

**NETWORKING AND SYSTEM  
ADMINISTRATION LAB  
RECORD**

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RMCA B  
ROLL : 20

# BASIC LINUX COMMANDS

1. **pwd (Print Working Directory):** Use the pwd command to find out the path of the current working directory (folder) you're in. The command will return an absolute (full) path, which is basically a path of all the directories that starts with a forward slash (/). An example of an absolute path is /home/username.

```
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

user@user-HP-Laptop-15-da0xxx:~$ pwd
/home/user
user@user-HP-Laptop-15-da0xxx:~$
```

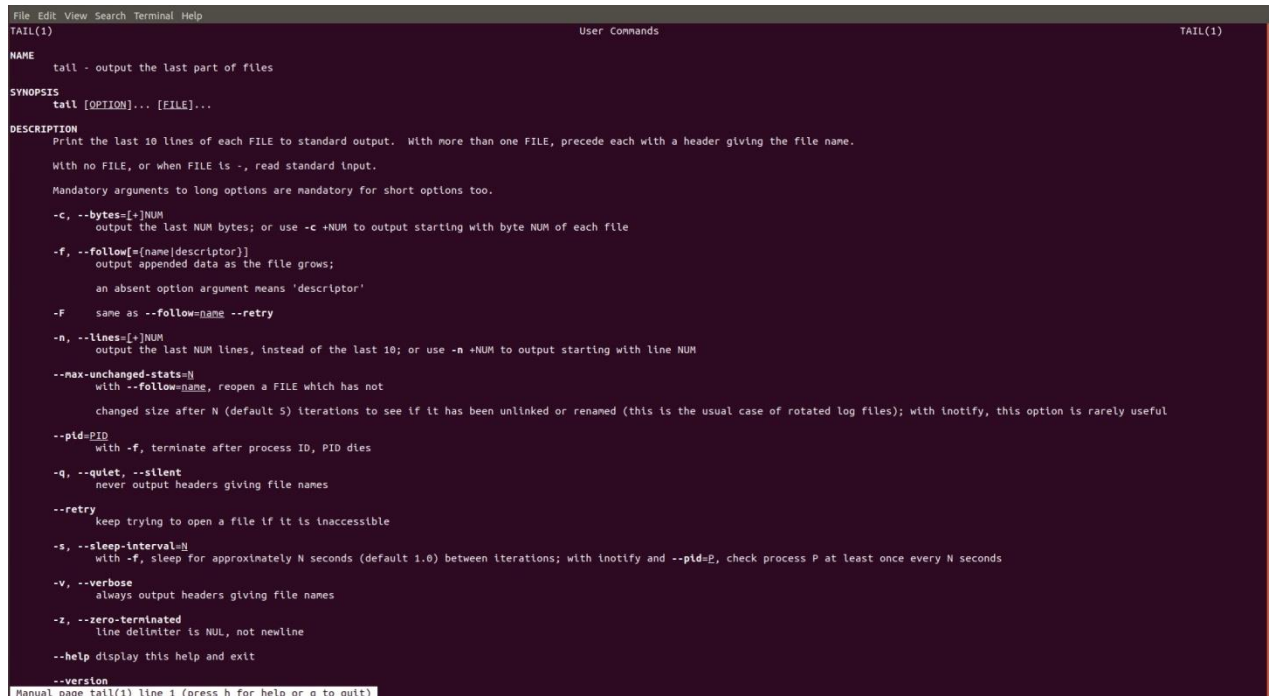
2. **history :** When you have been using Linux for a certain period of time, you will quickly notice that you can run hundreds of commands every day. As such, running history command is particularly useful if you want to review the commands you have entered before.

```
user@user-HP-Laptop-15-da0xxx:~$ history
 1  pwd
 2  /
 3  pwd
 4  history
user@user-HP-Laptop-15-da0xxx:~$
```

3. **man :** by using this command you can easily learn how to use

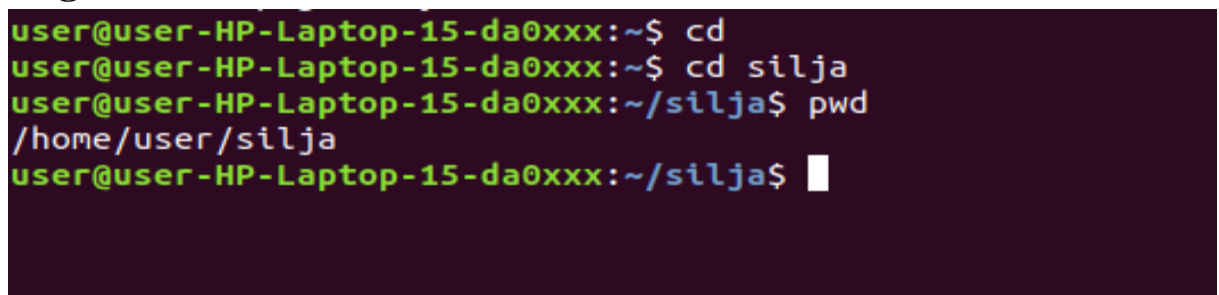
certain function of linux commands right from Linux's shell by using the man command. For instance, entering man tail will show the manual instruction of the tail command. Use the command: man man to start learning about man utility.

**Eg:**

A screenshot of a terminal window displaying the manual page for the 'tail' command. The window has a title bar with 'File Edit View Search Terminal Help' and 'User Commands'. The terminal content shows the 'NAME', 'SYNOPSIS', and 'DESCRIPTION' sections of the man page. The 'DESCRIPTION' section includes details about printing the last 10 lines of files, various options like -c, -f, -F, -n, --max-unchanged-stats=N, --pid=PID, -q, --quiet, --silent, --retry, -s, --sleep-interval=N, -v, --verbose, -Z, --zero-terminated, --help, and --version. At the bottom, it says 'Manual page tail(1) line 1 (press h for help or q to quit)'.

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

**Eg:**

A screenshot of a terminal window showing a sequence of commands and their output. The user starts at the prompt 'user@user-HP-Laptop-15-da0xxx:~\$'. They enter 'cd', and the prompt changes to 'user@user-HP-Laptop-15-da0xxx:~\$'. Then they enter 'cd silja', and the prompt changes to 'user@user-HP-Laptop-15-da0xxx:~/silja\$'. Finally, they enter 'pwd', and the output is '/home/user/silja'. The prompt then changes to 'user@user-HP-Laptop-15-da0xxx:~/silja\$'.

5. **ls**: The **ls** command is used to view the contents of a directory. By default, this command will display the contents of your current working directory. If you want to see the content of other directories, type **ls** and then the directory's path.

There are variations you can use with the **ls** command:

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

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ pwd
/home/user/silja
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
1.png 2.png 3.png 4.png 5.png 7.png 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$
```

6. **mkdir** : Use **mkdir** command to make a new directory — if you type **mkdir Music** it will create a directory called **Music**. To generate a new directory inside another directory, use this Linux basic command.

**Eg:**

```
user@user-HP-Laptop-15-da0xxx:~/silja$ mkdir rmca
user@user-HP-Laptop-15-da0xxx:~/silja$ pwd
/home/user/silja
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
1.png 2.png 3.png 4.png 5.png 7.png 8.png 9.png rmca 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$
```

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

**Eg:**

```
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
1.png 2.png 3.png 4.png 5.png 7.png 8.png 9.png rmca 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$ mkdir bmca
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png 1.png 2.png 3.png 4.png 5.png 7.png 8.png 9.png bmca rmca 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$ rmdir bmca
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png 1.png 2.png 3.png 4.png 5.png 7.png 8.png 9.png rmca 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$
```

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

**Eg**

```
user@user-HP-Laptop-15-da0xxx:~/silja$ touch
touch: missing file operand
Try 'touch --help' for more information.
user@user-HP-Laptop-15-da0xxx:~/silja$ touch web.html
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png 11.png 1.png 2.png 3.png 4.png 5.png 7.png 8.png 9.png rmca 'Screenshot from 2021-06-14 01-58-50.png' 'Screenshot from 2021-06-14 02-07-47.png' web.html
user@user-HP-Laptop-15-da0xxx:~/silja$
```

9. **rm** : The rm command is used to delete directories and the contents within them. If you only want to delete the directory — as an alternative to rmdir — use rm -r. 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.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png  1.png  5.png  fix          tes
11.png  2.png  7.png  rmca         tx.txt
12.png  3.png  8.png  'Screenshot from 2021-06-14 01-58-50.png'  web.html
13.png  4.png  9.png  'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$ cat tes
helooooo
user@user-HP-Laptop-15-da0xxx:~/silja$ touch
touch: missing file operand
Try 'touch --help' for more information.
user@user-HP-Laptop-15-da0xxx:~/silja$ rm tes
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png  12.png  14.png  2.png  4.png  7.png  9.png  rmca          'Screenshot from 2021-06-14 02-07-47.png'  web.html
11.png  13.png  1.png  3.png  5.png  8.png  fix    'Screenshot from 2021-06-14 01-58-50.png'  tx.txt
user@user-HP-Laptop-15-da0xxx:~/silja$
```

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.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png  1.png  5.png  fix          tes
11.png  2.png  7.png  rmca         tx.txt
12.png  3.png  8.png  'Screenshot from 2021-06-14 01-58-50.png'  web.html
13.png  4.png  9.png  'Screenshot from 2021-06-14 02-07-47.png'
user@user-HP-Laptop-15-da0xxx:~/silja$ cat tes
helooooo
user@user-HP-Laptop-15-da0xxx:~/silja$
```

**11.echo:** echo command is used to move some data into a file. If you want to add the text, “Hello, my name is John” into a file called name.txt, you would type echo Hello, my name is John >> name.txt 2. head .

Eg:

```
user@user-HP-Laptop-15-da0xxx:~$ pwd
/home/user
user@user-HP-Laptop-15-da0xxx:~$ cd silja
user@user-HP-Laptop-15-da0xxx:~/silja$ echo hello,my name is silja>>tst
user@user-HP-Laptop-15-da0xxx:~/silja$ cat tst
hello,my name is silja
```

**12.head:** The head command is used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking. If you only want to show the first five lines, type head -n 5 filename.txt.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ head -n 2 lin
helooo
hiiii
user@user-HP-Laptop-15-da0xxx:~/silja$
```

**13.tail :** This one has a similar function to the head command, but instead of showing the first lines, the tail command will display the last ten lines of a text file. tail -n filename.txt.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ tail -n 2 lin
yelloo
heyyyy
user@user-HP-Laptop-15-da0xxx:~/silja$
```

**14.read** : read the contents of a line into a variable. The read command can be used with and without arguments .read command is used to read [options] [name...] . \$read • \$read var1 var2 var3 .\$echo "[\$var1] [\$var2] [\$var3].

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ $read
user@user-HP-Laptop-15-da0xxx:~/silja$ $read a
a: command not found
user@user-HP-Laptop-15-da0xxx:~/silja$ read a

user@user-HP-Laptop-15-da0xxx:~/silja$
user@user-HP-Laptop-15-da0xxx:~/silja$ echo "a"
a
user@user-HP-Laptop-15-da0xxx:~/silja$
```

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

Eg:

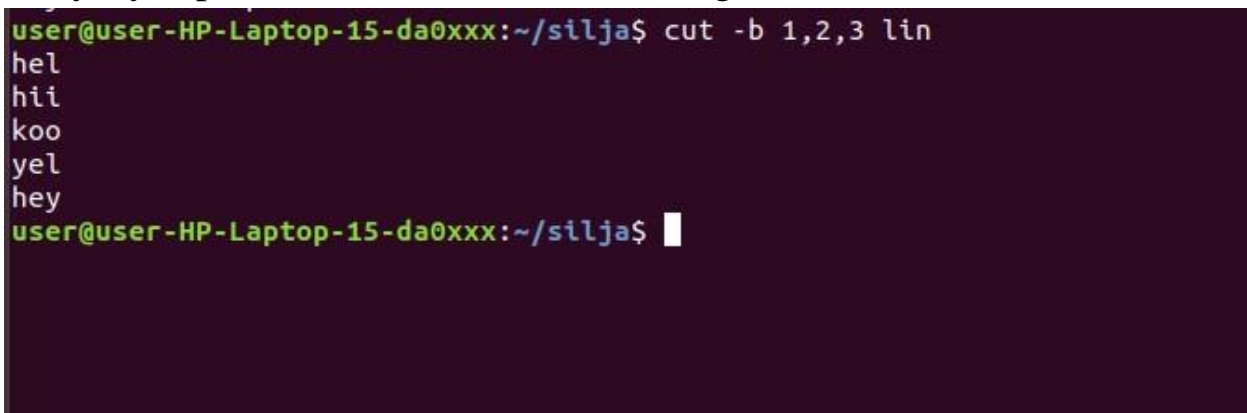




**16.less :**The 'less' command is same as 'more' command but include some more features. It automatically adjust with the width and height of the teminal window, while 'more' command cuts the content as the width of the terminal window get shorter.

Eg:

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



**18.paste :** It is used to join files horizontally (parallel merging) by

outputting lines consisting of lines from each file specified, separated by tab as delimiter, to the standard output. paste [OPTION]... [FILES]...

\$ paste state.txt capital.txt.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ paste tst lin
hello,my name is silja  helooo
    hiii
    kooooii
    yeloo
    heyyyy
user@user-HP-Laptop-15-da0xxx:~/silja$
```

**19. uname** :The uname command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on. \$uname , \$uname -r.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~$ pwd
/home/user
user@user-HP-Laptop-15-da0xxx:~$ cd silja
user@user-HP-Laptop-15-da0xxx:~/silja$ uname -r
4.18.0-15-generic
user@user-HP-Laptop-15-da0xxx:~/silja$
```

**20. cp** :cp command is used to copy files from the current directory to a different directory. For instance, the command cp scenery.jpg

/home/username/Pictures would create a copy of scenery.jpg (from your current directory) into the Pictures directory. cp -i will ask for user's consent in case of a potential file overwrite. cp -p will preserve source files' mode, ownership and timestamp. cp -r will copy directories recursively. cp -u copies files only if the destination file is not existing or the source file is newer than the destination file.

Eg:

```

user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja
cp: '2.png' and '/home/user/silja/2.png' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ mv lin /home/user/silja
mv: 'lin' and '/home/user/silja/lin' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ ^C
user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja
cp: '2.png' and '/home/user/silja/2.png' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja2
user@user-HP-Laptop-15-da0xxx:~/silja$ cat silja2

```

**21.mv :** The primary use of the mv command is to move files, it can also be used to rename files. The arguments in mv are similar to the cp command. You need to type mv, the file's name, and the destination's directory. mv file.txt /home/username/Documents .To rename files, the Linux is mv oldname.ext newname.ext.

Eg:

```

user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja
cp: '2.png' and '/home/user/silja/2.png' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ mv lin /home/user/silja
mv: 'lin' and '/home/user/silja/lin' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ ^C
user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja
cp: '2.png' and '/home/user/silja/2.png' are the same file
user@user-HP-Laptop-15-da0xxx:~/silja$ cp 2.png /home/user/silja2
user@user-HP-Laptop-15-da0xxx:~/silja$ cat silja2

```

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

Eg:

```

user@user-HP-Laptop-15-da0xxx:~/silja$ locate -i name*note
user@user-HP-Laptop-15-da0xxx:~/silja$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev            1000      0    1000      0% /dev

```

**23.find :**Similar to the locate command, using find also searches for files

and directories. The difference is, you use the find command to locate files within a given directory. As an example, find /home/ -name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories. Other variations when using the find are: To find files in the current directory use, find . -name notes.txt .To look for directories use, / -type d -name notes. Txt.

Eg:

```
user@user-HP-Laptop-15-da0xxx:~/silja$ locate -i name*note
user@user-HP-Laptop-15-da0xxx:~/silja$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev            1000000    0    1000000    0% /dev
```

**24.grep :** Another basic Linux command that is undoubtedly helpful for everyday use is grep. It lets you search through all the text in a given file. To illustrate, grep blue notepad.txt will search for the word blue in the notepad file. Lines that contain the searched word will be displayed fully. Usually output of a previous command is piped into the grep command. For example ls -l | grep “kernel” .

```
user@user-HP-Laptop-15-da0xxx:~/silja$ grep my tst
hello,my name is silja
user@user-HP-Laptop-15-da0xxx:~/silja$
```

Eg:

**25.df:**Use df command to get a report on the system’s disk space usage, shown in percentage and KBs. If you want to see the report in megabytes, type df -m.

Eg:

```

user@user-HP-Laptop-15-da0xxx:~/silja$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev             1900        0      1900    0% /dev
tmpfs            387         2      385    1% /run
/dev/sda8       48961    6548    39897   15% /
tmpfs            1931         0      1931    0% /dev/shm
tmpfs             5          1         5    1% /run/lock
tmpfs            1931         0      1931    0% /sys/fs/cgroup
/dev/loop3        15         15         0 100% /snap/gnome-logs/45
/dev/loop2       141        141         0 100% /snap/gnome-3-26-1604/74
/dev/loop4         3          3         0 100% /snap/gnome-calculator/260
/dev/loop0        91         91         0 100% /snap/core/6350
/dev/loop5        13         13         0 100% /snap/gnome-characters/139
/dev/loop6         4          4         0 100% /snap/gnome-system-monitor/57
/dev/loop1        35         35         0 100% /snap/gtk-common-themes/818
/dev/sda2         96         31         66   32% /boot/efi
tmpfs            387         1      386    1% /run/user/1000
user@user-HP-Laptop-15-da0xxx:~/silja$ █

```

**26.du** :If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer. However, the disk usage summary will show disk block numbers instead of the usual size format. If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line.

```

silja@silja-VirtualBox:~$ du
4      ./snap/snap-store/547/.config/dconf
8      ./snap/snap-store/547/.config/fontconfig
8      ./snap/snap-store/547/.config/autostart
4      ./snap/snap-store/547/.config/gtk-3.0
4      ./snap/snap-store/547/.config/gtk-2.0
4      ./snap/snap-store/547/.config/ibus
52     ./snap/snap-store/547/.config
188    ./snap/snap-store/547/.local/share/glib-2.0/sche

```

**27.useradd** : This is available only to system admins .Since Linux is a multi-user system, this means more than one person can interact with the same system at the same time. useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd 123456789.

```

user@user-HP-Laptop-15-da0xxx:~$ sudo useradd juliet
[sudo] password for user:
user@user-HP-Laptop-15-da0xxx:~$ █

```

**28.userdel** :Remove a user is very similar to adding a new user. To delete the users account type, userdel UserName .

```
silja@silja-VirtualBox:~$ sudo userdel maria
silja@silja-VirtualBox:~$
```

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

```
silja@silja-VirtualBox:~$ sudo useradd maria
```

**30.passwd** :Changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account.

Eg:

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

user@user-HP-Laptop-15-da0xxx:~$ passwd silja
passwd: user 'silja' does not exist
user@user-HP-Laptop-15-da0xxx:~$ sudo useradd silja
[sudo] password for user:
Sorry, try again.
[sudo] password for user:
Sorry, try again.
[sudo] password for user:
sudo: 3 incorrect password attempts
user@user-HP-Laptop-15-da0xxx:~$ userdel silja
userdel: user 'silja' does not exist
user@user-HP-Laptop-15-da0xxx:~$
```

31.usermod : usermod command is used to change the properties of a user in Linux through the command line command-line utility that allows you to modify a user's login information .

```
silja@silja-VirtualBox:~$ sudo useradd sil
silja@silja-VirtualBox:~$ sudo usermod -u 2000 sil
silja@silja-VirtualBox:~$ id sil
uid=2000(sil) gid=1001(sil) groups=1001(sil)
silja@silja-VirtualBox:~$
```

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

```
silja@silja-VirtualBox:~$ sudo groupadd mca
silja@silja-VirtualBox:~$
```

33.groups : print the groups a user is in#groups alice.

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

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

```
silja@silja-VirtualBox:~$ sudo groupadd mba
silja@silja-VirtualBox:~$ sudo groupdel mba
silja@silja-VirtualBox:~$
```



```

user@user-HP-Laptop-15-da0xxx:~/silja$ groupdel
Usage: groupdel [options] GROUP

Options:
  -h, --help                display this help message and exit
  -R, --root CHROOT_DIR    directory to chroot into
  -f, --force                delete group even if it is the primary group of a user

user@user-HP-Laptop-15-da0xxx:~/silja$

```

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

```

user@user-HP-Laptop-15-da0xxx:~/silja$ groupmod
Usage: groupmod [options] GROUP

Options:
  -g, --gid GID            change the group ID to GID
  -h, --help                display this help message and exit
  -n, --new-name NEW_GROUP  change the name to NEW_GROUP
  -o, --non-unique          allow to use a duplicate (non-unique) GID
  -p, --password PASSWORD  change the password to this (encrypted)
                           PASSWORD
  -R, --root CHROOT_DIR    directory to chroot into

user@user-HP-Laptop-15-da0xxx:~/silja$

```

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

```

silja@silja-VirtualBox:~$ sudo chmod +rwx ho
silja@silja-VirtualBox:~$ ls -d ho
ho
silja@silja-VirtualBox:~$

```

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

```

silja@silja-VirtualBox:~$ sudo chown sil ho
silja@silja-VirtualBox:~$ ls -d ho
ho
silja@silja-VirtualBox:~$

```



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

```
user@user-HP-Laptop-15-da0xxx:~$ id
uid=1000(user) gid=1000(user) groups=1000(user),4(adm),24(cdrom),27(sudo),30(dip),46(plugindev),116(lpadmin),126(sambashare)
user@user-HP-Laptop-15-da0xxx:~$
```

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

– The command that launched the process #ps -a 5

```
user@user-HP-Laptop-15-da0xxx:~$ ps
  PID TTY          TIME CMD
 2171 pts/0    00:00:00 bash
 2222 pts/0    00:00:00 ps
```

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

```
File Edit View Search Terminal Help
top - 02:22:41 up 16 min, 1 user, load average: 0.46, 0.45, 0.33
Tasks: 199 total, 3 running, 149 sleeping, 0 stopped, 0 zombie
%Cpu(s): 9.0 us, 1.0 sy, 0.0 ni, 89.8 id, 0.1 wa, 0.0 hi, 0.1 si, 0.0 st
MiB Mem : 3952728 total, 2466640 free, 774600 used, 711488 buff/cache
MiB Swap: 2097148 total, 2097148 free, 0 used, 2689376 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
 1027 user        20   0 3968744 271788 71188 R 23.4  6.9   1:07.22 gnome-shell
 874  user        20   0 501790   5192  38280 S   2.0  1.3   0:14.05 Xorg
2000  user        20   0 563740   6188  36744 S   2.0  1.5   0:02.83 nautilus
2326  user        20   0 355892   20392 15848 S   1.7  0.5   0:00.05 gnome-control-c
2345  user        20   0 353676   20436 15916 R   1.3  0.5   0:00.04 gnome-screensho
1009  user        20   0 377688   9788  8136 S   0.7  0.2   0:03.70ibus-daemon
262  root        10  -1 95052   15356 14368 S   0.3  0.4   0:00.46 systemd-journal
880  user        20   0 50936   528   3672 S   0.3  0.1   0:01.10 dbus-daemon
1011 user        20   0 220784   6920  6220 S   0.3  0.2   0:00.18 at-spi2-registr
1287 user        20   0 220956   8192  7372 S   0.3  0.2   0:01.13ibus-engine-sim
2376  user        20   0 803140  38608 28164 S   0.3  1.0   0:02.16 gnome-terminal
2323  user        20   0 51360   4024  3368 R   0.3  0.1   0:02.26 top
  1  root        20   0 255496   9500  6724 S   1.0  0.2   0:02.92 systemd
  2  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kthreadd
  3  root        20   0 0 0 0 S   0.0  0.0   0:00.00 rcu_gp
  4  root        20   0 0 0 0 S   0.0  0.0   0:00.00 rcu_par_gp
  5  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kworker/0:0H-kb
  6  root        20   0 0 0 0 S   0.0  0.0   0:00.38 kworker/u8:0-av
  7  root        20   0 0 0 0 S   0.0  0.0   0:00.00 mm_percpu_wq
  8  root        20   0 0 0 0 S   0.0  0.0   0:00.02 ksoftirqd/0
  9  root        20   0 0 0 0 S   0.0  0.0   0:00.00 rcu_bh
 10  root        20   0 0 0 0 S   0.0  0.0   0:00.00 rcu_sched
 11  root        20   0 0 0 0 S   0.0  0.0   0:00.00 migration/0
 12  root        20   0 0 0 0 S   0.0  0.0   0:00.00 watchdog/0
 13  root        20   0 0 0 0 S   0.0  0.0   0:00.00 cpuhp/0
 14  root        20   0 0 0 0 S   0.0  0.0   0:00.00 cpuhp/1
 15  root        20   0 0 0 0 S   0.0  0.0   0:00.00 watchdog/1
 16  root        20   0 0 0 0 S   0.0  0.0   0:00.00 migration/1
 17  root        20   0 0 0 0 S   0.0  0.0   0:00.02 ksoftirqd/1
 18  root        20   0 0 0 0 S   0.0  0.0   0:00.13 kworker/1:0-eve
 19  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kworker/1:0H-kb
 20  root        20   0 0 0 0 S   0.0  0.0   0:00.00 watchdog/2
 21  root        20   0 0 0 0 S   0.0  0.0   0:00.00 migration/2
 22  root        20   0 0 0 0 S   0.0  0.0   0:00.01 ksoftirqd/2
 23  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kworker/2:0H-kb
 24  root        20   0 0 0 0 S   0.0  0.0   0:00.00 cpuhp/2
 25  root        20   0 0 0 0 S   0.0  0.0   0:00.00 watchdog/3
 26  root        20   0 0 0 0 S   0.0  0.0   0:00.00 migration/3
 27  root        20   0 0 0 0 S   0.0  0.0   0:00.01 ksoftirqd/3
 28  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kworker/3:0H-kb
 29  root        20   0 0 0 0 S   0.0  0.0   0:00.00 kdevtmpfs
 30  root        20   0 0 0 0 S   0.0  0.0   0:00.00 rcu_tasks_kthre
 31  root        20   0 0 0 0 S   0.0  0.0   0:00.21 kworker/0:2-mm_
 32  root        20   0 0 0 0 S   0.0  0.0   0:00.00 khungtd
 33  root        20   0 0 0 0 S   0.0  0.0   0:00.00 con_reaper
```

41.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 6 8 54 state.tx . #wc state.txt capital.txt wc -l state.txt wc -w state.txt capital.txt wc -c state.txt .wc -m state.txt

```
user@user-HP-Laptop-15-da0xxx:~/silja$ wc tst
1 4 23 tst
user@user-HP-Laptop-15-da0xxx:~/silja$ tar
```

42.tar : The Linux 'tar' stands for tape archive, is used to createArchive and extract theArchive files Linux tar command to create compressed or uncompressedArchive files.

```
user@user-HP-Laptop-15-da0xxx:~/silja$ tar
tar: You must specify one of the '-Acdrux', '--delete' or '--test-label' options
Try 'tar --help' or 'tar --usage' for more information.
user@user-HP-Laptop-15-da0xxx:~/silja$ expr
expr: missing operand
Try 'expr --help' for more information.
```

43.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.

```
user@user-HP-Laptop-15-da0xxx:~/silja$ expr
expr: missing operand
Try 'expr --help' for more information.
user@user-HP-Laptop-15-da0xxx:~/silja$ expr 1+2
1+2
```

44.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.

```
1+2
user@user-HP-Laptop-15-da0xxx:~/silja$ ls-1
ls-1: command not found
user@user-HP-Laptop-15-da0xxx:~/silja$ ls
10.png 13.png 15.png 17.png 19.png 3.png ftx l32.png l34.png l36.png l38.png l141.png rmca
11.png 14.png 16.png 18.png 2.png 4.png l31.png l33.png l35.png l37.png l39.png lin 'Screenshot from 2021-06-20 05-45-30.png'
user@user-HP-Laptop-15-da0xxx:~/silja$ ssh
usage: ssh [-46AaCfGgKkMnNqsTtVvXxYy] [-b bind_address] [-c cipher_spec]
          [-D [bind_address:]port] [-E log_file] [-e escape_char]
          [-F configfile] [-I pkcs11] [-i identity_file]
          [-J [user@]host[:port]] [-L address] [-l login_name] [-m mac_spec]
```

45.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.

```
silja@silja-VirtualBox:~$ ssh
usage: ssh [-46AaCfGgKkMnNqsTtVvXxYy] [-B bind_interface]
          [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
          [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
          [-i identity_file] [-J [user@]host[:port]] [-L address]
          [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
          [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
          [-w local_tun[:remote_tun]] destination [command]
```

46.scp: SCP (secure copy) is a command-line utility that allows you to securely copy files and directories between two locations. With scp, you can copy a file or directory: From your local system to a remote system. From a remote system to your local system. Between two remote systems from your local system. Remote file system locations are specified in format [user@]host:/path Syntax: scp [OPTION] [user@]SRC\_HOST:]file1 [user@]DEST\_HOST:]file2 \$scp /etc/yum.config /etc/hosts ServerX:/home/student \$scp ServerX:/etc/hostname /home/student.

```
user@user-HP-Laptop-15-da0xxx:~/silja$ scp
usage: scp [-346BCpqrV] [-c cipher] [-F ssh_config] [-i identity_file]
        [-l limit] [-o ssh_option] [-P port] [-S program]
        [[user@]host1:]file1 ... [[user@]host2:]file2
user@user-HP-Laptop-15-da0xxx:~/silja$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user/.ssh/id_rsa): dfgh
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Passphrases do not match. Try again.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
```

47.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.

```
Wed Aug 16 02:27:09 IST 2021
user@user-HP-Laptop-15-da0xxx:~$ sudo useradd juliet
[sudo] password for user:
user@user-HP-Laptop-15-da0xxx:~$
```

48.a. Create six files with name of the form songX.mp3                      b. Create six files with name of the form snapX.jpg                      c. Create six files with name of the form filmX.mp4 (In each set, replace X with the numbers 1 through 6)

```
user@user-HP-Laptop-15-da0xxx:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
user@user-HP-Laptop-15-da0xxx:~$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg
user@user-HP-Laptop-15-da0xxx:~$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4 film6.mp4
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
mv: missing destination file operand after '*.jpg./pictures/'
Try 'mv --help' for more information.
user@user-HP-Laptop-15-da0xxx:~$ mv *.jpg./pictures/
mv: missing destination file operand after '*.jpg./pictures/'
Try 'mv --help' for more information.
user@user-HP-Laptop-15-da0xxx:~$ mv *.jpg./silja/
mv: missing destination file operand after '*.jpg./silja/'
Try 'mv --help' for more information.
user@user-HP-Laptop-15-da0xxx:~$ mv *.mp4./videos/
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ mkdir -p {friends,family,work}
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ cp /home/music/song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/friends/
cp: target '/home/friends/' is not a directory
cp: target '/home/friends/' is not a directory
user@user-HP-Laptop-15-da0xxx:~$ cp /home/pictures/snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/family/
cp: target '/home/family/' is not a directory
cp: target '/home/family/' is not a directory
user@user-HP-Laptop-15-da0xxx:~$ cp /home/music/song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3 /home/friends/
cp: target '/home/friends/' is not a directory
user@user-HP-Laptop-15-da0xxx:~$ cp /home/pictures/snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg snap6.jpg /home/family/
cp: target '/home/family/' is not a directory
cp: target '/home/family/' is not a directory
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ rmdir {friends,family}
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ rm -rf (friends,family)
user@user-HP-Laptop-15-da0xxx:~$ rm -rf friends family
rm: cannot remove 'friends': No such file or directory
rm: cannot remove 'family': No such file or directory
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ ls -la > allfiles.txt
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ date
Wed Aug 18 02:27:09 IST 2021
user@user-HP-Laptop-15-da0xxx:~$
```

56. Add the user Juliet

```
Wed Aug 18 02:27:09 IST 2021
user@user-HP-Laptop-15-da0xxx:~$ sudo useradd juliet
[sudo] password for user:
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user:x:1000:1000:silja:/home/user:/bin/bash
juliet:x:1001:1001::/home/juliet:/bin/sh
user@user-HP-Laptop-15-da0xxx:~$ cat /etc/passwd | grep juliet
juliet:x:1001:1001::/home/juliet:/bin/sh
user@user-HP-Laptop-15-da0xxx:~$
```

58. Use the `passwd` command to initialize Juliet's password

```
user@user-HP-Laptop-15-da0xxx:~$ sudo passwd juliet
[sudo] password for user:
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ sudo groupadd -g 30000 shakespeare
user@user-HP-Laptop-15-da0xxx:~$
```

60. Create a supplementary group called artists.

```
user@user-HP-Laptop-15-da0xxx:~$ sudo groupadd artists
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
juliet:x:1001:
shakespeare:x:30000:
artists:x:30001:
(END)
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ sudo usermod -G shakespeare juliet
[sudo] password for user:
user@user-HP-Laptop-15-da0xxx:~$
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ id juliet
uid=1001(juliet) gid=1001(juliet) groups=1001(juliet),30000(shakespeare)
user@user-HP-Laptop-15-da0xxx:~$
```

64. Add Romeo and Hamlet to the Shakespeare group

```
user@user-HP-Laptop-15-da0xxx:~$ sudo usermod -G shakespeare hamlet
user@user-HP-Laptop-15-da0xxx:~$ sudo usermod -G shakespeare Romeo
user@user-HP-Laptop-15-da0xxx:~$ id REMO
id: 'REMO': no such user
user@user-HP-Laptop-15-da0xxx:~$ id Romeo
uid=1004(Romeo) gid=1004(Romeo) groups=1004(Romeo),30000(shakespeare)
user@user-HP-Laptop-15-da0xxx:~$ id hamlet
uid=1005(hamlet) gid=1005(hamlet) groups=1005(hamlet),30000(shakespeare)
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ sudo usermod -G shakespeare hamlet
user@user-HP-Laptop-15-da0xxx:~$ sudo usermod -G shakespeare Romeo
user@user-HP-Laptop-15-da0xxx:~$ id REMO
id: 'REMO': no such user
user@user-HP-Laptop-15-da0xxx:~$ id Romeo
uid=1004(Romeo) gid=1004(Romeo) groups=1004(Romeo),30000(shakespeare)
user@user-HP-Laptop-15-da0xxx:~$ id hamlet
uid=1005(hamlet) gid=1005(hamlet) groups=1005(hamlet),30000(shakespeare)
```

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

```
user@user-HP-Laptop-15-da0xxx:~$ sudo usermo
user@user-HP-Laptop-15-da0xxx:~$ /etc/group
bash: /etc/group: Permission denied
```

67. Attempt to remove user Dolly.

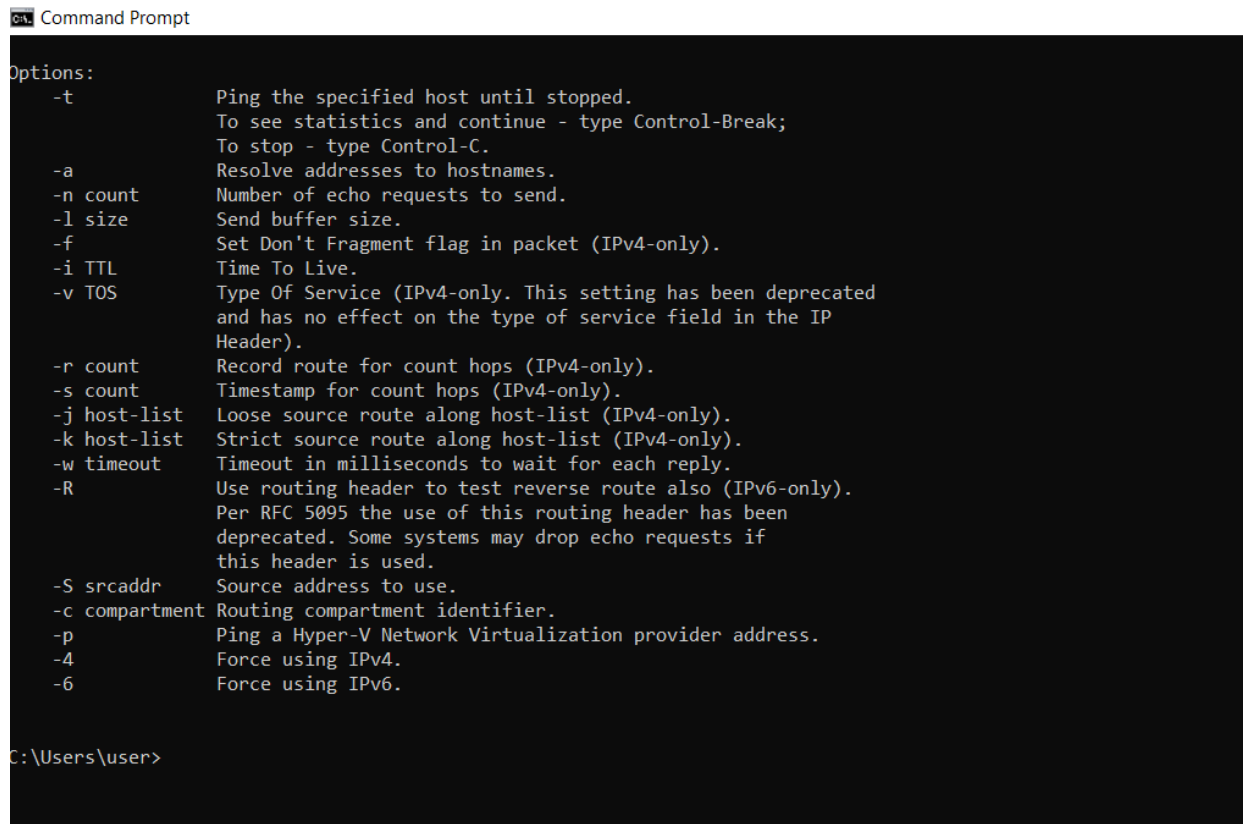
```
user@user-HP-Laptop-15-da0xxx:~$ id Dolly
id: 'Dolly': no such user
user@user-HP-Laptop-15-da0xxx:~$
```



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,IpConfig, NetStat .

- ping

Ping is an old Unix tool that has been around for a long time but many PC users are unfamiliar with the Windows version. Ping sends out a packet to a designated internet host or network computer and measures its response time.

A screenshot of a Windows Command Prompt window. The title bar reads "C:\ Command Prompt". The command prompt shows a list of options for the ping command. The prompt is at "C:\Users\user>".

```
C:\ Command Prompt

Options:
  -t          Ping the specified host until stopped.
              To see statistics and continue - type Control-Break;
              To stop - type Control-C.
  -a          Resolve addresses to hostnames.
  -n count    Number of echo requests to send.
  -l size     Send buffer size.
  -f          Set Don't Fragment flag in packet (IPv4-only).
  -i TTL      Time To Live.
  -v TOS      Type Of Service (IPv4-only. This setting has been deprecated
              and has no effect on the type of service field in the IP
              Header).
  -r count    Record route for count hops (IPv4-only).
  -s count    Timestamp for count hops (IPv4-only).
  -j host-list Loose source route along host-list (IPv4-only).
  -k host-list Strict source route along host-list (IPv4-only).
  -w timeout  Timeout in milliseconds to wait for each reply.
  -R          Use routing header to test reverse route also (IPv6-only).
              Per RFC 5095 the use of this routing header has been
              deprecated. Some systems may drop echo requests if
              this header is used.
  -S srcaddr  Source address to use.
  -c compartment Routing compartment identifier.
  -p          Ping a Hyper-V Network Virtualization provider address.
  -4          Force using IPv4.
  -6          Force using IPv6.

C:\Users\user>
```

## ● Route

In computing, route is a command used to view and manipulate the IP routing table in Unix-like and Microsoft Windows[1] operating systems and also in IBM OS/2 and ReactOS.[2] Manual manipulation of the routing table is characteristic of static routing.

```
C:\Users\user>route
```

```
Manipulates network routing tables.
```

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

-f	Clears the routing tables of all gateway entries. If this is used in conjunction with one of the commands, the tables are cleared prior to running the command.
-p	When used with the ADD command, makes a route persistent across boots of the system. By default, routes are not preserved when the system is restarted. Ignored for all other commands, which always affect the appropriate persistent routes.
-4	Force using IPv4.
-6	Force using IPv6.
command	One of these: PRINT Prints a route ADD Adds a route DELETE Deletes a route CHANGE Modifies an existing route
destination	Specifies the host.
MASK	Specifies that the next parameter is the 'netmask' value.
netmask	Specifies a subnet mask value for this route entry. If not specified, it defaults to 255.255.255.255.
gateway	Specifies gateway.

#### IPv6 Route Table

##### Active Routes:

If	Metric	Network	Destination	Gateway
1	331	::1/128		On-link
2	281	fe80::/64		On-link
23	296	fe80::/64		On-link
23	296	fe80::3967:1de3:1924:1daf/128		On-link
2	281	fe80::e866:65b:18f5:53de/128		On-link
1	331	ff00::/8		On-link
2	281	ff00::/8		On-link
23	296	ff00::/8		On-link

##### Persistent Routes:

None

```
C:\Windows\system32>route print -6
```

##### Interface List

2...0a 00 27 00 00 02	.....VirtualBox Host-Only Ethernet Adapter
25...1a 47 3d e9 62 5d	.....Microsoft Wi-Fi Direct Virtual Adapter #5
19...2a 47 3d e9 62 5d	.....Microsoft Wi-Fi Direct Virtual Adapter #6
23...18 47 3d e9 62 5d	.....Qualcomm QCA61x4A 802.11ac Wireless Adapter
10...18 47 3d e9 62 5e	.....Bluetooth Device (Personal Area Network) #2
1.....	.....Software Loopback Interface 1

#### IPv6 Route Table

##### Active Routes:

If	Metric	Network	Destination	Gateway
1	331	::1/128		On-link
2	281	fe80::/64		On-link
23	296	fe80::/64		On-link
23	296	fe80::3967:1de3:1924:1daf/128		On-link
2	281	fe80::e866:65b:18f5:53de/128		On-link
1	331	ff00::/8		On-link
2	281	ff00::/8		On-link
23	296	ff00::/8		On-link

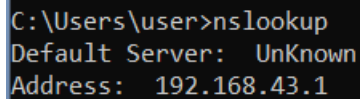
##### Persistent Routes:

None

## ● Nslookup

This command helps diagnose the Domain Name System (DNS) infrastructure and comes with a number of sub-commands. These are mainly for systems administrators. The primary interest for average PC users is its use to find the

computer name corresponding to a numeric IP. For example, if you want to know who is "216.109.112.135" , enter "nslookup 216.109.112.135" and you will find that it is (or was anyway) a Yahoo computer. My firewall keeps a log of the IPs involved in the attempts to probe my computer and I sometimes look a few up to see who they are. (There are also Whois search sites available on the Web as mentioned in the Ipconfig section.)



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

- ipconfig

The Windows IP Configuration tool (ipconfig) is the command-line equivalent of the accessory "Winipcfg" that was present in Windows 9X/Me. It is used to display the TCP/IP network configuration values. To open it, enter "ipconfig" in the command prompt. If you are connected directly to the Internet, you will obtain your IP address.

```

C:\Users\user>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::d971:39dc:b3d4:c7f%13
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter WiFi:

```

- Traceroute

Tracert (tracert) is another old tool borrowed from Unix. The actual path between two computers on the Internet is not a straight line but consists of numerous segments or "hops" from one intermediate computer to another. Tracert shows each step of the path taken. It can be interesting to see just how convoluted it is. The times for each hop and the IP addresses for each intermediate computer are displayed. Tracert shows up to 30 hops. It is convenient for finding if there is one particular segment that is causing a slow or bad connection. A typical command might be "tracert dell.com".

```
C:\Users\user>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
              [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                Do not resolve addresses to hostnames.
    -h maximum_hops  Maximum number of hops to search for target.
    -j host-list      Loose source route along host-list (IPv4-only).
    -w timeout        Wait timeout milliseconds for each reply.
    -R                Trace round-trip path (IPv6-only).
    -S srcaddr        Source address to use (IPv6-only).
    -4                Force using IPv4.
    -6                Force using IPv6.

C:\Users\user>_
```

## 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.

```

C:\Users\user>arp -a

Interface: 192.168.56.1 --- 0xd
    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

Interface: 192.168.43.13 --- 0x12
    Internet Address      Physical Address      Type
    192.168.43.1          9a-e4-ac-27-62-b0    dynamic
    192.168.43.255        ff-ff-ff-ff-ff-ff    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251           01-00-5e-00-00-fb    static
    224.0.0.252           01-00-5e-00-00-fc    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

C:\Users\user>

```

## 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.

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

NetBIOS Names Resolution and Registration Statistics
-----

Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast    = 72
Registered By Name Server  = 0

C:\Users\user>
```

### 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\user>hostname
DESKTOP-QV0H9LF

C:\Users\user>_
```

### 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 packet loss statistics that are more detailed than those provided by Ping or Tracert.

```
C:\Users\user>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.

C:\Users\user>_
```

#### e) getmac

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

# LAMP INSTALLATION PROCEDURE

## Install apache

- Update your system

**sudo apt update**

- Install Apache using apt:

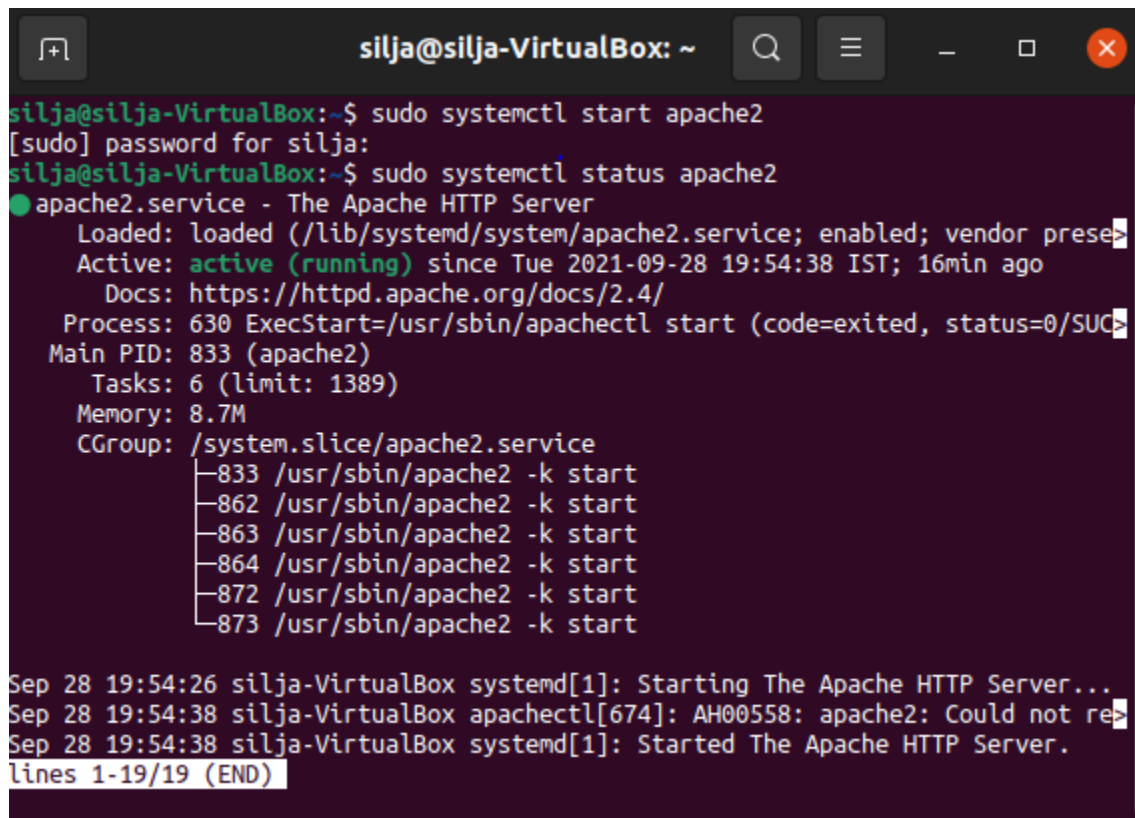
**sudo apt install apache2**

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

**sudo systemctl status apache2**

- if it is not working

**sudo systemctl start apache2**

A terminal window titled 'silja@silja-VirtualBox: ~' with standard window controls. The terminal shows the following commands and output:

```
silja@silja-VirtualBox:~$ sudo systemctl start apache2
[sudo] password for silja:
silja@silja-VirtualBox:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese
   Active: active (running) since Tue 2021-09-28 19:54:38 IST; 16min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Process: 630 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUC
 Main PID: 833 (apache2)
    Tasks: 6 (limit: 1389)
   Memory: 8.7M
    CGroup: /system.slice/apache2.service
            └─833 /usr/sbin/apache2 -k start
              └─862 /usr/sbin/apache2 -k start
                └─863 /usr/sbin/apache2 -k start
                  └─864 /usr/sbin/apache2 -k start
                    └─872 /usr/sbin/apache2 -k start
                      └─873 /usr/sbin/apache2 -k start

Sep 28 19:54:26 silja-VirtualBox systemd[1]: Starting The Apache HTTP Server...
Sep 28 19:54:38 silja-VirtualBox apachectl[674]: AH00558: apache2: Could not re
Sep 28 19:54:38 silja-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-19/19 (END)
```

# 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 )

```
silja@silja-VirtualBox:~$ sudo systemctl start mysql
[sudo] password for silja:
silja@silja-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-09-28 19:54:42 IST; 24min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Process: 633 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var>
  Process: 648 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_ST>
  Process: 652 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] &&>
  Process: 918 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_S>
  Process: 920 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/>
 Main PID: 741 (mariabdd)
   Status: "Taking your SQL requests now..."
    Tasks: 8 (limit: 1389)
  Memory: 31.6M
   CGroup: /system.slice/mariadb.service
           └─741 /usr/sbin/mariabdd

Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] R>
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] A>
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] />
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: Version: '10.5.12-MariaDB-0ubu>
Sep 28 19:54:42 silja-VirtualBox systemd[1]: Started MariaDB 10.5.12 database >
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'my>
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'my>
```

```

lines 1-27/27 (END)...skipping...
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-09-28 19:54:42 IST; 24min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Process: 633 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run/mysqld (code=exite>
  Process: 648 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exit>
  Process: 652 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR= || VAR='cd /usr/>
  Process: 918 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exi>
  Process: 920 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUCCESS)
 Main PID: 741 (mariadb)
   Status: "Taking your SQL requests now..."
    Tasks: 8 (limit: 1389)
  Memory: 31.6M
   CGroup: /system.slice/mariadb.service
           └─741 /usr/sbin/mariadb

Sep 28 19:54:41 silja-VirtualBox mariadb[741]: 2021-09-28 19:54:41 0 [Note] Reading of all Master_in>
Sep 28 19:54:41 silja-VirtualBox mariadb[741]: 2021-09-28 19:54:41 0 [Note] Added new Master_info ''>
Sep 28 19:54:41 silja-VirtualBox mariadb[741]: 2021-09-28 19:54:41 0 [Note] /usr/sbin/mariadb: read>
Sep 28 19:54:41 silja-VirtualBox mariadb[741]: Version: '10.5.12-MariaDB-0ubuntu0.21.04.1' socket: >
Sep 28 19:54:42 silja-VirtualBox systemd[1]: Started MariaDB 10.5.12 database server.
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'mysql' as: /usr/bin/mysql>
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'mysqlcheck' as: /usr/bin/>
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: This installation of MariaDB is alread>
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[955]: Checking for insecure root accounts.
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[959]: Triggering myisam-recover for all MyIS>
~

```

## Install PHP

- Install PHP

```
sudo apt install php libapache2-mod-php php-  
opcachephp-cli php-gdphp-curl php-mysql
```

- Restart apache2

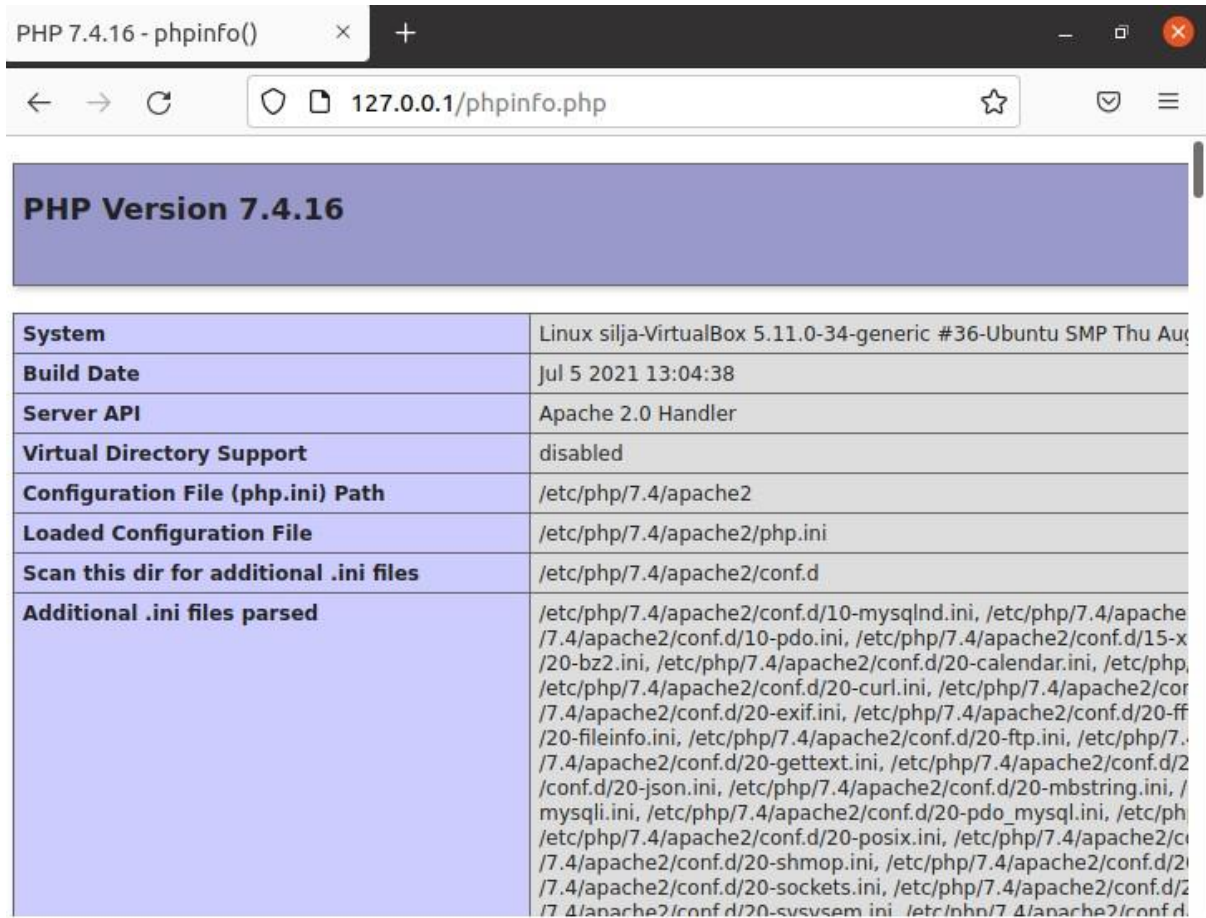
```
sudo systemctl restart apache2
```

- Now you can check php installation

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

- Open a browser

**<http://127.0.0.1/phpinfo.php>**



<b>PHP Version 7.4.16</b>	
<b>System</b>	Linux silja-VirtualBox 5.11.0-34-generic #36-Ubuntu SMP Thu Aug 12 22:03:10 UTC 2021 x86_64
<b>Build Date</b>	Jul 5 2021 13:04:38
<b>Server API</b>	Apache 2.0 Handler
<b>Virtual Directory Support</b>	disabled
<b>Configuration File (php.ini) Path</b>	/etc/php/7.4/apache2
<b>Loaded Configuration File</b>	/etc/php/7.4/apache2/php.ini
<b>Scan this dir for additional .ini files</b>	/etc/php/7.4/apache2/conf.d
<b>Additional .ini files parsed</b>	/etc/php/7.4/apache2/conf.d/10-mysqld.ini, /etc/php/7.4/apache2/conf.d/10-pdo.ini, /etc/php/7.4/apache2/conf.d/15-xdebug.ini, /etc/php/7.4/apache2/conf.d/20-bz2.ini, /etc/php/7.4/apache2/conf.d/20-calendar.ini, /etc/php/7.4/apache2/conf.d/20-curl.ini, /etc/php/7.4/apache2/conf.d/20-exif.ini, /etc/php/7.4/apache2/conf.d/20-ffi.ini, /etc/php/7.4/apache2/conf.d/20-fileinfo.ini, /etc/php/7.4/apache2/conf.d/20-ftp.ini, /etc/php/7.4/apache2/conf.d/20-gd.ini, /etc/php/7.4/apache2/conf.d/20-gettext.ini, /etc/php/7.4/apache2/conf.d/20-iconv.ini, /etc/php/7.4/apache2/conf.d/20-imagick.ini, /etc/php/7.4/apache2/conf.d/20-ldap.ini, /etc/php/7.4/apache2/conf.d/20-mbstring.ini, /etc/php/7.4/apache2/conf.d/20-mcrypt.ini, /etc/php/7.4/apache2/conf.d/20-mysql.ini, /etc/php/7.4/apache2/conf.d/20-mysqli.ini, /etc/php/7.4/apache2/conf.d/20-openssl.ini, /etc/php/7.4/apache2/conf.d/20-pdo_mysql.ini, /etc/php/7.4/apache2/conf.d/20-posix.ini, /etc/php/7.4/apache2/conf.d/20-shmop.ini, /etc/php/7.4/apache2/conf.d/20-sockets.ini, /etc/php/7.4/apache2/conf.d/20-sysvsem.ini, /etc/php/7.4/apache2/conf.d/20-sysvshm.ini, /etc/php/7.4/apache2/conf.d/20-tidy.ini, /etc/php/7.4/apache2/conf.d/20-xml.ini, /etc/php/7.4/apache2/conf.d/20-xmlrpc.ini, /etc/php/7.4/apache2/conf.d/20-zip.ini, /etc/php/7.4/apache2/conf.d/20-zlib.ini

## Install phpmyadmin

- Install phpmyadmin

**sudo apt install phpmyadminphp-mbstringphp-zip  
php-gdphp-jsonphp-curl**

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

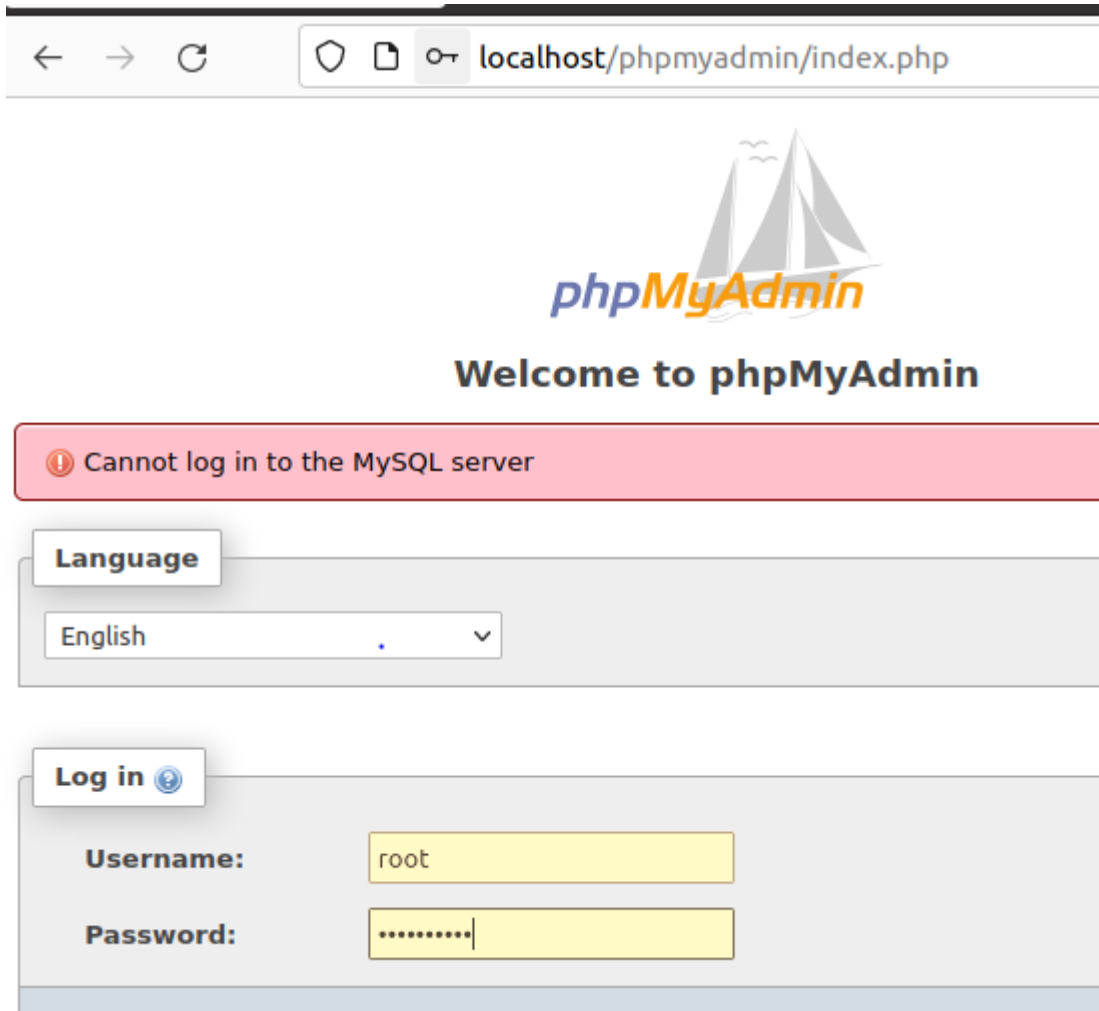
- Restart apache2

**sudo systemctl restart apache2**



- Check phpmyadmin


- Open a browser


<http://localhost/phpmyadmin>



The screenshot shows a web browser window with the address bar displaying `localhost/phpmyadmin/index.php`. The page features the phpMyAdmin logo, which includes a stylized sailboat, and the text "Welcome to phpMyAdmin". A red error message box states: "Cannot log in to the MySQL server". Below this, there is a "Language" section with a dropdown menu set to "English". At the bottom, the "Log in" section contains two input fields: "Username:" with the value "root" and "Password:" with masked characters ".....".


← → ↻   localhost/phpmyadmin/index.php

  
**Welcome to phpMyAdmin**

 Cannot log in to the MySQL server

**Language**

English ▾

**Log in** 

**Username:**

**Password:**



# Ansible installation

COMMAND `sudo apt install ansible`

```
silja@silja-VirtualBox:~$ sudo apt install ansible
[sudo] password for silja:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  Files 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-xlrd python3-xlwt
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-xlrd python3-xlwt
0 upgraded, 21 newly installed, 0 to remove and 157 not upgraded.
Need to get 31.8 MB of archives.
After this operation, 275 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-jinja2 all
  2.11.2-1 [99.8 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-pyparsing
```

COMMAND :ansible --version

```
Processing triggers for Man-db (2.9.4-2) ...
silja@silja-VirtualBox:~$ ansible --version
ansible 2.10.5
  config file = None
  configured module search path = ['/home/silja/.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 = 3.9.5 (default, May 11 2021, 08:20:37) [GCC 10.3.0]
silja@silja-VirtualBox:~$
```



# TCPDUMP

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

```
silja@silja-VirtualBox:~$ sudo apt install tcpdump
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
tcpdump is already the newest version (4.9.3-7).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 157 not upgraded.
```

- Sudo tcpdump

```
silja@silja-VirtualBox:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
```

- Sudo apt update

```
silja@silja-VirtualBox:~$ sudo apt update
[sudo] password for silja:
Hit:1 http://in.archive.ubuntu.com/ubuntu hirsute InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu hirsute-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu hirsute-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu hirsute-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
157 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

Sudo tcpdump

```
silja@silja-VirtualBox:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:30:31.334812 IP6 silja-VirtualBox > ip6-allrouters: ICMP6, router solicitation, length 8
11:31:11.501310 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [S], seq 475077761, win 64240, options [mss 1460,sackOK,TS val 2429675019 ecr 0,nop,wscale 7], length 0
11:31:11.501954 IP silja-VirtualBox.56434 > 192.168.43.1.domain: 50750+ PTR? 84.170.224.35.in-addr.arpa. (44)
11:31:11.732345 IP 192.168.43.1.domain > silja-VirtualBox.56434: 50750 1/0/0 PTR 84.170.224.35.bc.googleusercontent.com. (96)
11:31:11.733210 IP silja-VirtualBox.37861 > 192.168.43.1.domain: 28068+ PTR? 15.2.0.10.in-addr.arpa. (40)
11:31:11.834954 IP 192.168.43.1.domain > silja-VirtualBox.37861: 28068 NXDomain 0/0/0 (40)
11:31:11.835366 IP 84.170.224.35.bc.googleusercontent.com.http > silja-VirtualBox.41220: Flags [S.], seq 26048001, ack 475077762, win 65535, options [mss 1460], length 0
11:31:11.835392 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [.], ack 1, win 64240, length 0
11:31:11.836252 IP silja-VirtualBox.56651 > 192.168.43.1.domain: 56832+ PTR? 1.43.168.192.in-addr.arpa. (43)
11:31:11.836472 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [P.], seq 1:88, ack 1, win 64240, length 87: HTTP: GET / HTTP/1
```

Sudo tcpdump -D

```
silja@silja-VirtualBox:~$ sudo tcpdump -D
1.enp0s3 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
7.dbus-system (D-Bus system bus) [none]
8.dbus-session (D-Bus session bus) [none]
```

Sudo tcpdump -c 5

```
silja@silja-VirtualBox:~$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
-v
11:34:32.976480 IP silja-VirtualBox.57522 > 192.168.43.1.domain: 25681+ AAAA? c
onnectivity-check.ubuntu.com. (47)
11:34:32.978247 IP silja-VirtualBox.36580 > 192.168.43.1.domain: 62896+ PTR? 1.
43.168.192.in-addr.arpa. (43)
11:34:37.979326 IP silja-VirtualBox.36580 > 192.168.43.1.domain: 62896+ PTR? 1.
43.168.192.in-addr.arpa. (43)
11:34:37.979449 IP silja-VirtualBox.57522 > 192.168.43.1.domain: 25681+ AAAA? c
onnectivity-check.ubuntu.com. (47)
11:34:37.984032 IP 192.168.43.1.domain > silja-VirtualBox.36580: 62896 NXDomain
0/0/0 (43)
5 packets captured
10 packets received by filter
```

Sudo tcpdump -i enp2s0

```
silja@silja-VirtualBox:~$ -v
-v: command not found
silja@silja-VirtualBox:~$ sudo tcpdump -i enp2s0
tcpdump: enp2s0: No such device exists
(SIOCGIFHWADDR: No such device)
silja@silja-VirtualBox:~$
```

# Shell Scripting

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

```
echo "enter details and view"
echo enter your name
read name
echo enter your college name
read c
clear
echo Details you entered
echo Name:$name
echo College:$c
```

```
user@user-VirtualBox:~$ bash 1.sh
enter details and view
enter your name
sreya
enter your college name
amal jyothi college

Details you entered
Name:sreya
College:amal jyothi college
user@user-VirtualBox:~$
```

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

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

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

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

```
echo enter a number
read a
echo enter another number
read b
echo enter operation
echo "\n1.addition \n2.subtraction \n3.multiplication \n4.division"
read op
case "$op" in
"1") echo "a+b=$((a+b));;"
"2") echo "a-b=$((a-b));;"
"3") echo "a*b=$((a*b));;"
"4") echo "a/b=$((a/b));;"
esac
```

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

```
echo enter a number
read a
if [ $a -eq 10 ];
then
echo "number found"
else
echo "not found"
fi
```

```
user@user-VirtualBox:~$ bash 4.sh
enter a number
9
not found
```

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

```
echo "Today is $(date)"
echo "calender:"
cal
```

```
user@user-VirtualBox:~$ bash 5.sh
Today is Saturday 02 October 2021 05:53:45 PM IST
calender:
   October 2021
Su Mo Tu We Th Fr Sa
                1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

6. Write a shell script to check a number is even or odd. #!/bin/bash

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

```
user@user-VirtualBox:~$ bash 6.sh
enter a number
4
number is even
```

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

```
echo enter first number
read a
echo enter second number
read b
if [ $a -gt $b ];
then
```

```
echo "$a is larger"
elif [ $b -gt $a ];
then
echo "$b is larger"
else
echo "both are equal"
fi
```

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

```
s=0
for ((i=0;i<=10;i++))
do
s=`expr $s + $i`
done
echo "sum of first 10 numbers=$s"
```

```
user@user-VirtualBox:~$ bash 8.sh
sum of first 10 numbers=55
```

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

```
echo please enter your first number
read a
echo please enter your second number
read b
echo please enter your third number
read c
echo please enter your fourth number
read d
sum=$(( $a + $b + $c + $d ))
prod=$(( $a * $b * $c * $d ))
avg=$(echo $sum/4 | bc -l)
```

```
echo "the sum is:"$sum
echo "the average is:"$avg
echo "the product is:"$prod
```

```
user@user-VirtualBox:~$ bash 9.sh
please enter your first number
1
please enter your second number
2
please enter your third number
3
please enter your fourth number
4
the sum is:10
the average is:2.500000000000000000000000
the product is:24
```

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

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

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



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

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

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

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

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

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

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

```
echo enter size
user@user-VirtualBox:~$ bash 13.sh
enter size
5
enter numbers
6
7
8
9
4
average is 6.8000000000000000000000000000
i=$((i+1))
done
avg=$(echo $s/$n | bc -l)
echo "average is $avg"
```

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

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

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

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

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

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

# Analyzing network packet stream using nc and wireshark

Step 1:

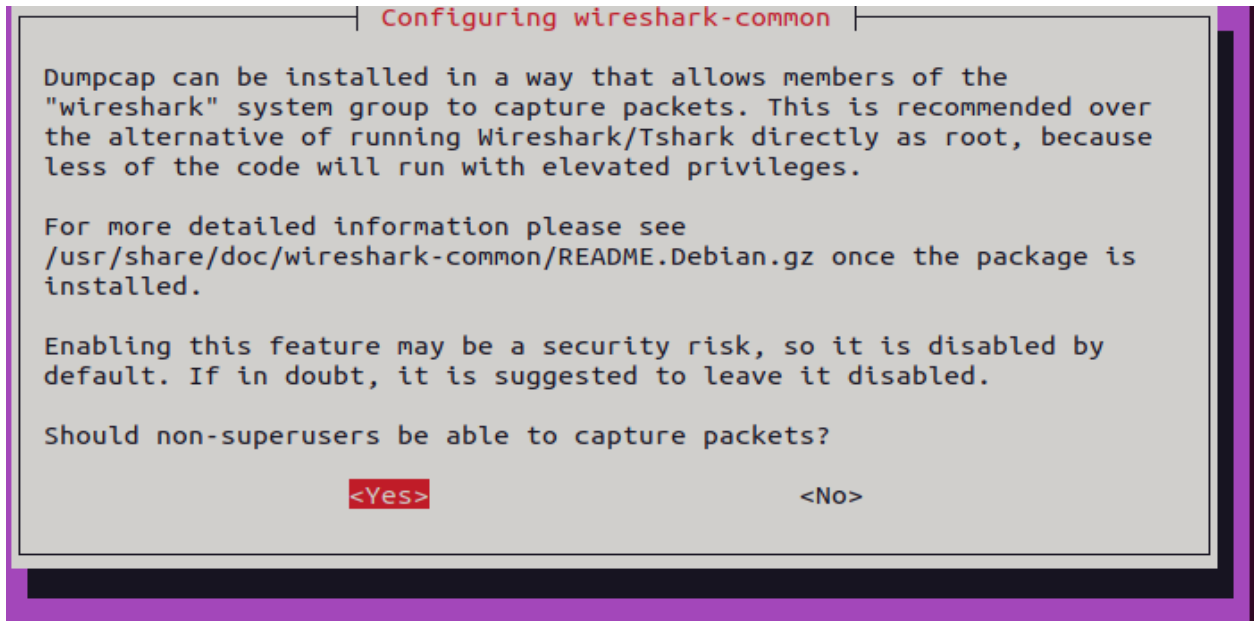
sudo apt-get install wireshark

```
silja@silja-VirtualBox:~$ sudo apt-get install wireshark
[sudo] password for silja:
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 libpcres2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
  libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediagsttools5
  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 libpcres2-16-0 libqt5core5a libqt5dbus5 libqt5gui5
  libqt5multimedia5 libqt5multimedia5-plugins libqt5multimediagsttools5
  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
```

```
Setting up libqt5network5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libwiretap11:amd64 (3.4.4-1ubuntu1) ...
Setting up libwireshark14:amd64 (3.4.4-1ubuntu1) ...
Setting up wireshark-common (3.4.4-1ubuntu1) ...
Setting up libqt5gui5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libqt5widgets5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up qt5-gtk-platformtheme:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libqt5multimedia5:amd64 (5.15.2-3) ...
Setting up libqt5printsupport5:amd64 (5.15.2+dfsg-5ubuntu1) ...
Setting up libqt5multimediawidgets5:amd64 (5.15.2-3) ...
Setting up libqt5multimediagsttools5:amd64 (5.15.2-3) ...
Setting up libqt5multimedia5-plugins:amd64 (5.15.2-3) ...
Setting up libqt5svg5:amd64 (5.15.2-3) ...
Setting up wireshark-qt (3.4.4-1ubuntu1) ...
Setting up wireshark (3.4.4-1ubuntu1) ...
Processing triggers for libc-bin (2.33-0ubuntu5) ...
Processing triggers for man-db (2.9.4-2) ...
Processing triggers for shared-mime-info (2.0-1) ...
Processing triggers for mailcap (3.68ubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
silja@silja-VirtualBox:~$
```

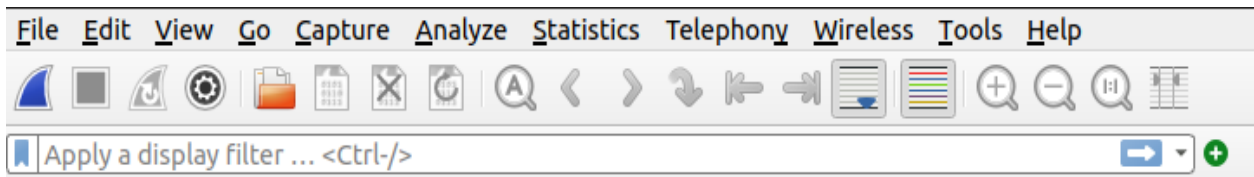
Step 2:

`sudo dpkg-reconfigure wireshark-common`



Step3 :

open wireshark from the applist.



Welcome to Wireshark

## Capture

...using this filter:

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

## Learn

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

# DOCKER INSTALLATION

## Step:1

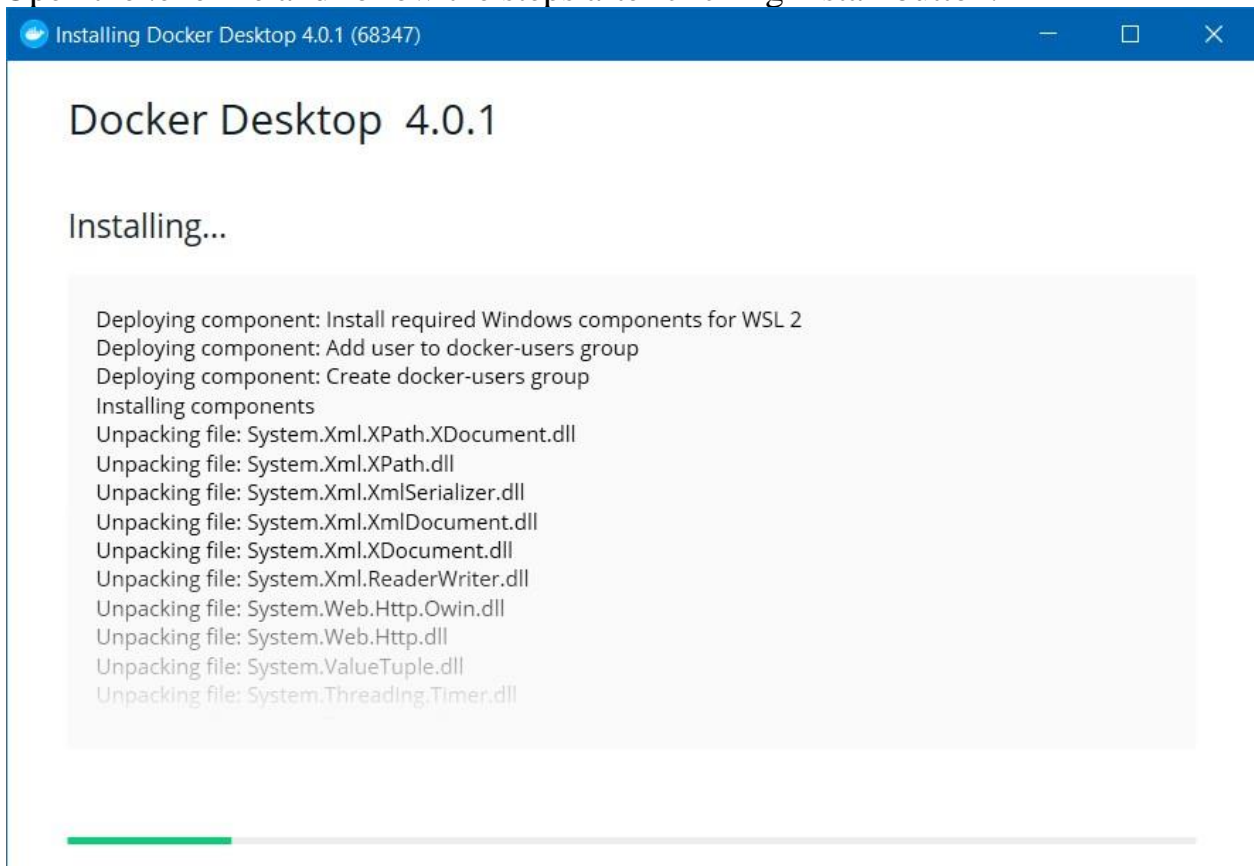
Download Docker Desktop installer for Windows from

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

 Docker Desktop Installer	9/29/2021 2:51 PM	Application	522,896 KB
--	-------------------	-------------	------------

## Step:2

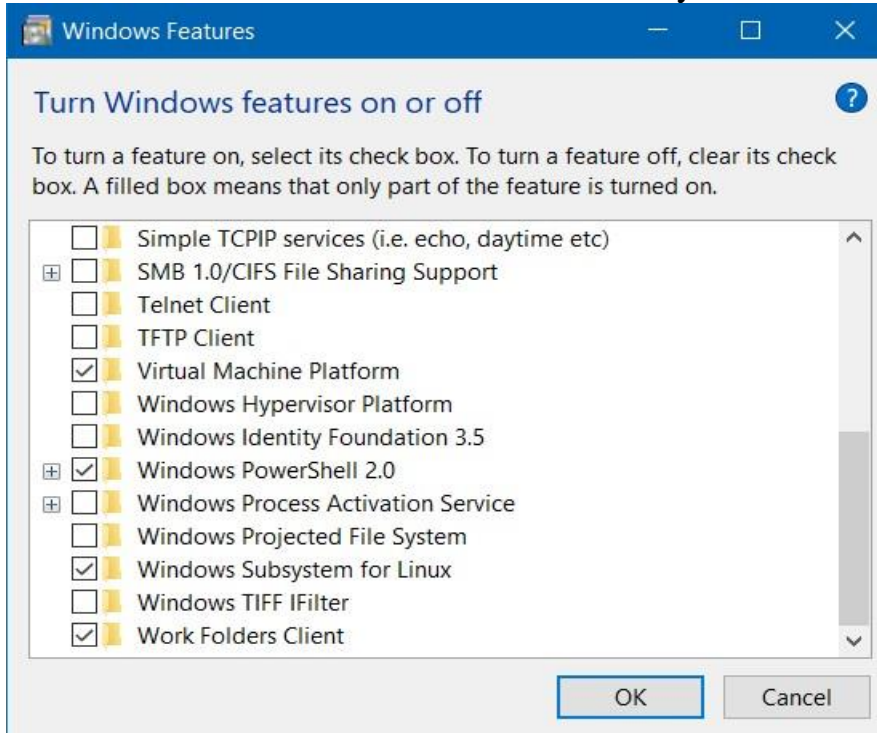
Open the .exe file and follow the steps after clicking install button.



### Step:3

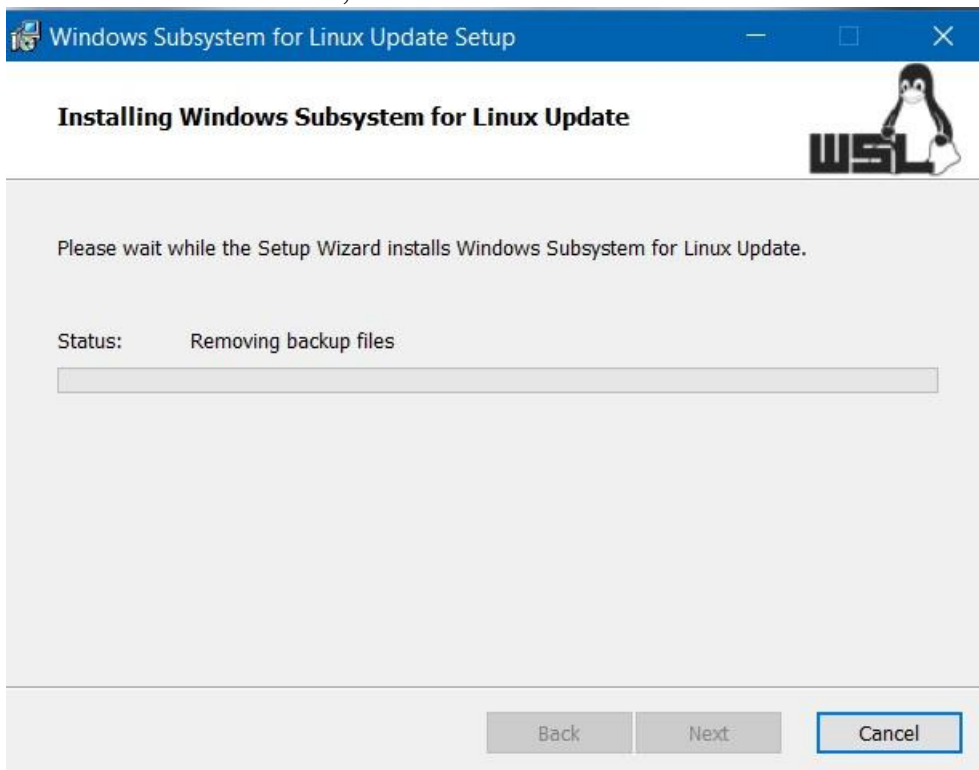
Once installed go to programs and features and click turn on windows features on or off

Scroll to the bottom and select windows subsystem for Linux



### Step:4

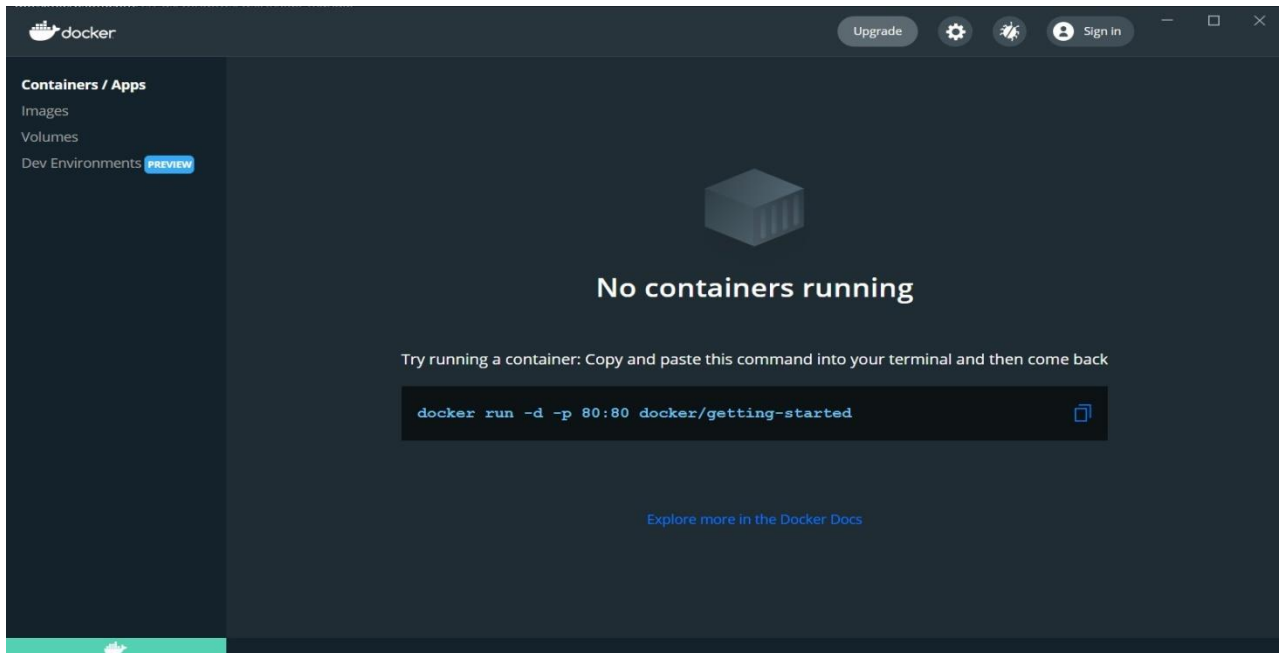
If any WSL 2 error occurs download windows subsystem for linux update package and install the .exe file, after the installation restart the windows device.





## Step:5

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



## Step:6

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

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

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

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

C:\Windows\system32>_
```

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

