic
192.168.1.255          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
239.255.102.18          01-00-5e-7f-66-12    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 --- 0xa
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

C:\Users\Ancy Alexander>
```

b)NbtStat

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

NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

```
239.255.255.250      01-00-5e-7f-ff-fa    static
C:\Users\Ancy Alexander>nbtstat -r
NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast   = 126
Registered By Name Server = 0
```

c) Hostname

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

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

```
C:\Users\Ancy Alexander>hostname
LAPTOP-91K4TH1P
```

d) PathPing

Earlier, I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping. Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five

minutes) to gather statistics, and then reports latency and minutes) to gather statistics, and then reports latency and packet loss statistics

that are more detailed than those provided by Ping or Tracert

```
C:\Users\Ancy Alexander>pathping

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

Options:
  -g host-list      Loose source route along host-list.
  -h maximum_hops  Maximum number of hops to search for target.
  -i address        Use the specified source address.
  -n               Do not resolve addresses to hostnames.
  -p period         Wait period milliseconds between pings.
  -q num_queries   Number of queries per hop.
  -w timeout        Wait timeout milliseconds for each reply.
  -4               Force using IPv4.
  -6               Force using IPv6.
```

e) getmac

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

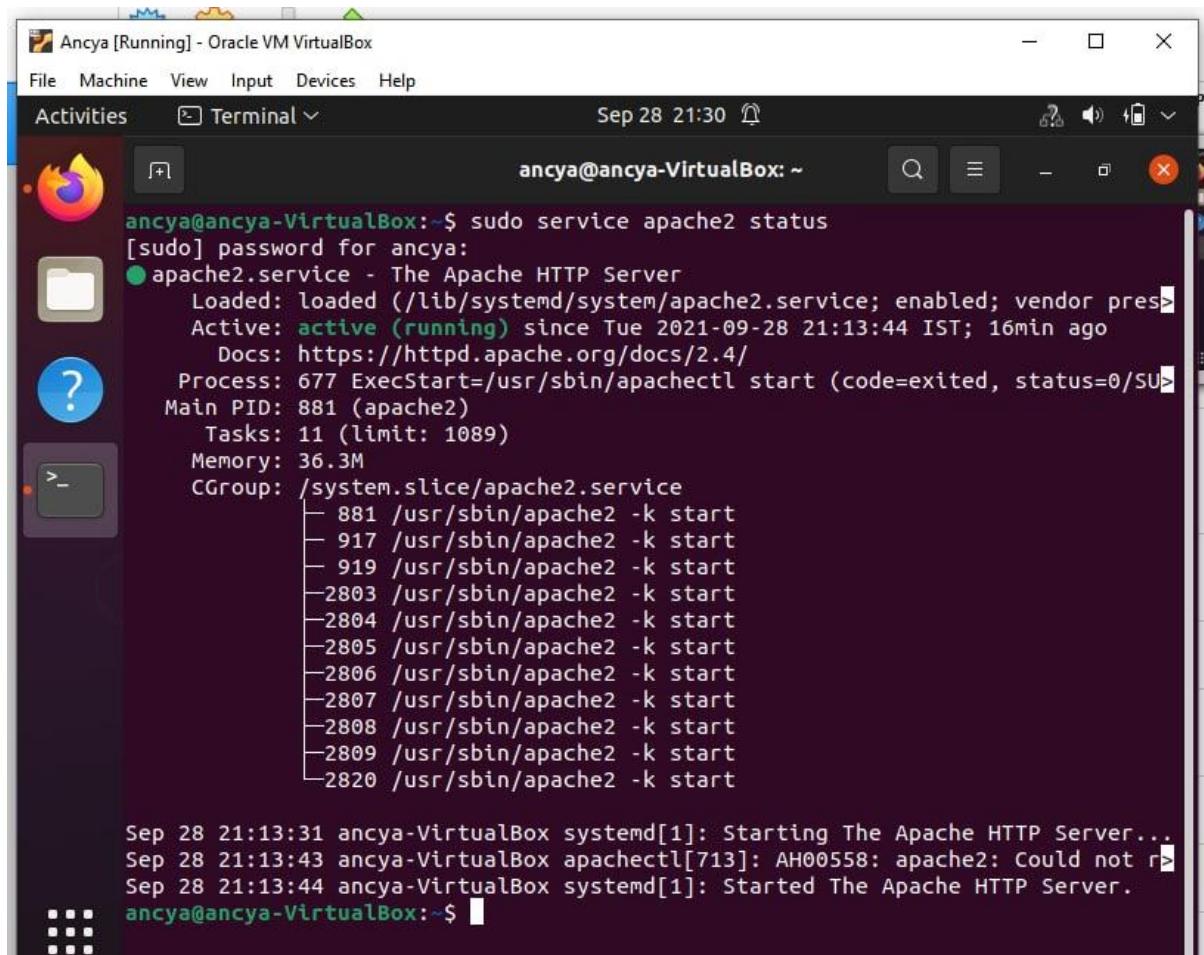
```
C:\Users\Ancy Alexander>getmac

Physical Address      Transport Name
=====
50-5B-C2-B6-5D-B7    \Device\Tcpip_{4C867780-99C4-4F78-A001-EAFD39DAF611}
0A-00-27-00-00-0A    \Device\Tcpip_{5F7D3C30-5EEB-4B6A-9F65-E5FFFC0EAE2A}

C:\Users\Ancy Alexander>
```

Install Apache

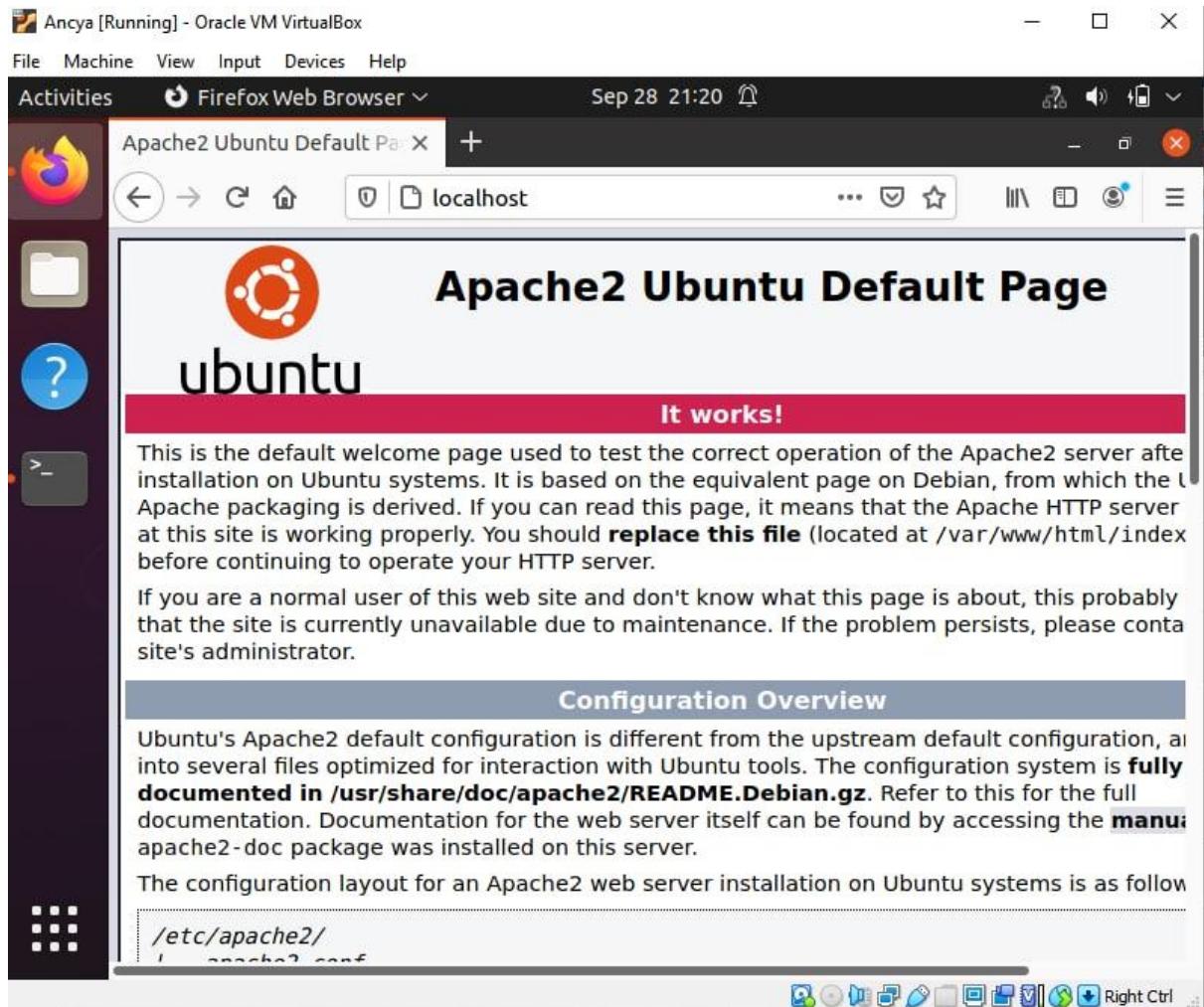
- Update your system sudo apt update
- Install Apache using apt: sudo apt install apache2
- Confirm that Apache is now running with the following command: sudo systemctl status apache2
- if it is not working sudo systemctl start apache2



```
ancya@ancya-VirtualBox:~$ sudo service apache2 status
[sudo] password for ancy:
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Tue 2021-09-28 21:13:44 IST; 16min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 677 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SU>
 Main PID: 881 (apache2)
   Tasks: 11 (limit: 1089)
  Memory: 36.3M
    CGroup: /system.slice/apache2.service
            └─ 881 /usr/sbin/apache2 -k start
                ├─ 917 /usr/sbin/apache2 -k start
                ├─ 919 /usr/sbin/apache2 -k start
                ├─ 2803 /usr/sbin/apache2 -k start
                ├─ 2804 /usr/sbin/apache2 -k start
                ├─ 2805 /usr/sbin/apache2 -k start
                ├─ 2806 /usr/sbin/apache2 -k start
                ├─ 2807 /usr/sbin/apache2 -k start
                ├─ 2808 /usr/sbin/apache2 -k start
                ├─ 2809 /usr/sbin/apache2 -k start
                └─ 2820 /usr/sbin/apache2 -k start

Sep 28 21:13:31 ancy-VirtualBox systemd[1]: Starting The Apache HTTP Server...
Sep 28 21:13:43 ancy-VirtualBox apachectl[713]: AH00558: apache2: Could not r>
Sep 28 21:13:44 ancy-VirtualBox systemd[1]: Started The Apache HTTP Server.
ancya@ancya-VirtualBox:~$
```

- Once installed, test by accessing your server's IP in your browser:
`http://youripaddress`
(find out your ip address using ifconfig)



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)

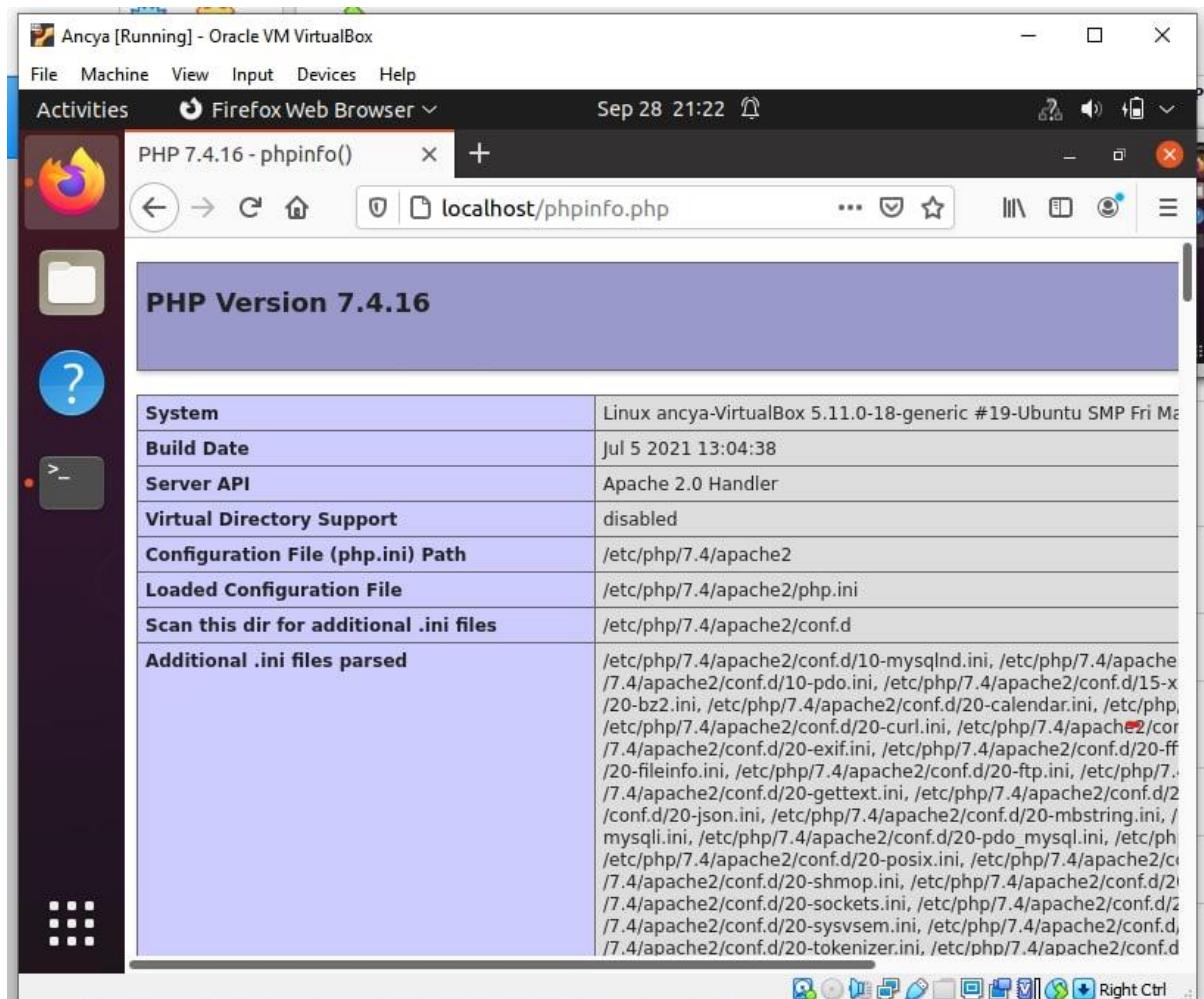
```
File Machine View Input Devices Help
Activities Terminal ~ Sep 28 21:31
[+]
ancya@anya-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres>
   Active: active (running) since Tue 2021-09-28 21:13:49 IST; 17min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Process: 679 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var>
   Process: 692 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_ST>
   Process: 695 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && >
   Process: 981 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_S>
   Process: 983 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/>
 Main PID: 757 (mariadb)
   Status: "Taking your SQL requests now..."
   Tasks: 8 (limit: 1089)
  Memory: 13.2M
  CGroup: /system.slice/mariadb.service
          └─757 /usr/sbin/mariadb

Sep 28 21:13:48 anya-VirtualBox mariadb[757]: 2021-09-28 21:13:48 0 [Note] A>
Sep 28 21:13:48 anya-VirtualBox mariadb[757]: 2021-09-28 21:13:48 0 [Note] />
Sep 28 21:13:48 anya-VirtualBox mariadb[757]: Version: '10.5.12-MariaDB-0ubu>
Sep 28 21:13:49 anya-VirtualBox systemd[1]: Started MariaDB 10.5.12 database >
Sep 28 21:13:49 anya-VirtualBox /etc/mysql/debian-start[985]: Upgrading MySQL>
Sep 28 21:13:50 anya-VirtualBox /etc/mysql/debian-start[988]: Looking for 'my>
Sep 28 21:13:50 anya-VirtualBox /etc/mysql/debian-start[988]: Looking for 'my>
Sep 28 21:13:50 anya-VirtualBox /etc/mysql/debian-start[988]: This installati>
Sep 28 21:13:50 anya-VirtualBox /etc/mysql/debian-start[1010]: Checking for i>
Sep 28 21:13:50 anya-VirtualBox /etc/mysql/debian-start[1024]: Triggering myi>
```

Install PHP and commonly used modules

- sudo apt install php libapache2-mod-php php-xmlcache php-cli
php-gd php-curl php-mysql
- Restart apache2
 - sudo systemctl restart apache2
- Now you can check php installation
 - sudo echo "" | sudo tee -a /var/www/html/phpinfo.php >
/dev/null
- Open a browser
 - <http://127.0.0.1/phpinfo.php>

```
ancya@ancya-VirtualBox:~$ php -v
PHP 7.4.16 (cli) (built: Jul 5 2021 13:04:38) ( NTS )
Copyright (c) The PHP Group
Zend Engine v3.4.0, Copyright (c) Zend Technologies
    with Zend OPcache v7.4.16, Copyright (c), by Zend Technologies
ancya@ancya-VirtualBox:~$
```



Install phpmyadmin

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

(It asks for webserver select apache2, select dbconfiguration and set password)

- Restart apache2

```
sudo systemctl restart apache2
```

- Check phpmyadmin

Open a browser <http://localhost/phpmyadmin>

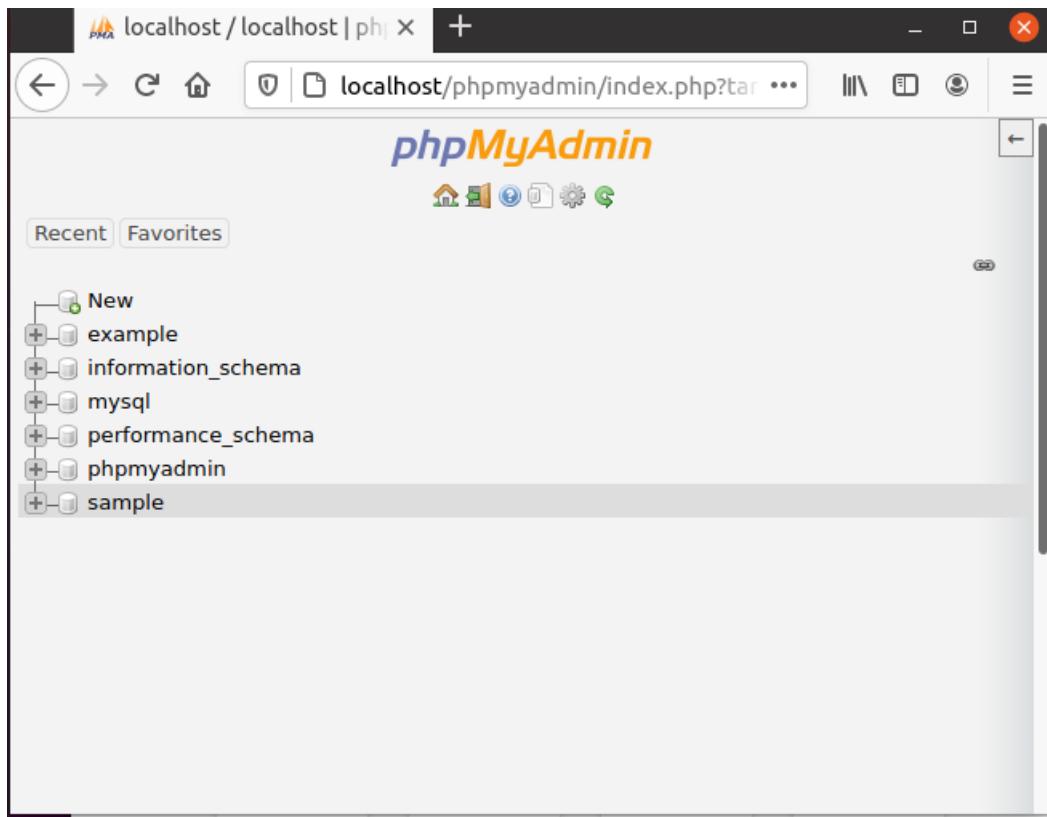
username : root

password : yourpassword

The screenshot shows the PHPMyAdmin interface with the 'Databases' tab selected. The main area displays a list of databases:

Database	Collation	Action
example	utf8mb4_general_ci	Check privileges
information_schema	utf8_general_ci	Check privileges
mysql	utf8mb4_general_ci	Check privileges
performance_schema	utf8_general_ci	Check privileges
phpmyadmin	utf8mb4_general_ci	Check privileges
sample	utf8mb4_general_ci	Check privileges
Total: 6	utf8mb4_general_ci	

Below the table, there are buttons for 'Check all' and 'Drop'. A warning message in the bottom right corner reads: "Console Enabling the database statistics here might cause heavy traffic between the web."



```
MariaDB [(none)]> create database example;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| example   |
| information_schema |
| mysql     |
| performance_schema |
| phpmyadmin |
| sample    |
+-----+
6 rows in set (0.001 sec)

MariaDB [(none)]> █
```

Ansible installation

```
ancya@ancya-VirtualBox:~$ sudo apt-get install ansible
[sudo] password for ancy:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-lib2to3 python3-libcloud python3-netaddr
  python3-ntlm-auth python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
  python-pyparsing-doc
The following NEW packages will be installed:
  ansible ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-libcloud python3-netaddr python3-ntlm-auth
  python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
The following packages will be upgraded:
  python3-lib2to3
1 upgraded, 21 newly installed, 0 to remove and 236 not upgraded.
Need to get 31.8 MB/31.8 MB of archives.
After this operation, 275 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-jinja2 all
```

Version

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

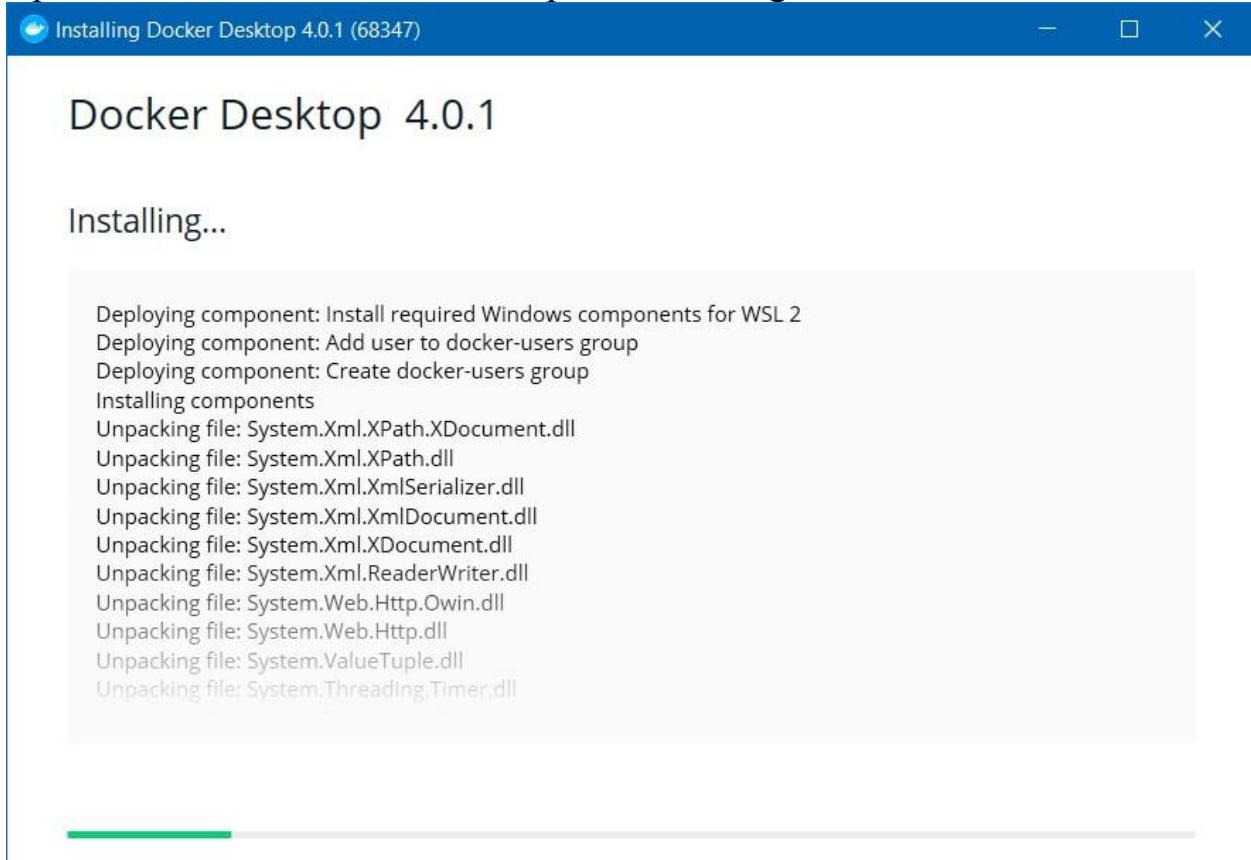
Step-I

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



Step-II

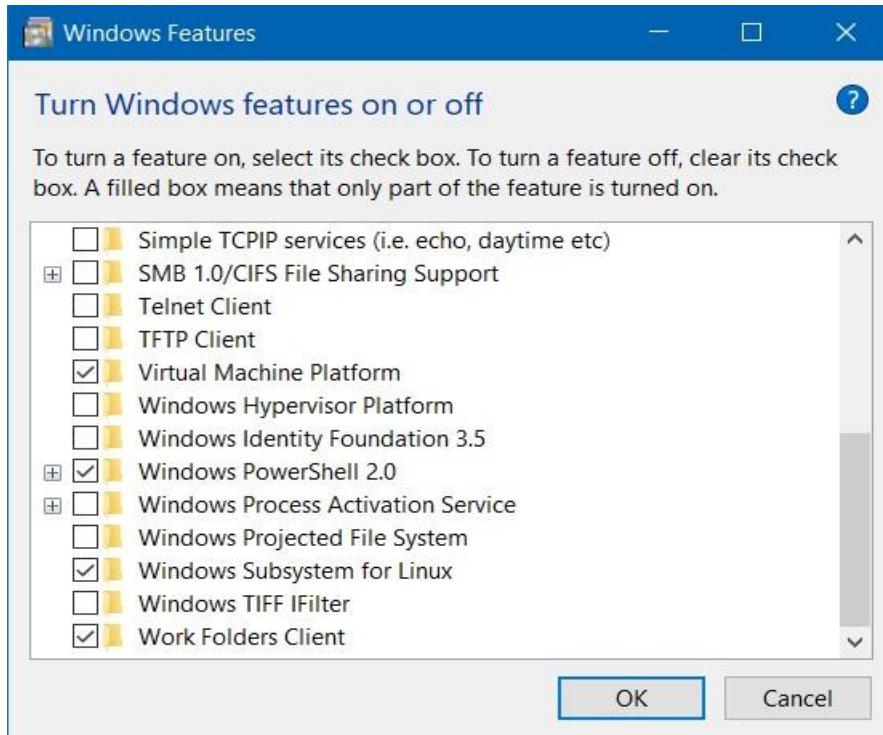
Open the .exe file and follow the steps after clicking install button.



Step-III

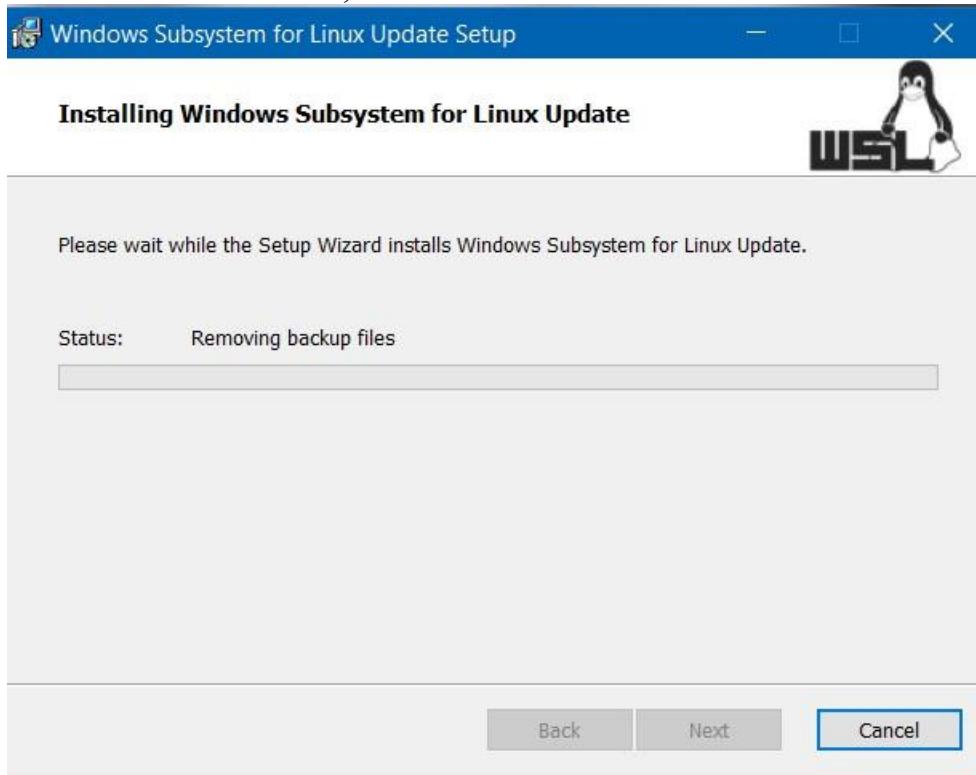
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



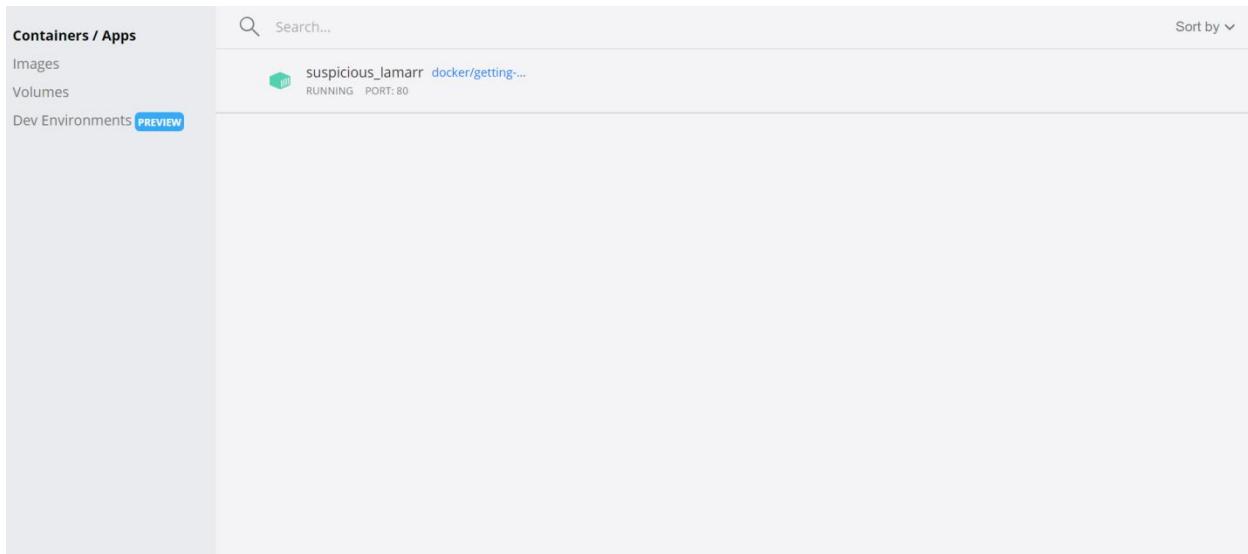
Step-IV

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)

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The title bar also shows 'Microsoft Windows [Version 10.0.19042.1081]' and '(c) Microsoft Corporation. All rights reserved.' The command line shows the following sequence of commands and their output:

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

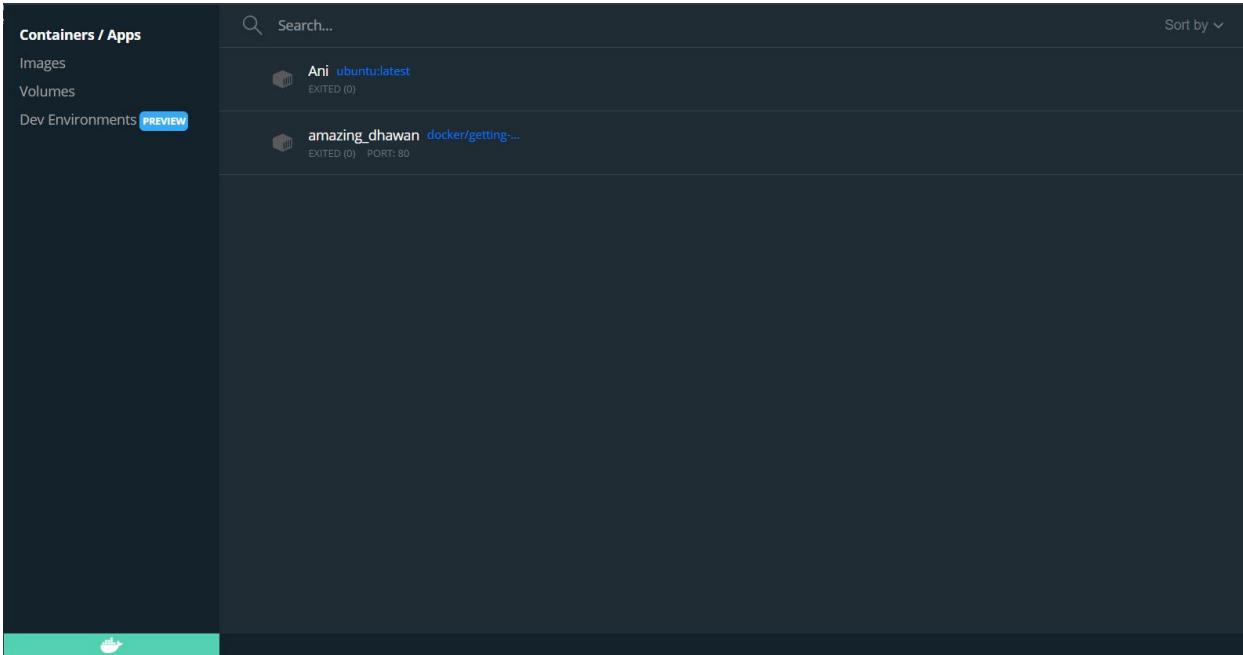
C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Windows\system32>
```

The command prompt window has a dark theme and is running as an administrator.

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

ubuntu instance using the cli.



Wireshark installation

```
ancya@ancya-VirtualBox:~$ sudo apt-get install wireshark
[sudo] password for ancy:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
 libbcg729-0 libc-ares2 libdouble-conversion3 liblua5.2-0 libmd4c0
 libminizip1 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasupports5
 libqt5multimediawidgets5 libqt5network5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiretap11 libwsutil12 libxcb-xinerama0 libxcb-xinput0
 qt5-gtk-platformtheme qttranslations5-l10n wireshark-common wireshark-qt
Suggested packages:
 qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geoipupdate
 geoip-database geoip-database-extra libjs-leaflet
 libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed:
 libbcg729-0 libc-ares2 libdouble-conversion3 liblua5.2-0 libmd4c0
 libminizip1 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
 libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediasupports5
 libqt5multimediawidgets5 libqt5network5 libqt5printsupport5 libqt5svg5
 libqt5widgets5 libsmi2ldbl libspandsp2 libssh-gcrypt-4 libwireshark-data
 libwireshark14 libwiretap11 libwsutil12 libxcb-xinerama0 libxcb-xinput0
 qt5-gtk-platformtheme qttranslations5-l10n wireshark wireshark-common
```

```
ancya@ancya-VirtualBox:~$ sudo dpkg-reconfigure wireshark-common
ancya@ancya-VirtualBox:~$ sudo adduser $USER wireshark
Adding user `ancya' to group `wireshark' ...
Adding user ancy to group wireshark
Done.
```

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol
2	0.000178123	10.0.2.15	224.0.0.251	MDNS
3	13.682966161	10.0.2.15	91.189.89.198	NTP
4	13.867000524	91.189.89.198	10.0.2.15	NTP
5	18.895071461	PcsCompu_e0:95:e6	RealtekU_12:35:02	ARP
6	18.895955077	RealtekU_12:35:02	PcsCompu_e0:95:e6	ARP

Frame 1: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) or
 ▾ Ethernet II, Src: PcsCompu_e0:95:e6 (08:00:27:e0:95:e6), Dst: IPv6mcast
 ▾ Internet Protocol Version 6, Src: fe80::f90c:bb69:56b1:caf5, Dst: ff02:
 ▾ User Datagram Protocol, Src Port: 5353, Dst Port: 5353
 ▾ Multicast Domain Name System (query)

0000	33	33	00	00	00	fb	08	00	27	e0	95	e6	86	dd	60	0f	33	'.....
0010	4d	1e	00	30	11	ff	fe	80	00	00	00	00	00	00	f9	0c	M	..0
0020	bb	69	56	b1	ca	f5	ff	02	00	00	00	00	00	00	00	00	.	iV
0030	00	00	00	00	00	fb	14	e9	14	e9	00	30	d4	dd	00	00	0

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

```
#!/bin/bash
echo " Enter Details and View"
echo "=====
echo Enter your Name
read name
echo Enter your College name
read college
clear
echo Details you entered
echo Name: $name
echo College: $college
```

```
ancya@ancya-VirtualBox:~$ bash 1.sh
Enter Details and View
=====
Enter your Name
Ancy Alexander
Enter your Collegename
Amal jyothi college of engineering
Details you entered
Name:Ancy Alexander
College:Amal jyothi college of engineering
ancya@ancya-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Display value of a Variable "
echo "=====
a=10
echo "$a"
```

```
ancya@ancya-VirtualBox:~$ bash 2.sh
Display value of a Variable
=====
10
```

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

```
#!/bin/bash
echo "ARITHMETIC OPERATIONS"
echo "=====
echo "Enter a number"
read a
echo "Enter another number"
read b
echo "Enter operation needed"
echo "\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division"
read op
case "$op" in
"1") echo "a+b=\"$((a+b))";;
"2") echo "a-b=\"$((a-b))";;
"3") echo "a*b=\"$((a*b))";;
"4") echo "a/b=\"$((a/b))";;
esac
```

```
SVN: 127.127.1.1 2018-08-08 14:48:55
ancya@ancya-VirtualBox:~$ gedit 3.sh
ancya@ancya-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATIONS
=====
Enter a number
67
Enter another number
78
Enter operation needed

1.Addition
2.Subtraction
3.Multiplication
4.Division
1
a+b=145
```

```
ancya@ancya-VirtualBox:~$ bash 3.sh
ARITHMETIC OPERATIONS
=====
Enter a number
67
Enter another number
90
Enter operation needed

1.Addition
2.Subtraction
3.Multiplication
4.Division
3
a*b=6030
```

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

```
#!/bin/bash
echo "Finding a number"
echo "====="
echo "Enter a number"
read a
if [ $a == 10 ]; then
    echo "Number found ;)"
```

```
else
    echo "Number NOT found !"
fi
```

```
ancya@ancya-VirtualBox:~$ gedit 4.sh
ancya@ancya-VirtualBox:~$ bash 4.sh
Finding a number
=====
Enter a number
10
Number found
```

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

```
#!/bin/bash
echo "Time and Calendar"
echo "===== "
echo "Today is $(date)"
echo ""
echo "Calendar :"
cal
ancya@ancya-VirtualBox:~$ bash 5.sh
Time and Calendar
=====
Today is Sunday 03 October 2021 11:38:45 AM IST
Calendar:
          October 2021
Su Mo Tu We Th Fr Sa
                1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

6. Write a shell script to check a number is even or odd.

```
#!/bin/bash
echo "EVEN OR ODD"
echo "===== "
```

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

```
ancya@ancya-VirtualBox:~$ gedit 6.sh
ancya@ancya-VirtualBox:~$ bash 6.sh
EVEN OR ODD
=====
Enter a number
7
Number is odd
ancya@ancya-VirtualBox:~$ bash 6.sh
EVEN OR ODD
=====
Enter a number
6
Number is Even
```

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

```
#!/bin/bash
echo "Comparing numbers"
echo "===== "
echo "Enter first number"
read a
echo "Enter second number"
read b
if [ $a -gt $b ]; then
```

```
echo "$a is greater"  
elif [ $b -gt $a ];then  
    echo "$b is greater"  
else  
    echo "Both are Equal"  
fi
```

```
ancya@ancya-VirtualBox:~$ gedit 7.sh  
ancya@ancya-VirtualBox:~$ bash 7.sh  
Comparing numbers  
=====  
Enter first number  
4  
Enter second number  
4  
Both are Equal
```

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

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

```
ancya@ancya-VirtualBox:~$ bash 8.sh  
Sum of Numbers  
=====   
Sum of first 10 numbers=55
```

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

```

#!/bin/bash
echo "AVG, SUM & Product of 4 No."
echo "===== "
echo "Please enter your first number: "
read a
echo "Second number: "
read b
echo "Third number: "
read c
echo "Fourth number: "
read d

sum=$((a + b + c + d))
avg=$(echo $sum / 4 | bc -l )
prod=$((a * b * c * d))

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

```

```

ancya@ancya-VirtualBox:~$ gedit 9.sh
ancya@ancya-VirtualBox:~$ bash 9.sh
AVG ,SUM&Productof4No
=====
Please enter your first number:
1
Second number:
2
Third number:
3
Fourth number:
4
The sum of these numbers is: 10
The average of these numbers is: 2
The product of these numbers is: 24

```

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

```

#!/bin/bash
echo "LARGEST OF THREE"
echo "===== "

```

```
echo "Enter first number"
read a
echo "Enter second number"
read b
echo "Enter third number"
read c
if [$a -gt $b]; then
if [$a -gt $c]; then
echo "$a is big"
else
echo "$c is big"
fi
elif [$b -gt $c];then
echo "$b is big"
else
echo "$c is big"
fi
```

```
ancya@ancya-VirtualBox:~$ gedit 10.sh
ancya@ancya-VirtualBox:~$ bash 10.sh
LARGESTOFTHREE
=====
Enterfirstnumber
7
Entersecondnumber
8
Enterthirdnumber
5
8 isbig
```

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

```
#!/bin/bash
```

```

echo "Factorial"
echo "====="
echo "Enter a number"
read num
fact=1

for((i=2;i<=num;i++))
{
    fact=$((fact * i)) #fact = fact * i
}
echo "Factorial is $fact"

```

```

ancya@ancya-VirtualBox:~$ gedit 11.sh
ancya@ancya-VirtualBox:~$ bash 11.sh
Factorial
=====
Enter a number
2
Factorial is 2

```

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

```

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

```

```
ancya@ancya-VirtualBox:~$ gedit 12.sh
ancya@ancya-VirtualBox:~$ bash 12.sh
Palindrome or Not
=====
Enter number to check
56
Number is not Palindrome
ancya@ancya-VirtualBox:~$ bash 12.sh
Palindrome or Not
=====
Enter number to check
12321
Number is Palindrome
ancya@ancya-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Average of N numbers"
echo "===== "
echo "Enter Size"
read n
i=1
sum=0

echo "Enter Numbers"
while [ $i -le $n ]
do
    read num
    sum=$((sum + num))
    i=$((i + 1))
done
avg=$(echo $sum / $n | bc -l)
echo $avg
```

```
ancya@ancya-VirtualBox:~$ gedit 13.sh
ancya@ancya-VirtualBox:~$ bash 13.sh
AverageofNnumbers
=====
EnterSize
3
EnterNumbers
1
6
9
5.33333333333333333333
ancya@ancya-VirtualBox:~$
```

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

```
#!/bin/bash
echo "Sum of all digits"
echo "===== "
echo "Enter a number:"
read num
sum=0

while [ $num -gt 0 ]
do
    mod=$((num % 10))
    sum=$((sum + mod))
    num=$((num / 10))
done
echo "Sum of digits is $sum"
```

```
ancya@ancya-VirtualBox:~$ bash 14.sh
Sum of all digits
=====
Enter a number:
698
Sum of digits is23
```

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

```
#!/bin/bash
```

```
echo "LEAP YEAR OR NOT"
echo "=====
echo "Enter the year"
read y
a=`expr $y % 4`
b=`expr $y % 100`
c=`expr $y % 400`
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
then
echo "$y is leap year"
else
echo "$y is not leap year"
fi
```

```
ancya@ancya-VirtualBox:~$ bash 15.sh
LEAP YEAR OR NOT
=====
Enter the year
2020
2020 is leapyear
ancya@ancya-VirtualBox:~$ bash 15.sh
LEAP YEAR OR NOT
=====
Enter the year
1990
1990 is not leapyear
ancya@ancya-VirtualBox:~$
```