

NETWORKING&SYSTEM ADMINISTRATION LAB

RECORD

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LINUX COMMANDS

pwd(PrintWorkingDirectory)

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

```
swathi@swathi:~$ pwd  
/home/swathi  
swathi@swathi:~$ 
```

history

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

```
swathi@swathi:~/Desktop$ pwd  
/home/swathi/Desktop  
swathi@swathi:~/Desktop$ history  
 1  ls  
 2  sh VBoxLinuxAdditions.run  
 3  chmod 777 VBoxLinuxAdditions.run  
 4  sh VBoxLinuxAdditions.run  
 5  sudo sh VBoxLinuxAdditions.run  
 6  sudo apt install virtualbox-guest-utils virtualbox-guest-dkms  
 7  sudo apt install gcc g++  
 8  sudo apt install gcc  
 9  sudo apt get update  
10  sudo apt update  
11  sudo apt get upgrade  
12  sudo apt upgrade  
13  pwd  
14  history  
15  man  
16  man pwd  
17  man history  
18  man clear  
19  man man  
20  cd  
21  cd.  
22  cd  
23  cd-  
24  ls  
25  cd ajce  
26  ls  
27  cd mca  
28  ls regmca  
29  cd..  
30  cd.  
31  cd-  
32  pwd  
33  cd.  
34  pwd  
35  cd..
```

➤ !command number to run a command from history

```
swathi@swathi:/Desktop$ history !30
history cd.
bash: history: cd.: numeric argument required
swathi@swathi:/Desktop$
```

man

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

```
MAN(1)                                Manual pager utils                               MAN(1)

NAME
    man - an interface to the system reference manuals

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

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

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

    1 Executable programs or shell commands
    2 System calls (functions provided by the kernel)
    3 Library calls (functions within program libraries)
    4 Special files (usually found in /dev)
    5 File formats and conventions, e.g. /etc/passwd
    6 Games
    7 Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)
    8 System administration commands (usually only for root)
    9 Kernel routines [Non standard]

    A manual page consists of several sections.

    Conventional section names include NAME, SYNOPSIS, CONFIGURATION, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUE, ERRORS, ENVIRONMENT, FILES, VERSIONS, CONFORMING TO, NOTES, BUGS, EXAMPLE, AUTHORS, and SEE ALSO.

    The following conventions apply to the SYNOPSIS section and can be used as a guide in other sections.
    Manual name man(1) line 1 (press h for help or n to next)
```

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.

Shortcuts to help you navigate quickly:

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

```
swathi@swathi:~/Desktop$ mkdir file1
swathi@swathi:~/Desktop$ cd file1
swathi@swathi:~/Desktop/file1$ cd ..
swathi@swathi:~/Desktop$ pwd
/home/swathi/Desktop
swathi@swathi:~/Desktop$ mkdir file2
swathi@swathi:~/Desktop$ cd file2
swathi@swathi:~/Desktop/file2$ mkdir mylabworks
swathi@swathi:~/Desktop/file2$ ls
mylabworks
swathi@swathi:~/Desktop/file2$ mkdir -p
mkdir: missing operand
Try 'mkdir --help' for more information.
swathi@swathi:~/Desktop/file2$ mkdir -p sample/sample2
swathi@swathi:~/Desktop/file2$ ls
mylabworks sample
swathi@swathi:~/Desktop/file2$ cd nwlab
bash: cd: nwlab: No such file or directory
swathi@swathi:~/Desktop/file2$
```

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.

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

```
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4
```

- `ls -R` will ls install the files in the sub-directories as well
- `ls -l` long listing
- `ls -a` will show the hidden files
- `ls -al` will is 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.

```
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -l
total 16
-rw-rw-r-- 1 swathi swathi 11 Jun 14 21:24 file1
-rw-rw-r-- 1 swathi swathi 12 Jun 14 21:24 file2
-rw-rw-r-- 1 swathi swathi 11 Jun 14 21:25 file3
-rw-rw-r-- 1 swathi swathi 34 Jun 14 21:25 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -al
total 24
drwxrwxr-x 2 swathi swathi 4096 Jun 14 21:42 .
drwxrwxr-x 3 swathi swathi 4096 Jun 14 21:23 ..
-rw-rw-r-- 1 swathi swathi 11 Jun 14 21:24 file1
-rw-rw-r-- 1 swathi swathi 12 Jun 14 21:24 file2
-rw-rw-r-- 1 swathi swathi 11 Jun 14 21:25 file3
-rw-rw-r-- 1 swathi swathi 34 Jun 14 21:25 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -t
file4 file3 file2 file1
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -r
file4 file3 file2 file1
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -tr
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -a
. ..
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ ls -R
.:
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ 
```

mkdir

Use **mkdir** command to make an directory.

To generate a new directory inside another directory, use this Linux basic command.

```
swathi@swathi:~/Desktop$ mkdir file1
swathi@swathi:~/Desktop$ cd file1
swathi@swathi:~/Desktop/file1$ cd ..
swathi@swathi:~/Desktop$ pwd
/home/swathi/Desktop
swathi@swathi:~/Desktop$ mkdir file2
swathi@swathi:~/Desktop$ cd file2
swathi@swathi:~/Desktop/file2$ mkdir mylabwork
swathi@swathi:~/Desktop/file2$ ls
mylabworks
```

```
swathi@swathi:~/Desktop/file2$ mkdir -p sample/sample2
swathi@swathi:~/Desktop/file2$ ls
mylabworks sample
```

rmdir

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

```
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4 file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ rm file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ []
```

touch

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

```
swathi@swathi:~/Desktop/file2$ mkdir newlab
swathi@swathi:~/Desktop/file2$ cd newlab
swathi@swathi:~/Desktop/file2/newlab$ touch file1 file2 file3
swathi@swathi:~/Desktop/file2/newlab$ ls
file1 file2 file3
swathi@swathi:~/Desktop/file2/newlab$ []
```

rm

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

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

To remove a file use **rm filename**

```
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4 file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ rm file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1 file2 file3 file4
swathi@swathi:~/Desktop/file2/newlab/documents$ 
```

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:catfile.txt.

Here are other ways to use the cat command:

- **cat > filename** creates a new file
- **cat filename1 filename2>filename3** joins two files(1 and2)and stores the output of them in a new file(3)
- to convert a file to upper or lowercase use, **cat filename | tr a-z A-Z>output.txt**
- **cat >>myfile** insert data to a file

```
swathi@swathi:~/Desktop/file2/newlab$ cat mycommands1
cat: mycommands1: No such file or directory
swathi@swathi:~/Desktop/file2/newlab$ hello this is my lab work
Command 'hello' not found, but can be installed with:

sudo apt install hello          # version 2.10-2ubuntu2, or
sudo apt install hello-traditional # version 2.10-5

swathi@swathi:~/Desktop/file2/newlab$ this will show basic linux commands^C
swathi@swathi:~/Desktop/file2/newlab$ 
```

```
swathi@swathi:~/Desktop/file2/newlab$ mkdir documents
swathi@swathi:~/Desktop/file2/newlab$ cd documents
swathi@swathi:~/Desktop/file2/newlab/documents$ touch file1 file2 file3
swathi@swathi:~/Desktop/file2/newlab/documents$ cat >file1
first file
^C
swathi@swathi:~/Desktop/file2/newlab/documents$ cat >file2
second file
^C
swathi@swathi:~/Desktop/file2/newlab/documents$ cat >file3
third file
^C
swathi@swathi:~/Desktop/file2/newlab/documents$ cat file1 file2 file3 >file4
swathi@swathi:~/Desktop/file2/newlab/documents$ cat file4
first file
second file
third file
swathi@swathi:~/Desktop/file2/newlab/documents$ 
```

```
swathi@swathi:~/Desktop/file2/newlab/documents$ cat file4
first file
second file
third file
swathi@swathi:~/Desktop/file2/newlab/documents$ cat file4 | tr a-z A-Z >file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ ls
file1  file2  file3  file4  file5.txt
swathi@swathi:~/Desktop/file2/newlab/documents$ cat file5.txt
FIRST FILE
SECOND FILE
THIRD FILE
swathi@swathi:~/Desktop/file2/newlab/documents$ █
```

echo

echo command is used to move some data into a file.

```
swathi@swathi:~/Desktop$ echo "hello iam swathy";read name;echo "yes $name"
hello iam swathy
swathy
yes swathy
swathi@swathi:~/Desktop$ █
```

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.

```
swat@igs-wathi:~/Desktop$ head -n 3 /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
```

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.

```
swathi@swathi:~/Desktop$ tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
login
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
swathi:x:1000:1000:Swathi,,,:/home/swathi:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
vboxadd:x:998:1::/var/run/vboxadd:/bin/false
swathi@swathi:~/Desktop$
```

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]"

```
swathi@swathi:~/Desktop$ read v1 v2 v3  
Amal Jyothi college
```

```
[v1] [v2] [v3]  
swathi@swathi:~/Desktop$ echo ["$v1"] ["$v2"] ["$v3"]  
[Amal Jyothi college]
```

more

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

Enter key: To scroll down page line by line.

Space bar: To go to next page.

b key: To go to the backward page.

/ key: Lets you search the string.

Syntax: more <file name>

more /etc/passwd

```
swathi@swathi:~/Desktop$ more /etc/passwd
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lpix: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:/var/run/ircd:/usr/sbin/nologin
```

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.

less <file name>

\$less /etc/passwd

```
root@kali:~# less /etc/passwd  
root@kali:~# ls  
kali root kali root
```

cut

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

cut OPTION... [FILE]...

\$cut -b 1,2,3 state.txt

```
DOCUMENTS    Pictures    Videos    41.xls
swathi@swathi:~/Desktop$ touch state.txt
swathi@swathi:~/Desktop$ echo kerala >>state.txt
swathi@swathi:~/Desktop$ echo jammu >>state.txt
swathi@swathi:~/Desktop$ echo karnadaka >>state.txt
swathi@swathi:~/Desktop$ echo tamilnadu >>state.txt
swathi@swathi:~/Desktop$ echo assam >>state.txt
swathi@swathi:~/Desktop$ cat state.txt
kerala
jammu
tamilnadu
swathi@swathi:~/Desktop$ cut -b 1,2 state.txt
ke
ja
ta
swathi@swathi:~/Desktop$ cut -b 1,2,3 state.txt
ker
jam
tam
```

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

A screenshot of a terminal window with a dark background and light-colored text. The text shows the output of the 'paste' command. It consists of two columns of text: 'Alabama' and 'Montana'. The first column has four lines: 'Montgomery', 'Birmingham', 'Tuscaloosa', and 'Huntsville'. The second column has three lines: 'Helena', 'Bozeman', and 'Billings'. The lines are aligned by their position in each column.

```
Montgomery
Birmingham
Tuscaloosa
Huntsville
Helena
Bozeman
Billings
```

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.

```
swathi@swathi:~/Desktop$ uname  
Linux  
swathi@swathi:~/Desktop$ uname -r  
5.8.0-55-generic  
swathi@swathi:~/Desktop$ uname -v  
#62-20.84.1-Ubuntu SMP Wed Jun 2 08:55:04 UTC 2021  
swathi@swathi:~/Desktop$ uname -p  
x86_64  
swathi@swathi:~/Desktop$ man uname
```

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.

```
swathi@swathi:~/Desktop$ touch v1.txt v2.txt
swathi@swathi:~/Desktop$ ls
document file1 file2 q1.txt state.txt stste.txt v1.txt v2.txt
swathi@swathi:~/Desktop$ mkdir ajce
swathi@swathi:~/Desktop$ ls
ajce document file1 file2 q1.txt state.txt stste.txt v1.txt v2.txt
swathi@swathi:~/Desktop$ cp v1.txt ajce/
swathi@swathi:~/Desktop$ ls ajce
v1.txt
swathi@swathi:~/Desktop$ cp v2.txt ajce/
swathi@swathi:~/Desktop$ ls
ajce document file1 file2 q1.txt state.txt stste.txt v1.txt v2.txt
swathi@swathi:~/Desktop$ ls ajce
v1.txt v2.txt
```

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

```
swathi@swathi:~/Desktop$ mv v1.txt ajce/
swathi@swathi:~/Desktop$ ls ajce
v1.txt  v2.txt
```

locate

To locate a file, just like the search command in Windows.

What's more, using the -i argument along with this command will make it case-insensitive,

so you can search for a file even if you don't remember its exact name.

To search for a file that contains two or more words, use an asterisk (*).

For example, **locate -i school*note** command will search for any file that contains the word “school” and “note”, whether it is uppercase or lowercase.

```
swathi@swathi:~/Desktop$ locate number*song
Command 'locate' not found, but can be installed with:
sudo apt install mlocate
```

1. **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**

```
swathi@swathi:~/Desktop$ find /home/ -name state.txt  
/home/swathi/Desktop/state.txt  
swathi@swathi:~/Desktop$ find /home/ -name v2.txt  
/home/swathi/Desktop/v2.txt  
/home/swathi/Desktop/ajce/v2.txt
```

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”**

```
swathi@swathi:~/Desktop$ cat state.txt
kerala
jammu
tamilnadu
swathi@swathi:~/Desktop$ grep jammu state.txt
jammu
```

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**.

```
swathi@swathi:~/Desktop$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              918      0     918   0% /dev
tmpfs             190      2     189   1% /run
/dev/sda5       63745  8256    52222  14% /
tmpfs             948      0     948   0% /dev/shm
tmpfs               5      1      5   1% /run/lock
tmpfs             948      0     948   0% /sys/fs/cgroup
/dev/loop0            56      56      0 100% /snap/core18/2074
/dev/loop1            56      56      0 100% /snap/core18/1988
/dev/loop2            219     219      0 100% /snap/gnome-3-34-1804/66
/dev/loop3            219     219      0 100% /snap/gnome-3-34-1804/72
/dev/loop4            65      65      0 100% /snap/gtk-common-themes/1514
/dev/loop5            52      52      0 100% /snap/snap-store/518
/dev/loop7            66      66      0 100% /snap/gtk-common-themes/1515
/dev/loop8            33      33      0 100% /snap/snapd/12159
/dev/loop6            51      51      0 100% /snap/snap-store/547
/dev/loop9            32      32      0 100% /snap/snapd/11036
/dev/sda1            511      1     511   1% /boot/efi
Desktop          116389  51019    65371  44% /media/sf_Desktop
Pictures          116389  51019    65371  44% /media/sf_Pictures
tmpfs             190      1     190   1% /run/user/1000
```

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.

\$du-h

```
swathi@swathi:~/Desktop$ du -h
4.0K    ./file1
20K    ./file2/newlab/documents
24K    ./file2/newlab
4.0K    ./file2/mylabworks
4.0K    ./file2/sample/sample2
8.0K    ./file2/sample
40K    ./file2
4.0K    ./document/nwlab
8.0K    ./document
4.0K    ./ajce
72K    .
```

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**

```
swathi@swatht:~/Desktop$ sudo useradd bindu
[sudo] password for swathi:
Sorry, try again.
[sudo] password for swathi:
Sorry, try again.
[sudo] password for swatht: □
```

userdel

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

```
swathi@swatht:~/Desktop$ userdel swathi
userdel: user swathi is currently used by process 399
```

2. 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.

```
swathi@swathi:~/Desktop$ sudo useradd bindu
[sudo] password for swathi:
Sorry, try again.
[sudo] password for swathi:
Sorry, try again.
[sudo] password for swathi: □
```

3. passwd

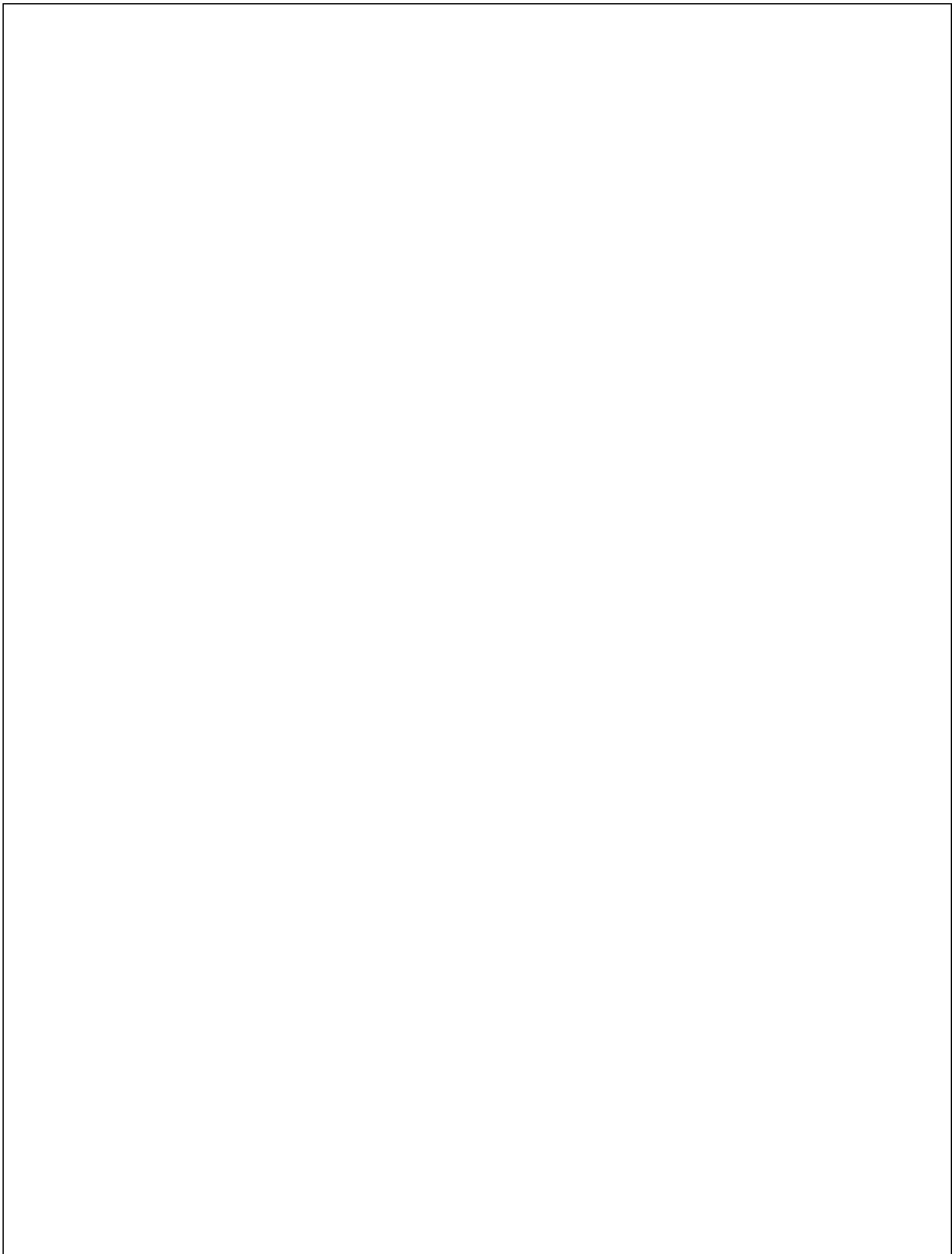
Changes passwords for user accounts.

A normal user may only change the password for their own account, while the superuser may change the password for any account.

passwd[option] [username]

passwd user1

```
swathi@swathi:~/Desktop$ passwd
Changing password for swathi.
Current password:
New password:
Retype new password:
passwd: password updated successfully
swathi@swathi:~/Desktop$
```



usermod

- usermod command is used to change the properties of a user in Linux through the command line
- command-line utility that allows you to modify a user's login information
- #usermod –help
- #usermod –u 2000 swathi

```
swathi@swathi:~/Desktop$ 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/* fi
```

```
swathi@swathi:~/Desktop$ usermod -u 2000 swathi
usermod: user swathi is currently used by process 900
swathi@swathi:~/Desktop$ 
```

groupadd

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

- #groupadd student

```
swathi@swathi:~/Desktop$ sudo groupadd student
[sudo] password for swathi:
swathi@swathi:~/Desktop$ 
```

groups - print the groups a user is in

- #groups alice

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

groupdel

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

- #groupdel marketing

```
swathi@swathi:~/Desktop$ sudo groupdel student
swathi@swathi:~/Desktop$ 
```

groupmod

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

```
# groupmod -n group1 group2
```

```
swathi@swathi:~/Desktop$ compgen -g mca
mca
mca1
swathi@swathi:~/Desktop$ sudo groupmod -n new_group mca1
swathi@swathi:~/Desktop$ compgen -g mca
mca
swathi@swathi:~/Desktop$ compgen -g new_group
new_group
```

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
```

```
swathi@swathi:~/Desktop$ mkdir mca
swathi@swathi:~/Desktop$ ls mca
swathi@swathi:~/Desktop$ ls -l mca
total 0
swathi@swathi:~/Desktop$ ls -ld mca
drwxrwxr-x 2 swathi swathi 4096 Aug 12 20:33 mca
swathi@swathi:~/Desktop$ chmod g-w mca
swathi@swathi:~/Desktop$ ls -ld mca
drwxr-xr-x 2 swathi swathi 4096 Aug 12 20:33 mca
swathi@swathi:~/Desktop$ ls
ajce [file1] mca state.txt v2.txt
books document file2 q1.txt stste.txt
swathi@swathi:~/Desktop$
```

chown

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

```
#chown q1.txt
```

```
swathi@swathi:~/Desktop$ chown swathi q1.txt
swathi@swathi:~/Desktop$ ls -l q1.txt
-rw-rw-r-- 1 swathi swathi 24 Jun 21 19:50 q1.txt
swathi@swathi:~/Desktop$
```

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

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

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

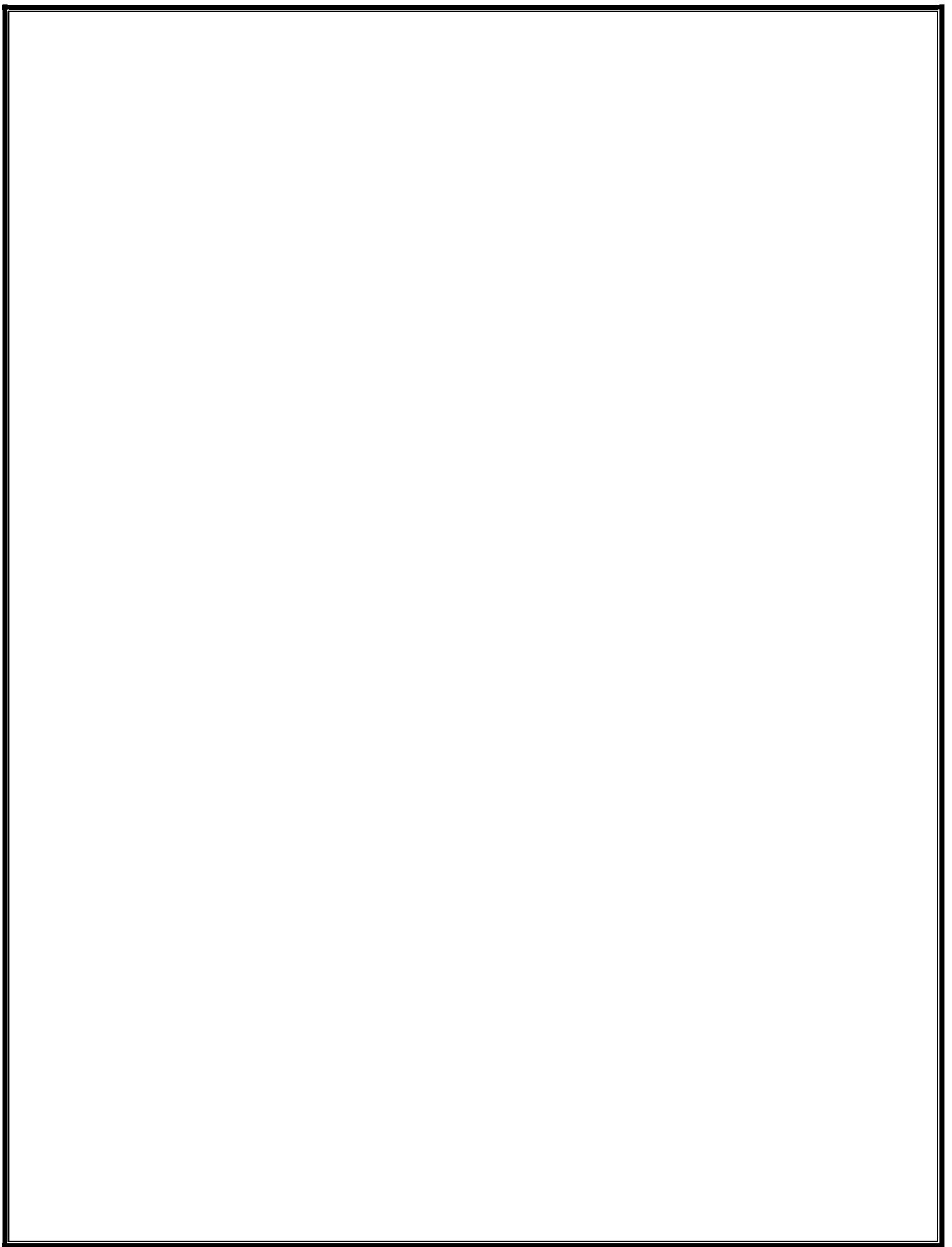
```
swathi@swathi:~/Desktop$ ps -a  
PID TTY      TIME CMD  
917 tty2    00:00:23 Xorg  
1017 tty2    00:00:00 gnome-session-b  
2415 pts/0    00:00:00 ps  
swathi@swathi:~/Desktop$
```

top

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

```
#top -u rose
```

```
swathi@swathi:~/Desktop$ top  
  
top - 20:20:27 up 27 min,  1 user,  load average: 0.31, 0.20, 0.22  
Tasks: 185 total,   1 running, 184 sleeping,   0 stopped,   0 zombie  
%Cpu(s): 7.9 us, 3.1 sy, 0.0 ni, 88.3 id, 0.7 wa, 0.0 hi, 0.0 si, 0.0 st  
MiB Mem : 1894.1 total,   437.1 free,   601.6 used,   855.3 buff/cache  
MiB Swap: 2048.0 total,   2048.0 free,     0.0 used.  1129.1 avail Mem  
  
 PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND  
 916 swathi    20   0  826380  59692  40548 S  7.3  3.1  0:21.40 Xorg  
1216 swathi    20   0 4168072 302352 120268 S  7.3 15.6  1:01.77 gnome-s+  
2029 swathi    20   0  823016  50668  38312 S  4.6  2.6  0:01.32 gnome-t+  
2043 swathi    20   0   20492   3772   3276 R  1.0  0.2  0:00.06 top  
189 root      20   0      0      0      0 S  0.3  0.0  0:00.10 jbd2/sd+  
1117 swathi    20   0 163996   2800   2432 S  0.3  0.1  0:06.98 VBoxCli+  
1264 swathi    20   0 162912   6476   5816 S  0.3  0.3  0:00.11 at-spi2+  
1382 swathi    20   0 355124 29432  18936 S  0.3  1.5  0:01.30 gsd-xse+  
1842 root      20   0      0      0      0 I  0.3  0.0  0:00.85 kworker+  
1921 root      20   0      0      0      0 I  0.3  0.0  0:00.11 kworker+  
 1 root      20   0 102024  11352   8196 S  0.0  0.6  0:04.65 systemd  
 2 root      20   0      0      0      0 S  0.0  0.0  0:00.00 kthreadd  
 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_par+  
 6 root      0 -20      0      0      0 I  0.0  0.0  0:00.00 kworker+
```



- **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.

```
swathi@swathi:~/Desktop$ wc q1.txt
2 4 24 q1.txt
swathi@swathi:~/Desktop$ 
```

- **tar**
 - The Linux ‘tar’stands for tape archive, is used to create Archive and extract the Archive files
 - Linux tar command to create compressed or uncompressed Archive files
 - Options:
 - c : Creates Archive
 - x : Extract the archive
 - f : creates archive with given filename
 - t : displays or lists files in archived file
 - u : archives and adds to an existing archive file
 - v : Displays Verbose Information
 - A : Concatenates the archive files
 - z : zip, tells tar command that creates tar file using gzip
 - j : filter archive tar file using tbzip
 - W : Verify a archive file
 - r : update or add file or directory in already existed .tar file

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

```
swathi@swathi:~/Desktop$ tar cf all.tar q1.txt stste.txt v2.txt stste.txt
swathi@swathi:~/Desktop$ ls
ajce  books      document  file2  q1.txt      stste.txt
all.tar  books.txt  file1   mca    state.txt  v2.txt
swathi@swathi:~/Desktop$ 
```

• **Compression Types**

```
gzip(z),bzip2(j), xz(J) #tar czf /abc.tar.gz /etc
#tar cf /abcd.tar.bz2 /etc
```

```
#tar Cf /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
```

- Bzip2

```
swathi@swathi:~/Desktop$ ls
ajce      archive1.tar  document  mca        q1.txt      v2.txt
allfolder books          file1     myfile2.txt  state.txt
all.tar   [REDACTED]    file2     myfile.txt   stste.txt
swathi@swathi:~/Desktop$ bzip2 v2.txt
swathi@swathi:~/Desktop$ bzip2 -cc f3.txt > f3.txt.bz
bzip2: Can't open input file f3.txt: No such file or directory.
swathi@swathi:~/Desktop$ bzip2 -cc myfile2.txt > myfile.txt.bz
swathi@swathi:~/Desktop$ ls
ajce      archive1.tar  document  file2      myfile.txt  state.txt
allfolder books          f3.txt.bz  mca       myfile.txt.bz stste.txt
all.tar   [REDACTED]    file1     myfile2.txt q1.txt      v2.txt.bz2
swathi@swathi:~/Desktop$ bzip2 -d v2.txt.bz2
swathi@swathi:~/Desktop$ bunzip2 -c myfile.txt.bz > v2.txt.bz2
swathi@swathi:~/Desktop$ ls
ajce      books          file1     myfile.txt  stste.txt
allfolder [REDACTED]    file2     myfile.txt.bz v2.txt
all.tar   document       mca      q1.txt      v2.txt.bz2
archive1.tar f3.txt.bz  myfile2.txt  state.txt
swathi@swathi:~/Desktop$ 
```

- gzip

```
swathi@swathi:~/Desktop$ ls
ajce      books          file1     myfile.txt  stste.txt
allfolder [REDACTED]    file2     myfile.txt.bz v2.txt
all.tar   document       mca      q1.txt      v2.txt.bz2
archive1.tar f3.txt.bz  myfile2.txt  state.txt
swathi@swathi:~/Desktop$ gzip q1.txt
swathi@swathi:~/Desktop$ ls
ajce      books          file1     myfile.txt  stste.txt
allfolder [REDACTED]    file2     myfile.txt.bz v2.txt
all.tar   document       mca      q1.txt.gz   v2.txt.bz2
archive1.tar f3.txt.bz  myfile2.txt  state.txt
swathi@swathi:~/Desktop$ 
```

- xz

```
swathi@swathi:~/Desktop$ ls
ajce      books          file1     myfile2.txt  state.txt
allfolder [REDACTED]    file2     myfile.txt   stste.txt
all.tar   document       file3.gz  myfile.txt.bz v2.txt
archive1.tar f3.txt.bz  mca      q1.txt.gz   v2.txt.bz2
swathi@swathi:~/Desktop$ xz v2.txt
swathi@swathi:~/Desktop$ xz -k state.txt
swathi@swathi:~/Desktop$ xz -c myfile2.txt > myfile.txt.xz
swathi@swathi:~/Desktop$ ls
ajce      books          file1     myfile2.txt  q1.txt.gz   v2.txt.bz2
allfolder [REDACTED]    file2     myfile.txt   state.txt  v2.txt.xz
all.tar   document       file3.gz  myfile.txt.bz state.txt.xz
archive1.tar f3.txt.bz  mca      myfile.txt.xz stste.txt
swathi@swathi:~/Desktop$ 
```

- 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

```
swathi@swathi:~/Desktop/allfolder/all.tar$ expr 10 + 2
12
swathi@swathi:~/Desktop/allfolder/all.tar$ 
```

- **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
```

```
swathi@swathi:~/Desktop$ ls -l|wc -l
15
swathi@swathi:~/Desktop$ 
```

- **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
```

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

- **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
```

```
swathi@swathi:~/Desktop$ ssh swathi
ssh: connect to host swathi port 22: Connection refused
swathi@swathi:~/Desktop$ 
```

- **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
```

```
swathi@swathi:~/Desktop/allfolder/all.tar$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/swathi/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:Vt06eif5XYlk7Fkolo1rwPxruBZhID/kfEM2enZzc3Q swathi@swathi
The key's randomart image is:
+---[RSA 3072]---+
| |
| . o + . . . E |
| * = o . o . |
| *o0 o=+.. |
| S++==*o. |
| . .+.*o+ . |
| +++++... |
| 0.o.+ .. |
| ..o. . . |
+---[SHA256]---+
swathi@swathi:~/Desktop/allfolder/all.tar$
```

- **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
```


Managing Files, Creating Usersand Groups Using Command-line tools

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

```
swathi@swathi:~/Desktop$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3  
song6.mp3  
swathi@swathi:~/Desktop$ 
```

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

```
swathi@swathi:~/Desktop$ touch snap1.jpg snap2.jpg snap3.jpg snap4.jpg snap5.jpg  
snap6.jpg  
swathi@swathi:~/Desktop$ 
```

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

```
swathi@swathi:~/Desktop$ touch film1.mp4 film2.mp4 film3.mp4 film4.mp4 film5.mp4  
film6.mp4  
swathi@swathi:~/Desktop$ 
```

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

```
swathi@swathi:~/Desktop$ ls  
ajce          film2.mp4          myfile.txt.xz        song4.mp3  
allfolder     film3.mp4          mylinux           song5.mp3  
all.tar       film4.mp4          q1.txt.gz        song6.mp3  
archieve1.tar film5.mp4film6.mp4    snap1.jpg        state.txt  
books         friends           snap2.jpg        state.txt.xz  
books.txt      mca              snap3.jpg        stste.txt  
document      music             snap4.jpg        v2.txt.bz2  
f3.txt.bz     music1           snap5.jpgsnap6.jpg  v2.txt.xz  
file1         music2           myfile2.txt      song1.mp3  
file2         myfile2.txt      myfile.txt       song2.mp3  
files.gz      myfile.txt.bz    myfile.txt      song3.mp3  
film1.mp4     myfile.txt.bz    song4.mp3       song4.mp3  
swathi@swathi:~/Desktop$ cd music1/  
swathi@swathi:~/Desktop/music1$ ls  
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3  
swathi@swathi:~/Desktop/music1$ 
```

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

```
swathi@swathi:~/Desktop$ mkdir -p {friends,family,work}  
swathi@swathi:~/Desktop$ 
```

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

```
swathi@swathi:~/Desktop$ cp /home/swathi/Desktop/music/ song1.mp3 song2.mp3 song  
3.mp3 /home/swathi/Desktop/friends/  
  
swathi@swathi:~/Desktop$ cp /home/swathi/Desktop/pictures snap1.jpg snap2.jpg sn  
ap3.jpg snap4.jpg /home/swathi/Desktop/family/ 
```

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

```
swathi@swathi:~/Desktop$ rmdir {friends,family}  
swathi@swathi:~/Desktop$ 
```

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

```
swathi@swathi:~/Desktop$ rm -r friends family 
```

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

```
swathi@swathi:~/Desktop$ ls -a > myfile.txt
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ date
Tuesday 17 August 2021 07:56:56 PM IST
swathi@swathi:~/Desktop$
```

9. Add the user Juliet

```
swathi@swathi:~/Desktop$ sudo useradd juliet
[sudo] password for swathi:
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ cat /etc/passwd | grep juliet
juliet:x:1003:1008::/home/juliet:/bin/sh
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ sudo passwd juliet
New password:
Retype new password:
passwd: password updated successfully
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ sudo groupadd -g 30000 shakephere
```

3. Create a supplementary group called artists

```
swathi@swathi:~/Desktop$ sudo groupadd artist
[sudo] password for swathi:
```

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

```
juliet:x:1008:
artist:x:1009:Reba,Elvis
shakesphere:x:1010:juliet,Remo,Hamlet
Remo:x:1011:
Hamlet:x:1012:
Reba:x:1013:
Elvis:x:1015:
shakephere:x:30000:
```

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

```
swathi@swathi:~/Desktop$ sudo usermod -G shakesphere juliet
```

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

```
swathi@swathi:~/Desktop$ id juliet
uid=1003(juliet) gid=1008(juliet) groups=1008(juliet),1010(shakesphere)
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ sudo passwd juliet
New password:
Retype new password:
passwd: password updated successfully
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ sudo groupadd -g 30000 shakephere
```

9. Create a supplementary group called artists

```
swathi@swathi:~/Desktop$ sudo groupadd artist
[sudo] password for swathi:
```

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

```
juliet:x:1008:
artist:x:1009:Reba,Elvis
shakesphere:x:1010:juliet,Romo,Hamlet
Romo:x:1011:
Hamlet:x:1012:
Reba:x:1013:
Elvis:x:1015:
shakephere:x:30000:
```

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

```
swathi@swathi:~/Desktop$ sudo usermod -G shakesphere juliet
```

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

```
swathi@swathi:~/Desktop$ id juliet
uid=1003(juliet) gid=1008(juliet) groups=1008(juliet),1010(shakesphere)
swathi@swathi:~/Desktop$
```

13. Add Romeo and Hamlet to the Shakespeare group.

```
swathi@swathi:~/Desktop$ sudo useradd Remo
swathi@swathi:~/Desktop$ sudo useradd Hamlet
swathi@swathi:~/Desktop$ sudo usermod -G shakesphere Remo
swathi@swathi:~/Desktop$ sudo usermod -G shakesphere Hamlet
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ sudo useradd Reba
[sudo] password for swathi:
Sorry, try again.
[sudo] password for swathi:
swathi@swathi:~/Desktop$ sudo useradd Reba
useradd: user 'Reba' already exists
swathi@swathi:~/Desktop$ sudo useradd Dolly
swathi@swathi:~/Desktop$ sudo useradd Elvis
swathi@swathi:~/Desktop$ sudo usermod -G artist Reba
swathi@swathi:~/Desktop$ sudo usermod -G artist Dolly
swathi@swathi:~/Desktop$ sudo usermod -G artist Elvis
swathi@swathi:~/Desktop$ 
```

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

```
juliet:x:1008:
artist:x:1009:Reba,Dolly,Elvis
shakesphere:x:1010:juliet,Remo,Hamlet
Remo:x:1011:
Hamlet:x:1012:
Reba:x:1013:
Dolly:x:1014:
Elvis:x:1015:
/enum\ 
```

16. Attempt to remove user Dolly.

```
swathi@swathi:~/Desktop$ sudo userdel Dolly
[sudo] password for swathi:
swathi@swathi:~/Desktop$ 
```

NETWORK COMMANDS

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 .

1.Ping & traceroute tests

Ping and Trace Route tests can help to identify any connection issues between your network and a specified server (or website) address.

PING test

The PING command is used to test the connection and latency between two network connections. The PING command sends packets of information to a specified IP Address and then measures the time it takes to get a response from the specified computer or device.

Trace Route test

The TRACERT command is used to conduct a similar test to PING, but instead of displaying the time it takes to connect, it looks at the exact server hops required to connect your computer to the server.

You should already have the CMD prompt dialogue box open, after performing the PING test above.

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

Pinging google.com [2404:6800:4002:815::200e] with 32 bytes of data:
Reply from 2404:6800:4002:815::200e: time=1119ms
Reply from 2404:6800:4002:815::200e: time=1048ms
Request timed out.
Request timed out.
```

```
Ping statistics for 2404:6800:4002:815::200e:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1048ms, Maximum = 1119ms, Average = 1083ms
```

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

```
Tracing route to www.google.com [2404:6800:4002:819::2004]
over a maximum of 30 hops:
```

```
 1      2 ms      2 ms      2 ms  2409:4073:2113:449c::4a
 2      *          *          * Request timed out.
 3  1100 ms  2215 ms  1839 ms  2405:200:366:a168:4::ff05
 4  1639 ms  2454 ms  1840 ms  2405:200:801:3500::1e2
 5  3576 ms  3096 ms      *  2405:200:801:3500::1e7
 6  1487 ms  1840 ms      *  2405:200:801:3500::1e9
 7      *          *          * Request timed out.
 8  1884 ms  2163 ms  1298 ms  2001:4860:1:1::8f2
 9      *          *          * Request timed out.
10      *          *          1316 ms  2001:4860:0:1::163e
11  1292 ms  1571 ms  1902 ms  2001:4860:0:1340::a
12  1905 ms  1489 ms  2192 ms  2001:4860::9:4001:b922
13  2099 ms  2454 ms      *  2001:4860::9:4001:67bd
14  1709 ms  1732 ms      *  2001:4860::9:4001:67bc
15  1793 ms   783 ms   675 ms  2001:4860:0:1::54f7
16      *      1389 ms      *  del11s14-in-x04.1e100.net [2404:6800:4002:819::2004]
17  2086 ms  2455 ms  2454 ms  del11s14-in-x04.1e100.net [2404:6800:4002:819::2004]
```

```
Trace complete.
```

1. Nslookup

Microsoft Windows includes a tool called NSLOOKUP that you can use via the command prompt. This tool can be used to check DNS records propagation and resolution using different servers, and perform other troubleshooting steps.

```
C:\Users\dell>nslookup aesajce.in
Server:  UnKnown
Address:  192.168.43.1

DNS request timed out.
    timeout was 2 seconds.
Non-authoritative answer:
Name:      aesajce.in
Address:   103.120.179.46
```

- ⑤ Type nslookup -q=XX where XX is a type of a DNS record. Some of the available types are MX, A, CNAME, and TXT. The records are then displayed, to exit the tool type exit

```
C:\Users\dell>nslookup -type=ns aesajce.in
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
aesajce.in      nameserver = ns2.aessas.com
aesajce.in      nameserver = ns1.ajcemca.in
aesajce.in      nameserver = ns1.aessas.com
aesajce.in      nameserver = ns2.ajcemca.in
```

- ⑥ To use **nslookup** as a troubleshooting tool, you can set the specific type of record to lookup for a domain by using the **-type=record_type** where **record_type** is A, CNAME, MX, PTR, NS, ANY.

Type **nslookup -type=ns domain_name** where **domain_name** is the domain for your query and hit **Enter**. Now the tool will display the name servers for the domain you specified.

```
C:\Users\dell>nslookup -q=MX aesajce.in
Server: UnKnown
Address: 192.168.43.1

Non-authoritative answer:
aesajce.in      MX preference = 10, mail exchanger = aspmx2.googlemail.com
aesajce.in      MX preference = 10, mail exchanger = aspmx3.googlemail.com
aesajce.in      MX preference = 5, mail exchanger = alt1.aspmx.l.google.com
aesajce.in      MX preference = 1, mail exchanger = aspmx.l.google.com
aesajce.in      MX preference = 5, mail exchanger = alt2.aspmx.l.google.com
```

2. Netstat

On Windows 10, netstat (network statistics) has been around for a long time, and it's a command-line tool that you can use in Command Prompt to display statistics for all network connections. It allows you to understand open and connected ports to monitor and troubleshoot networking problems for system or applications.

```
C:\Users\dell>netstat  
Active Connections  
  
Proto Local Address Foreign Address State  
TCP 192.168.43.62:56265 20.198.162.76:https ESTABLISHED  
TCP 192.168.43.62:56293 13.107.4.52:http ESTABLISHED  
TCP 192.168.43.62:62293 a-0001:https ESTABLISHED  
TCP 192.168.43.62:62295 20.190.145.140:https TIME_WAIT  
TCP 192.168.43.62:62296 20.190.145.140:https TIME_WAIT  
TCP [2409:4073:2113:449c:d097:75ed:762e:9b2a]:56289 whatsapp-cdn6-shv-01-tir2:https ESTABLISHED  
TCP [2409:4073:2113:449c:d097:75ed:762e:9b2a]:62294 [2606:2800:147:120f:30c:1ba0:fc6:265a]:https ESTABLISHED
```

netstat -n

command to display active connections showing numeric IP address and port number instead of trying to determine the names .

netstat -n INTERVAL

In the command, make sure to replace INTERVAL for the number (in seconds) you want to redisplay the information.

```
C:\Users\dell>netstat -n 5  
Active Connections  
  
Proto Local Address Foreign Address State  
TCP 192.168.43.62:56265 20.198.162.76:443 ESTABLISHED  
TCP 192.168.43.62:56293 13.107.4.52:80 ESTABLISHED  
TCP 192.168.43.62:62293 204.79.197.200:443 ESTABLISHED  
TCP 192.168.43.62:62302 20.36.40.51:443 ESTABLISHED  
TCP 192.168.43.62:62303 20.190.145.141:443 ESTABLISHED  
TCP 192.168.43.62:62304 20.190.145.141:443 ESTABLISHED  
TCP 192.168.43.62:62305 20.190.145.141:443 ESTABLISHED  
TCP 192.168.43.62:62306 20.140.48.71:443 ESTABLISHED  
TCP 192.168.43.62:62307 13.107.4.254:443 ESTABLISHED  
TCP [2409:4073:2113:449c:d097:75ed:762e:9b2a]:56289 [2a03:2800:f268:c1:face:b00c:0:167]:443 ESTABLISHED  
TCP [2409:4073:2113:449c:d097:75ed:762e:9b2a]:62294 [2606:2800:147:120f:30c:1ba0:fc6:265a]:443 TIME_WAIT  
TCP [2409:4073:2113:449c:d097:75ed:762e:9b2a]:62300 [2603:1010:300::2]:443 ESTABLISHED
```

netstat -a

The netstat -a command displays all active and inactive connections, and the TCP and UDP ports the device is currently listening.

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

Active Connections

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:445	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:5040	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:5357	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49664	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49665	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49666	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49667	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49668	DESKTOP-U0PQD3Q:0	LISTENING
TCP	0.0.0.0:49669	DESKTOP-U0PQD3Q:0	LISTENING
TCP	127.0.0.1:1001	DESKTOP-U0PQD3Q:0	LISTENING
TCP	127.0.0.1:62868	DESKTOP-U0PQD3Q:0	LISTENING
TCP	192.168.43.62:139	DESKTOP-U0PQD3Q:0	LISTENING
TCP	192.168.43.62:56265	20.198.162.76:https	ESTABLISHED
TCP	192.168.43.62:56293	13.107.4.52:http	ESTABLISHED
TCP	192.168.43.62:62293	a-0001:https	ESTABLISHED
TCP	192.168.43.62:62324	13.107.3.254:https	ESTABLISHED
TCP	192.168.43.62:62325	20.190.145.141:https	TIME_WAIT
TCP	192.168.43.62:62326	20.190.145.141:https	TIME_WAIT
TCP	192.168.43.62:62327	20.190.145.141:https	TIME_WAIT
TCP	192.168.43.62:62328	204.79.197.222:https	ESTABLISHED
TCP	192.168.43.62:62330	20.140.48.71:https	ESTABLISHED
TCP	192.168.43.62:62334	204.79.197.254:https	ESTABLISHED
TCP	192.168.43.62:62335	20.190.145.141:https	ESTABLISHED
TCP	192.168.43.62:62336	20.190.145.141:https	ESTABLISHED
TCP	192.168.43.62:62337	20.190.145.141:https	ESTABLISHED
TCP	192.168.43.62:62338	13.107.4.254:https	ESTABLISHED
TCP	192.168.56.1:139	DESKTOP-U0PQD3Q:0	LISTENING
TCP	[::]:135	DESKTOP-U0PQD3Q:0	LISTENING

netstat -b

The netstat -b command lists all the executables (applications) associated with each connection. Sometimes, applications may open multiple connections.

netstat -e

The netstat -e command generates a statistic of the network interface, which shows information like the number of bytes, unicast and non-unicast sent and received packets. You can also see discarded packets and errors and unknown protocols, which can help you troubleshoot networking problems.

```
C:\Users\dell>netstat -b  
The requested operation requires elevation.
```

```
C:\Users\dell>netstat -e  
Interface Statistics
```

	Received	Sent
Bytes	36287826	34149522
Unicast packets	56760	48348
Non-unicast packets	492	6414
Discards	0	0
Errors	0	0
Unknown protocols	0	0

```
C:\Users\dell>
```

3. ipconfig

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. Used without parameters, ipconfig displays Internet Protocol version 4 (IPv4) and IPv6 addresses, subnet mask, and default gateway for all adapters.

PARAMETERS:

/all: Displays the full TCP/IP configuration for all adapters. Adapters can represent physical interfaces, such as installed network adapters, or logical interfaces, such as dial-up connections.

/displaydns: Displays the contents of the DNS client resolver cache, which includes both entries preloaded from the local Hosts file and any recently obtained resource records for name queries resolved by the computer. The DNS Client service uses this information to resolve frequently queried names quickly, before querying its configured DNS servers.

/flushdns: Flushes and resets the contents of the DNS client resolver cache. During DNS troubleshooting, you can use this procedure to discard negative cache entries from the cache, as well as any other entries that have been added dynamically.

/registerdns: Initiates manual dynamic registration for the DNS names and IP addresses that are configured at a computer. You can use this parameter to troubleshoot a failed DNS name registration or resolve a dynamic update problem between a client and the DNS server without rebooting the client

computer. The DNS settings in the advanced properties of the TCP/IP protocol determine which names are registered in DNS.

```
C:\Users\dell>ipconfig /all

Windows IP Configuration

Host Name . . . . . : DESKTOP-U0PQD3Q
Primary Dns Suffix . . . . . :
Node Type . . . . . : Mixed
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . :
Description . . . . . : Realtek PCIe FE Family Controller
Physical Address. . . . . : 74-E6-E2-12-20-6F
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-05
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::1cdb:2491:d269:e502%5(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 705298471
DHCPv6 Client DUID. . . . . : 00-01-00-01-27-3B-B5-DF-74-E6-E2-12-20-6F
```

```
C:\Users\dell>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::1cdb:2491:d269:e502%5
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . :
    IPv6 Address. . . . . : 2409:4073:2113:449c:40ce:fe72:2d88:821a
    Temporary IPv6 Address. . . . . : 2409:4073:2113:449c:d097:75ed:762e:9b2a
    Link-local IPv6 Address . . . . . : fe80::40ce:fe72:2d88:821a%14
    IPv4 Address. . . . . : 192.168.43.62
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::3c57:6cff:fee7:1be2%14
                                         192.168.43.1
```

Other Networking Commands

1. Hostname Command

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

2. getmac Command

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

3.arp Command

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

4. Nbtstat

Diagnostic tool for troubleshooting netBIOS problems.

5. Net Command

Used for managing users,service,shares etc..

```
H:\>net
The syntax of this command is:

NET
[ ACCOUNTS | COMPUTER | CONFIG | CONTINUE | FILE | GROUP | HELP |
  HELPMMSG | LOCALGROUP | PAUSE | SESSION | SHARE | START |
  STATISTICS | STOP | TIME | USE | USER | VIEW ]


H:\>hostname
DESKTOP-ILB31AE

H:\>-
```

```
H:\>nbtstat

Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
           [-r] [-R] [-RR] [-s] [-S] [interval] ]

-a (adapter status) Lists the remote machine's name table given its name
-A (Adapter status) Lists the remote machine's name table given its
                   IP address.
-c (cache)          Lists NBT's cache of remote [machine] names and their IP addresses
-n (names)          Lists local NetBIOS names.
-r (resolved)       Lists names resolved by broadcast and via WINS
-R (Reload)         Purges and reloads the remote cache name table
-S (Sessions)       Lists sessions table with the destination IP addresses
-s (sessions)       Lists sessions table converting destination IP
                   addresses to computer NETBIOS names.
-RR (ReleaseRefresh) Sends Name Release packets to WINS and then, starts Refresh

RemoteName  Remote host machine name.
IP address   Dotted decimal representation of the IP address.
interval    Redisplays selected statistics, pausing interval seconds
            between each display. Press Ctrl+C to stop redisplaying
            statistics.
```

```
H:\>
```

```
H:\>getmac

Physical Address      Transport Name
===== =====
48-F1-7F-04-07-81    \Device\Tcpip_{083275F0-5D75-483E-9CA1-5D2B536909B7}
04-92-26-1D-65-3B    Media disconnected
48-F1-7F-04-07-85    Media disconnected
0A-00-27-00-00-11    \Device\Tcpip_{A74689BB-EA25-4EFA-8DC2-57AA7FC4E351}
```

```
H:\>arp -a
```

```
Interface: 192.168.1.33 --- 0x4
 Internet Address      Physical Address      Type
 192.168.1.1            14-a7-2b-83-03-34    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
 239.255.255.250        01-00-5e-7f-ff-fa    static
 255.255.255.255        ff-ff-ff-ff-ff-ff    static
```

```
Interface: 192.168.56.1 --- 0x11
 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
```

UBUNTU

Ping

```
swathi@swathi:~/Desktop$ ping www.google.com
PING www.google.com (142.250.193.4) 56(84) bytes of data.
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=1 ttl=110 time=553 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=2 ttl=110 time=2060 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=3 ttl=110 time=1028 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=4 ttl=110 time=366 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=5 ttl=110 time=406 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=7 ttl=110 time=707 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=8 ttl=110 time=251 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=9 ttl=110 time=407 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=11 ttl=110 time=1024 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=12 ttl=110 time=1006 ms
64 bytes from del11s14-in-f4.1e100.net (142.250.193.4): icmp_seq=13 ttl=110 time=446 ms
```

```
swathi@swathi:~/Desktop$ ping -a google.com
PING google.com (142.250.77.110) 56(84) bytes of data.
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=1 ttl=110 time=170 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 time=169 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 time=169 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=4 ttl=110 time=208 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=6 ttl=110 time=315 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=7 ttl=110 time=262 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=8 ttl=110 time=218 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=9 ttl=110 time=226 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=10 ttl=110 time=180 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=11 ttl=110 time=248 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=12 ttl=110 time=286 ms
```

```
swathi@swathi:~/Desktop$ ping -b google.com
PING google.com (142.250.77.110) 56(84) bytes of data.
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=1 ttl=110 time=229 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=2 ttl=110 time=117 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=3 ttl=110 time=95.9 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=4 ttl=110 time=306 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=5 ttl=110 time=68.5 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=6 ttl=110 time=111 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=7 ttl=110 time=96.0 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=8 ttl=110 time=96.4 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=9 ttl=110 time=269 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=10 ttl=110 time=131 ms
64 bytes from maa05s15-in-f14.1e100.net (142.250.77.110): icmp_seq=13 ttl=110 time=1226 ms
```

Route

```
swathi@swathi:~/Desktop$ 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
swathi@swathi:~/Desktop$
```

```
swathi@swathi:~/Desktop$ 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
swathi@swathi:~/Desktop$
```

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

```
swathi@swathi:~/Desktop$ 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
swathi@swathi:~/Desktop$
```

Traceroute

```
swathi@swathi:~/Desktop$ traceroute google.com
traceroute to google.com (142.250.182.142), 64 hops max
 1  10.0.2.2  0.768ms  0.648ms  0.533ms
 2  *  *  *
 3  *  *  *
 4  *  *  *
 5  *  *  *
 6  *  *  *
 7  *  *  *
 8  *  *  *
 9  *  *  *
10  *  *  *
11  *  *  *
```

```
swathi@swathi:~/Desktop$ traceroute -v
traceroute: invalid option -- 'v'
Try 'traceroute --help' or 'traceroute --usage' for more information.
swathi@swathi:~/Desktop$ traceroute --usage
Usage: traceroute [-I?V] [-f NUM] [-g GATES] [-m NUM] [-M METHOD] [-p PORT]
                  [-q NUM] [-t NUM] [-w NUM] [--first-hop=NUM] [--gateways=GATES]
                  [--icmp] [--max-hop=NUM] [--type=METHOD] [--port=PORT]
                  [--tries=NUM] [--resolve-hostnames] [--tos=NUM] [--wait=NUM]
                  [--help] [--usage] [--version] HOST
```

Nslookup

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

Non-authoritative answer:
Name:   google.com
Address: 142.250.195.142
Name:   google.com
Address: 2404:6800:4007:825::200e

swathi@swathi:~/Desktop$
```

```
swathi@swathi:~/Desktop$ nslookup -q=MX google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

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

```
swathi@swathi:~/Desktop$ nslookup -type=soa redhat.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
redhat.com
origin = a1-68.akam.net
mail addr = noc.redhat.com
serial = 2021091300
refresh = 300
retry = 180
expire = 604800
minimum = 14400
```

```
swathi@swathi:~/Desktop$ nslookup -type=a google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.182.142
```

Ifconfig

```
swathi@swathi:~/Desktop$ 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::1e87:5432:a2c5:828d prefixlen 64 scopeid 0x20<link>
              ether 08:00:27:eb:bd:a4 txqueuelen 1000 (Ethernet)
        RX packets 862 bytes 333706 (333.7 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 938 bytes 106330 (106.3 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 282 bytes 24352 (24.3 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 282 bytes 24352 (24.3 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
swathi@swathi:~/Desktop$ 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::1e87:5432:a2c5:828d prefixlen 64 scopeid 0x20<link>
              ether 08:00:27:eb:bd:a4 txqueuelen 1000 (Ethernet)
        RX packets 861 bytes 333616 (333.6 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 937 bytes 106240 (106.2 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 282 bytes 24352 (24.3 KB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 282 bytes 24352 (24.3 KB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
swathi@swathi:~/Desktop$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR      TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      862     0     0 0          938      0     0 0 BMRU
lo       65536      282     0     0 0          282      0     0 0 LRU
swathi@swathi:~/Desktop$
```

Netstat

```
swathi@swathi:~/Desktop$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address     State
udp      0      0 swathi:bootpc            _gateway:bootps    ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type      State         I-Node  Path
unix  2      [ ]       DGRAM                    26796   /run/user/1000/system
d/notify
unix  2      [ ]       DGRAM                    468     /run/systemd/journal/
syslog
unix  16     [ ]       DGRAM                    478     /run/systemd/journal/
dev-log
unix  8      [ ]       DGRAM                    482     /run/systemd/journal/
socket
unix  3      [ ]       DGRAM                    454     /run/systemd/notify
unix  3      [ ]       STREAM     CONNECTED    31663   /run/dbus/system_bus_
socket
unix  3      [ ]       STREAM     CONNECTED    31121   @/tmp/dbus-tgzANuiGat
unix  3      [ ]       STREAM     CONNECTED    27945   /run/user/1000/bus
unix  2      [ ]       DGRAM                    22449
unix  3      [ ]       STREAM     CONNECTED    31135   @/tmp/dbus-tgzANuiGat
unix  3      [ ]       STREAM     CONNECTED    29249
unix  3      [ ]       STREAM     CONNECTED    27284   /run/dbus/system_bus_
socket
```

```
swathi@swathi:~/Desktop$ 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 localhost:ipp             0.0.0.0:*
tcp6     0      0 ip6-localhost:ipp        [::]:*
udp      0      0 0.0.0.0:631              0.0.0.0:*
udp      0      0 localhost:domain          0.0.0.0:*
udp      0      0 swathi:bootpc            _gateway:bootps    ESTABLISHED
udp      0      0 0.0.0.0:mdns              0.0.0.0:*
udp      0      0 0.0.0.0:35099             0.0.0.0:*
udp6     0      0 [::]:mdns                [::]:*
udp6     0      0 [::]:51541               [::]:*
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    28607   @/tmp/.ICE-unix/1204
unix  2      [ ACC ]    SEQPACKET LISTENING    484     /run/udev/control
unix  2      [ ACC ]    STREAM    LISTENING    457     /run/systemd/private
unix  2      [ ]        DGRAM                    26796   /run/user/1000/system
d/notify
unix  2      [ ACC ]    STREAM    LISTENING    459     /run/systemd/userdb/i
o.systemd.DynamicUser
unix  2      [ ACC ]    STREAM    LISTENING    26799   /run/user/1000/system
```

INSTALL LAMP IN UBUNTU

Install Apache2

- **Update your system**

Sudo apt update

```
swathi@swathi:~/Desktop$ sudo apt update
[sudo] password for swathi:
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,256 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [544 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [265 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [284 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main DEP-11 48x48 Icons [60.8 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/main DEP-11 64x64 Icons [98.3 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [14.4 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [485 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [60.4 kB]
```

- **Install Apache using apt**

Sudo apt install apache2

```
swathi@swathi:~/Desktop$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following packages will be upgraded:
  apache2 apache2-bin apache2-data apache2-utils
4 upgraded, 0 newly installed, 0 to remove and 189 not upgraded.
Need to get 1,519 kB of archives.
After this operation, 4,096 B of additional disk space will be used.
Do you want to continue? [Y/n] █
```

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

Sudo systemctl status apache2

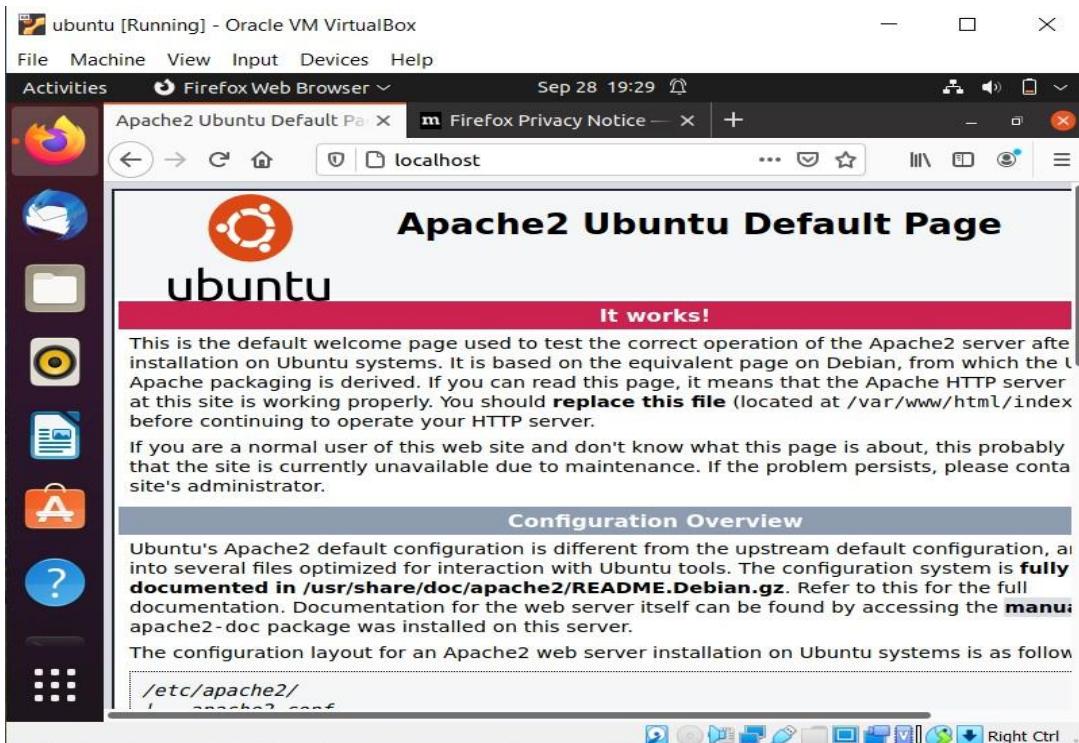
```

swathi@swathi:~/Desktop$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
   Active: active (running) since Thu 2021-09-30 11:57:33 IST; 1min 20s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2603 (apache2)
      Tasks: 6 (limit: 2202)
     Memory: 9.9M
      CGroup: /system.slice/apache2.service
              └─2603 /usr/sbin/apache2 -k start
                  ├─2606 /usr/sbin/apache2 -k start
                  ├─2607 /usr/sbin/apache2 -k start
                  ├─2608 /usr/sbin/apache2 -k start
                  ├─2609 /usr/sbin/apache2 -k start
                  └─2610 /usr/sbin/apache2 -k start

Sep 30 11:57:33 swathi systemd[1]: Starting The Apache HTTP Server...
Sep 30 11:57:33 swathi apachectl[2602]: AH00558: apache2: Could not reliably de>
Sep 30 11:57:33 swathi systemd[1]: Started The Apache HTTP Server.
[lines 1-18/18 (END)]

```

- Once installed test by accessing your servers IP in your browser
<http://localhost>



Install mariadb

Sudo apt install mariadb-server mariadb-client

```
swathi@swathi:~/Desktop$ sudo apt install mariadb-server mariadb-client
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
  libhtml-template-perl libreadline5 libsigsegv2 libsnappy1v5
  libterm-readkey-perl mariadb-client-10.3 mariadb-client-core-10.3
  mariadb-common mariadb-server-10.3 mariadb-server-core-10.3 socat
Suggested packages:
  gawk-doc libclone-perl liblmbm-perl libnet-daemon-perl
  libsql-statement-perl libipc-sharedcache-perl mailx mariadb-test tinyca
The following NEW packages will be installed:
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
  libhtml-template-perl libreadline5 libsigsegv2 libsnappy1v5
  libterm-readkey-perl mariadb-client mariadb-client-10.3
  mariadb-client-core-10.3 mariadb-common mariadb-server mariadb-server-10.3
  mariadb-server-core-10.3 socat
0 upgraded, 22 newly installed, 0 to remove and 189 not upgraded.
Need to get 20.2 MB of archives.
After this operation, 167 MB of additional disk space will be used.
Do you want to continue? [Y/n] ■
```

➤ **To check status**

Sudo systemctl status mysql

```
swathi@swathi:~/Desktop$ sudo systemctl status mysql # to check status
● mariadb.service - MariaDB 10.3.31 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor prese>
   Active: active (running) since Thu 2021-09-30 12:09:06 IST; 2min 7s ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 4465 (mysqld)
      Status: "Taking your SQL requests now..."
        Tasks: 31 (limit: 2202)
       Memory: 65.0M
      CGroup: /system.slice/mariadb.service
              └─4465 /usr/sbin/mysqld

Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: information_schema
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: mysql
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: performance_schema
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: Phase 6/7: Checking and updat>
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: Processing databases
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: information_schema
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: performance_schema
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: Phase 7/7: Running 'FLUSH' on all d>
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4504]: OK
Sep 30 12:09:07 swathi /etc/mysql/debian-start[4566]: Triggering myisam-recover>
```

```
swathi@swathi:~/Desktop$ sudo systemctl start mysql
swathi@swathi:~/Desktop$ ■
```

➤ **Secure your newly installed mariadb service**

Sudo mysql_secure_installation

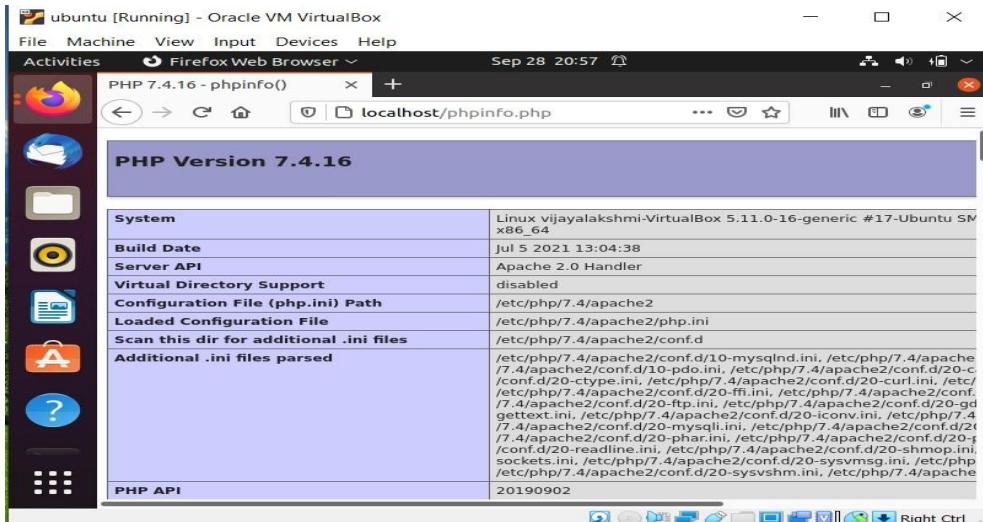
Install PHP and commonly used modules

Sudo apt install php libapache2-mod-php php-ocache php-cli php-gd php-curl php-mysql

```
swathi@swathi:~/Desktop$ sudo apt install php libapache2-mod-php php-ocache php
-cli php-gd php-curl php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'php7.4-ocache' instead of 'php-ocache'
php is already the newest version (2:7.4+75).
php7.4-ocache is already the newest version (7.4.3-4ubuntu2.6).
php7.4-ocache set to manually installed.
The following additional packages will be installed:
  php7.4-curl php7.4-gd php7.4-mysql
The following NEW packages will be installed:
  libapache2-mod-php php-cli php-curl php-gd php-mysql php7.4-curl php7.4-gd
  php7.4-mysql
0 upgraded, 8 newly installed, 0 to remove and 189 not upgraded.
Need to get 191 kB of archives.
After this operation, 826 kB of additional disk space will be used.
Do you want to continue? [Y/n] ■
```

- **Sudo systemctl restart apache2**
- Test PHP processing on web server
Sudo nano /var/www/html/phpinfo.php
- Inside the file,type in valid php code

```
<?php
    phpinfo ();
?>
```
- **http://localhost/phpinfo.php**



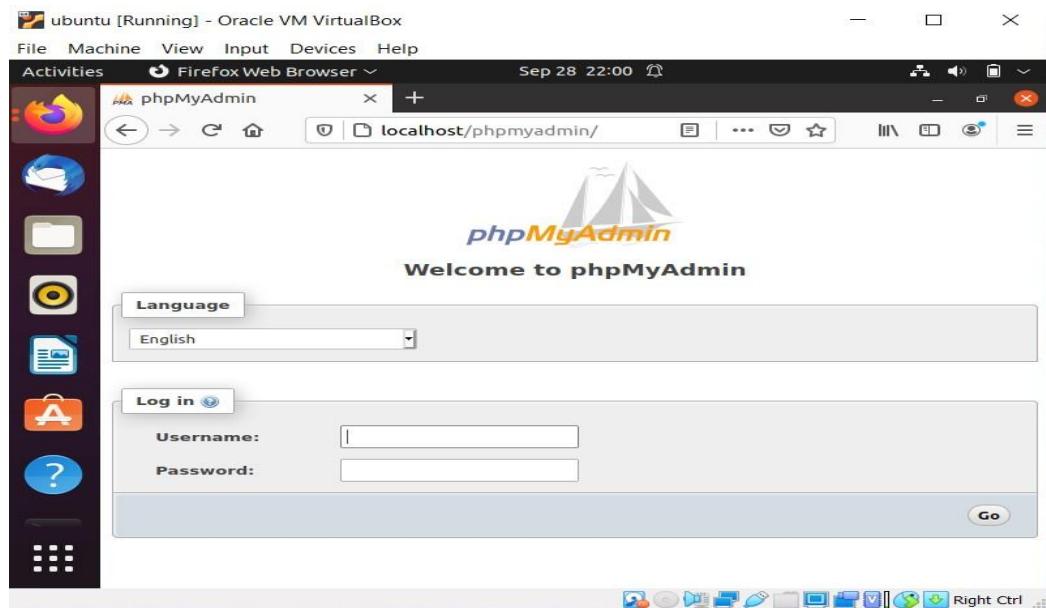
Install phpmyadmin

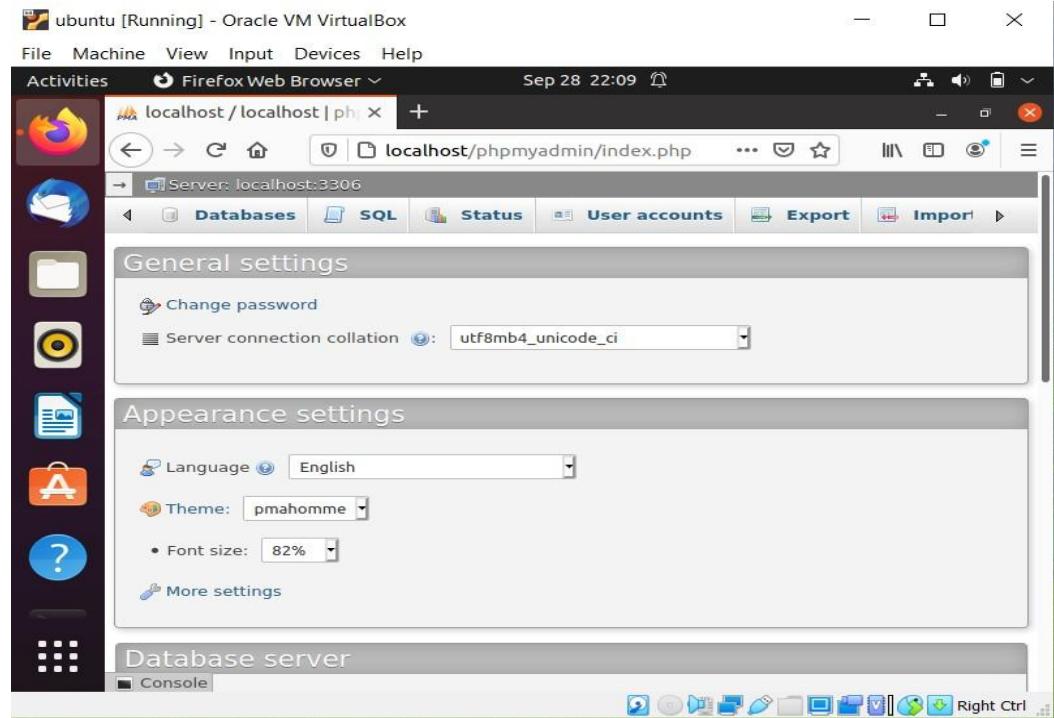
- Sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json php-curl

```
swathi@swathi:~/Desktop$ sudo apt install phpmyadmin php-mbstring php-zip php-json
on php-curl
Reading package lists... Done
Building dependency tree
Reading state information... Done
php-curl is already the newest version (2:7.4+75).
The following additional packages will be installed:
  dbconfig-common dbconfig-mysql icc-profiles-free javascript-common
  libjs-jquery libjs-openlayers libjs-sphinxdoc libjs-underscore libonig5
  libzip5 php-bz2 php-google-recaptcha php-phpmyadmin-motranslator
  php-phpmyadmin-shapefile php-phpmyadmin-sql-parser php-phpseclib
  php-psr-cache php-psr-container php-psr-log php-symfony-cache
  php-symfony-cache-contracts php-symfony-expression-language
  php-symfony-service-contracts php-symfony-var-exporter php-tcpdf php-twig
  php-twig-extensions php-xml php7.4-bz2 php7.4-mbstring php7.4-xml php7.4-zip
Suggested packages:
  php-dbase php-libodium php-mcrypt php-gmp
  php-symfony-service-implementation php-imagick php-twig-doc
  php-symfony-translation php-recode php-gd2 php-pragmarx-google2fa
  php-bacon-qr-code php-samyoul-u2f-php-server
Recommended packages:
  php-mcrypt
The following NEW packages will be installed:
```

- Sudo systemctl restart apache2
 - <http://localhost/phpmyadmin>
- username: root
 password: your password
- if phpmyadmin page not found
 - sudo nano /etc/apache2/apache2.conf
- Add this line to last of the line
- Include /etc/phpmyadmin/apache.conf

- Restart apache2
 - Sudo systemctl restart apache2-now try
 - <http://localhost/phpmyadmin>
-
- If any problem for login run the following command
Sudo mysql
ALTER USER root@localhost IDENTIFIED BY "yourpassword";





installation of ansible

Q.NO:1

Explain the steps for the installation of ansible with your own screenshots.

Step1: install ansible

sudo apt-get install ansible

```
swathi@swathi:~/Desktop$ sudo apt-get install ansible
[sudo] password for swathi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-lib2to3 python3-libcloud python3-lockfile python3-markupsafe
  python3-netaddr python3-ntlm-auth python3-requests-kerberos
  python3-requests-ntlm python3-selinux python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc python-lockfile-doc ipython3
  python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-lib2to3 python3-libcloud python3-lockfile python3-markupsafe
  python3-netaddr python3-ntlm-auth python3-requests-kerberos
  python3-requests-ntlm python3-selinux python3-winrm python3-xmldict
0 upgraded, 20 newly installed, 0 to remove and 181 not upgraded.
Need to get 9,970 kB of archives.
After this operation, 92.8 MB of additional disk space will be used.
Do you want to continue? [Y/n] 
```

Step2:ansible version

```
swathi@swathi:~/Desktop$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/swathi/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
    ansible python module location = /usr/lib/python3/dist-packages/ansible
    executable location = /usr/bin/ansible
      python version = 3.8.5 (default, May 27 2021, 13:30:53) [GCC 9.3.0]
swathi@swathi:~/Desktop$ 
```

Tcpdump installation

1. Tcpdump installation

- Sudo apt install tcpdump
- Sudo tcpdump

```
swathi@swathi:~/Desktop$ sudo apt install tcpdump
[sudo] password for swathi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tcpdump is already the newest version (4.9.3-4).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 189 not upgraded.
swathi@swathi:~/Desktop$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes

22:13:21.069367 IP swathi.53710 > alphyn.canonical.com.ntp: NTPv4, Client, length 48
22:13:21.118774 IP swathi.34873 > 192.168.43.1.domain: 60266+ PTR? 157.91.189.91.in-addr.arpa. (44)
22:13:21.855127 IP alphyn.canonical.com.ntp > swathi.53710: NTPv4, Server, length 48
22:13:26.128781 IP swathi.34873 > 192.168.43.1.domain: 60266+ PTR? 157.91.189.91.in-addr.arpa. (44)
22:13:26.169271 IP 192.168.43.1.domain > swathi.34873: 60266 1/0/0 PTR alphyn.canonical.com. (78)
22:13:26.172130 IP swathi.39315 > 192.168.43.1.domain: 38096+ PTR? 15.2.0.10.in-addr.arpa. (40)
```

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

```
swathi@swathi:~/Desktop$ tcpdump -D
1.enp0s3 [Up, Running]
2.lo [Up, Running, Loopback]
3.any (Pseudo-device that captures on all interfaces) [Up, Running]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
swathi@swathi:~/Desktop$ tcpdump -i enp0s3
tcpdump: enp0s3: You don't have permission to capture on that device
(socket: Operation not permitted)
```

```
swathi@swathi:~/Desktop$ sudo tcpdump -c 5
[sudo] password for swathi:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes

22:19:21.280900 IP swathi.44595 > alphyn.canonical.com.ntp: NTPv4, Client, length 48
22:19:21.289105 IP swathi.60024 > 192.168.43.1.domain: 39437+ PTR? 15.2.0.10.in-addr.arpa. (40)
22:19:21.294793 IP 192.168.43.1.domain > swathi.60024: 39437 NXDomain 0/0/0 (40)
22:19:21.297986 IP swathi.51782 > 192.168.43.1.domain: 42133+ PTR? 1.43.168.192.in-addr.arpa. (43)
22:19:21.302371 IP 192.168.43.1.domain > swathi.51782: 42133 NXDomain 0/0/0 (43)
5 packets captured
5 packets received by filter
0 packets dropped by kernel
```

```
swathi@swathi:~/Desktop$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
22:22:12.129587 IP swathi.45728 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 3756570357, win 64240, options [mss 1460,sackOK,TS val 3064685014 ecr 0,nop,wscale 7], length 0
22:22:13.144450 IP swathi.45728 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 3756570357, win 64240, options [mss 1460,sackOK,TS val 3064686029 ecr 0,nop,wscale 7], length 0
22:22:15.153723 IP swathi.45728 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 3756570357, win 64240, options [mss 1460,sackOK,TS val 3064688038 ecr 0,nop,wscale 7], length 0
```

- Sudo tcpdump –i enp0s3 –c 5 port 80

```
swathi@swathi:~/Desktop$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
22:24:12.578930 IP6 swathi.mdns > ff02::fb.mdns: 0 [2q] PTR (QM)? _ipp._tcp.loc
al. PTR (QM)? _ipp._tcp.local. (45)
22:24:12.586235 IP swathi.33131 > 192.168.43.1.domain: 8934+ PTR? b.f.0.0.0.0.0.
0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.2.0.f.f.ip6.arpa. (90)
22:24:12.590459 IP 192.168.43.1.domain > swathi.33131: 8934 NXDomain 0/0/0 (90)
22:24:12.598544 IP swathi.50100 > 192.168.43.1.domain: 11930+ PTR? d.8.2.8.5.c.2
.a.2.3.4.5.7.8.e.1.0.0.0.0.0.0.0.0.0.0.0.0.0.0.8.e.f.ip6.arpa. (90)
22:24:12.601502 IP 192.168.43.1.domain > swathi.50100: 11930 NXDomain 0/0/0 (90)
5 packets captured
9 packets received by filter
0 packets dropped by kernel
swathi@swathi:~/Desktop$ sudo tcpdump -i enp0s3 -c 5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
```

- tcpdump host 10.0.2.15
- tcpdump –l eth1 icmp

```
swathi@swathi:~/Desktop$ tcpdump host 10.0.2.15
tcpdump: enp0s3: You don't have permission to capture on that device
(socket: Operation not permitted)
swathi@swathi:~/Desktop$ tcpdump -i eth1 icmp
tcpdump: eth1: You don't have permission to capture on that device
(socket: Operation not permitted)
swathi@swathi:~/Desktop$ █
```

- Sudo tcpdump -n -i enp0s3 -c 10 -w

```
swathi@swathi:~/Desktop$ sudo tcpdump -n -i enp0s3 -c 10 -w
tcpdump: option requires an argument -- 'w'
tcpdump version 4.9.3
libpcap version 1.9.1 (with TPACKET_V3)
OpenSSL 1.1.1f  31 Mar 2020
Usage: tcpdump [-aAbdDefhHIJKLMNOPqStuUvxX#] [ -B size ] [ -c count ]
           [ -C file_size ] [ -E algo:secret ] [ -F file ] [ -G seconds ]
           [ -i interface ] [ -j tstamptype ] [ -M secret ] [ --number ]
           [ -Q in|out|inout ]
           [ -r file ] [ -s snaplen ] [ --time-stamp-precision precision ]
           [ --immediate-mode ] [ -T type ] [ --version ] [ -V file ]
           [ -w file ] [ -W filecount ] [ -y datalinktype ] [ -z postrotate
-command ]
           [ -Z user ] [ expression ]
swathi@swathi:~/Desktop$ █
```

SHELL SCRIPTING

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

```
i  
#!/bin/bash  
echo "enter your name":read you;  
echo "enter college name";read college;  
echo $you;  
echo $college;■  
~  
~  
~  
~
```

Output:

```
enter your name  
swathy  
enter college name  
amal jyothi  
swathy  
amal jyothi
```

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

```
#!/bin/bash  
((sum=10))  
echo "number is $sum"
```

Output:

```
swathi@swathi:~/Desktop$ vi example2.sh  
swathi@swathi:~/Desktop$ chmod +x example2.sh  
swathi@swathi:~/Desktop$ ./example2.sh  
../example2.sh: line 1: i: command not found  
../example2.sh: line 2: !#/bin/bash: No such file or directory  
number is 10
```

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

```
#!/bin/bash
echo "enter two number";
read a b;
echo "addition $((a+b))";
echo "subtraction $((a-b))";
echo "division $((a/b))";
echo "multiplication $((a*b))";
```

Output:

```
swathi@swathi:~/Desktop$ ./exm3.sh
./exm3.sh: line 1: i: command not found
./exm3.sh: line 2: !#/bin/bash: No such file or directory
enter two number
19 6
addition 25
subtraction 13
division 3
multiplication 114
```

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

Output:

```
swathi@swathi:~/Desktop$ vi exm4.sh
swathi@swathi:~/Desktop$ chmod +x exm4.sh
swathi@swathi:~/Desktop$ ./exm4.sh
./exm4.sh: line 1: i: command not found
./exm4.sh: line 2: !#/bin/bash: No such file or directory
enter a number
2
number not found
```

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

```
#!/bin/bash
echo "$(date)";
echo "calnder :";
cal
```

Output

```
swathi@swathi:~/Desktop$ chmod +x exm5.sh
swathi@swathi:~/Desktop$ ./exm5.sh
./exm5.sh: line 1: i: command not found
./exm5.sh: line 2: !#/bin/bash: No such file or directory
Sunday 03 October 2021 04:03:59 PM IST
calnder :
      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 a;
if [[ $((a%2)) -eq 0 ]]
then
echo "$a is even ";
else
echo "$a is odd ";
fi
```

Output:

```
swathi@swathi:~/Desktop$ vi exm6.sh
swathi@swathi:~/Desktop$ chmod +x exm6.sh
swathi@swathi:~/Desktop$ ./exm6.sh
./exm6.sh: line 1: i: command not found
./exm6.sh: line 2: !#/bin/bash: No such file or directory
enter a number
10
10 is even
swathi@swathi:~/Desktop$ ./exm6.sh
./exm6.sh: line 1: i: command not found
./exm6.sh: line 2: !#/bin/bash: No such file or directory
enter a number
5
5 is odd
```

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

```
#!/bin/bash
echo "enter a number";
read a;
if [[ $a -gt 10 ]]
then
echo "number is grater then 10";
fi
if [[ $a -le 10 ]]
then
echo "number is less than or equal to 10"
fi
```

Output:

```
swathi@swathi:~/Desktop$ vi exm7.sh
swathi@swathi:~/Desktop$ chmod +x exm7.sh
swathi@swathi:~/Desktop$ ./exm7.sh
./exm7.sh: line 1: i: command not found
./exm7.sh: line 2: !#/bin/bash: No such file or directory
enter a number
12
number is grater then 10
```

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

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

Output:

```
swathi@swathi:~/Desktop$ vi exm8.sh
swathi@swathi:~/Desktop$ chmod +x exm8.sh
swathi@swathi:~/Desktop$ ./exm8.sh
./exm8.sh: line 1: i: command not found
./exm8.sh: line 2: !#/bin/bash: No such file or directory
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 "enter 4 number";
read a b c d;
sum=$((a+b+c+d))
echo "sum is $sum";
avg=$((sum/4))
echo "average is $avg";
pro=$((a*b*c*d))
echo "product is $pro";
```

Output:

```
swathi@swathi:~/Desktop$ vi exm9.sh
swathi@swathi:~/Desktop$ chmod +x exm9.sh
swathi@swathi:~/Desktop$ ./exm9.sh
./exm9.sh: line 1: i: command not found
./exm9.sh: line 2: !#/bin/bash: No such file or directory
enter 4 number
10 34 56 33
sum is 133
average is 33
product is 628320
```

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

```
#!/bin/bash
echo "enter 3 numbers"
read a b c;
if [[ $a -lt $b ]]
then
echo "$a is smaller";
elif [[ $b -lt $c ]]
then
echo "$b is smaller";
else
echo "$c is smaller";
fi
```

Output:

```
swathi@swathi:~/Desktop$ vi exm10.sh
swathi@swathi:~/Desktop$ chmod +x exm10.sh
swathi@swathi:~/Desktop$ ./exm10.sh
./exm10.sh: line 1: i: command not found
./exm10.sh: line 2: !#/bin/bash: No such file or directory
enter 3 numbers
4 3 6
3 is smaller
swathi@swathi:~/Desktop$ ./exm10.sh
./exm10.sh: line 1: i: command not found
./exm10.sh: line 2: !#/bin/bash: No such file or directory
enter 3 numbers
5 7 9
5 is smaller
swathi@swathi:~/Desktop$ ./exm10.sh
./exm10.sh: line 1: i: command not found
./exm10.sh: line 2: !#/bin/bash: No such file or directory
enter 3 numbers
9 7 0
0 is smaller
```

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

```
#!/bin/bash
echo "enter a number";
read a;
fact=1;
while [ $a -ge 1 ]
do
fact=((fact * $a))
a=$((a-1))
done
echo "factorial is $fact";
```

Output:

```
swathi@swathi:~/Desktop$ vi exm11.sh
swathi@swathi:~/Desktop$ chmod +x exm11.sh
swathi@swathi:~/Desktop$ ./exm11.sh
./exm11.sh: line 1: i: command not found
./exm11.sh: line 2: !#/bin/bash: No such file or directory
enter a number
5
factorial is 120
```

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

```
#!/bin/bash
echo "enter a number";
read a;
pali=$a;
num=0;
while [ $a -gt 0 ]
do
digit=$((a%10));
num=$((num*10))+$digit;
a=$((a/10));
done
if [[ $num -eq $pali ]]
then
echo "$pali is palindrome";
else
echo "$pali is no palidrome";
fi
```

Output:

```
swathi@swathi:~/Desktop$ vi exm12.sh
swathi@swathi:~/Desktop$ chmod +x exm12.sh
swathi@swathi:~/Desktop$ ./exm12.sh
./exm12.sh: line 1: i: command not found
./exm12.sh: line 2: !#/bin/bash: No such file or directory
enter a number
121
is palindrome
swathi@swathi:~/Desktop$ ./exm12.sh
./exm12.sh: line 1: i: command not found
./exm12.sh: line 2: !#/bin/bash: No such file or directory
enter a number
231
231 is no palidrome
```

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

```
#!/bin/bash
echo "enter number of number";
read n;
sum=0;
echo "enter number";
for((i=0;i<n;i++))
do
read a;
sum=$((sum + a));
done
avg=$((sum/n));
echo "average is $avg"
```

Output:

```
swathi@swathi:~/Desktop$ vi exm13.sh
swathi@swathi:~/Desktop$ chmod +x exm13.sh
swathi@swathi:~/Desktop$ ./exm13.sh
./exm13.sh: line 1: i: command not found
./exm13.sh: line 2: !#/bin/bash: No such file or directory
enter number of number
5
enter number
23
12
45
43
23
average is 29
```

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

```
#!/bin/bash
echo "enter a number";
read a;
pali=$a;
num=0;
while [ $a -gt 0 ]
do
digit=$((a%10));
num=$((digit+num));
a=$((a/10));
done
echo "sum of digits of $pali os $num";
```

Output:

```
swathi@swathi:~/Desktop$ vi exm14.sh
swathi@swathi:~/Desktop$ chmod +x exm14.sh
swathi@swathi:~/Desktop$ ./exm14.sh
./exm14.sh: line 1: i: command not found
./exm14.sh: line 2: !#/bin/bash: No such file or directory
enter a number
123
sum of digits of 123 os 6
```

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

```
#!/bin/bash
echo "enter the year";
read a;
year=$((a%4));
if [[ $year -eq 0 ]]
then
echo "$a is leap year";
else
echo "$a is a normal year";
fi
```

Output

```
swathi@swathi:~/Desktop$ vi exm15.sh
swathi@swathi:~/Desktop$ chmod +x exm15.sh
swathi@swathi:~/Desktop$ ./exm15.sh
./exm15.sh: line 1: i: command not found
./exm15.sh: line 2: !#/bin/bash: No such file or directory
enter the year
2012
2012 is leap year
swathi@swathi:~/Desktop$ ./exm15.sh
./exm15.sh: line 1: i: command not found
./exm15.sh: line 2: !#/bin/bash: No such file or directory
enter the year
2007
2007 is a normal year
```

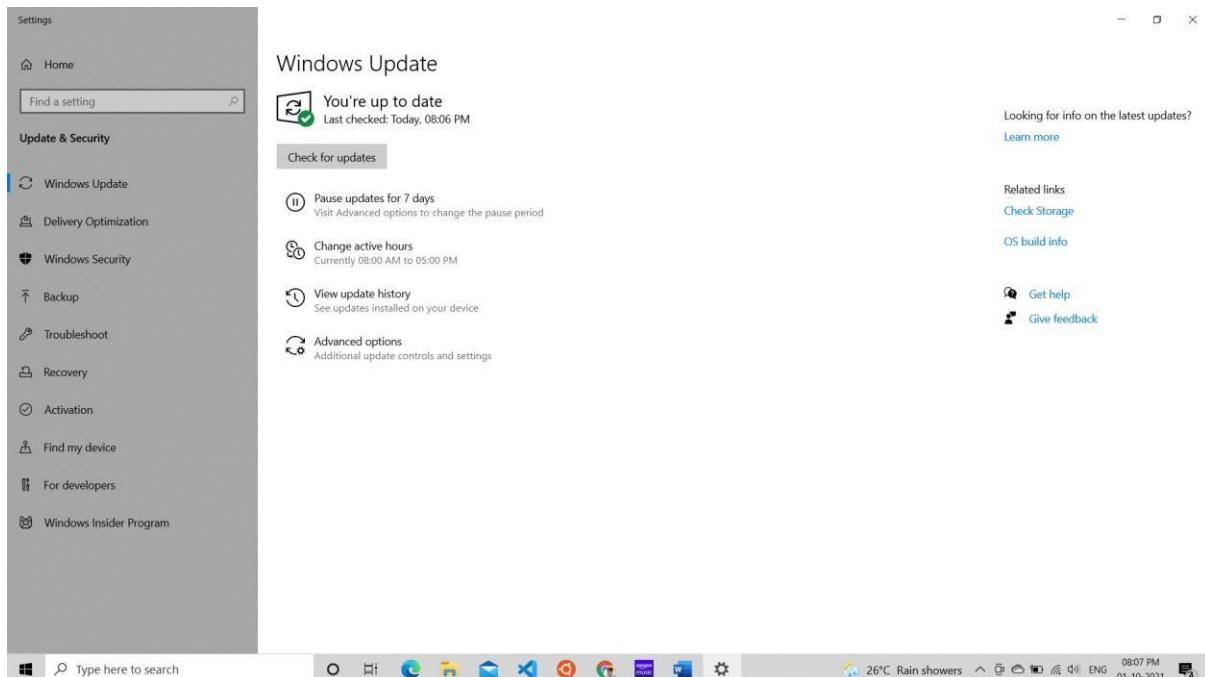
INSTALLING DOCKER ON WINDOWS 10

Installing Docker on Windows 10

First make sure Windows is up to date.

In the Windows search type "Windows Update" and select Windows Update setting

You should see a green check and "You're up to date". If not click "Check for updates". You will need to repeat this process until you no longer have any updates to install.



Next install WSL2

- From the Windows Search Type "powershell" then right-click on Windows PowerShell and then Run as administrator.
- Click 'Yes' to allow PowerShell to make changes to your device.
- In the Administrator: Windows PowerShell window run (copy and past) "wsl –install" to install Windows Services for Linux (wsl).

```
Display usage information.
PS C:\Windows\system32> wsl --install
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: WSL Kernel
Installing: WSL Kernel
WSL Kernel has been installed.
Downloading: Ubuntu
The requested operation is successful. Changes will not be effective until the system is rebooted.
PS C:\Windows\system32>
```

- Next enable the Virtual Machine Platform. In the Administrator: Windows PowerShell run (copy and past) "dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart".

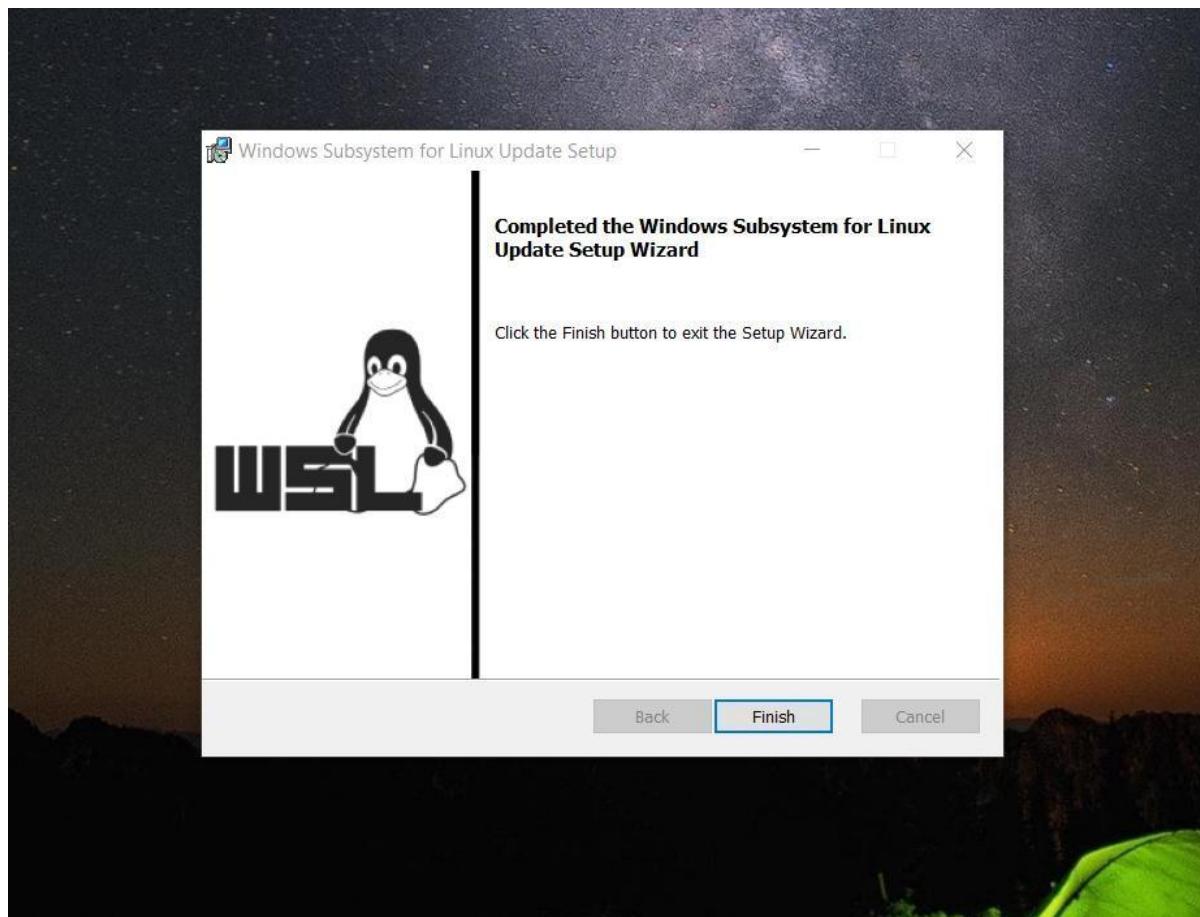
```
PS C:\Windows\system32> dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart

Deployment Image Servicing and Management tool
Version: 10.0.19041.844

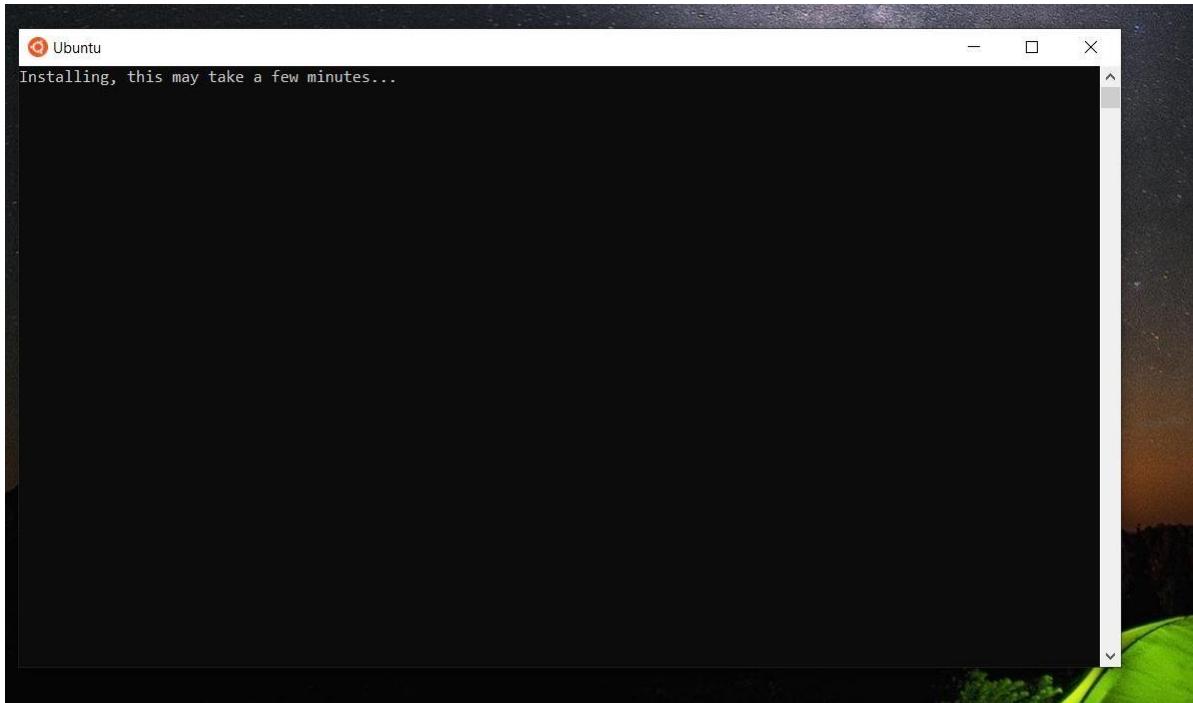
Image Version: 10.0.19043.1266

Enabling feature(s)
[=====100.0%=====]
The operation completed successfully.
PS C:\Windows\system32>
```

- Download and install the [WSL2 Linux kernel update package for x64 machines](#)



- set up a Linux user



```
Retype new password:  
passwd: password updated successfully  
Installation successful!  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)  
  
 * Documentation:  https://help.ubuntu.com  
 * Management:    https://landscape.canonical.com  
 * Support:       https://ubuntu.com/advantage  
  
 System information as of Fri Oct  1 11:50:30 IST 2021  
  
 System load:  0.16          Processes:           8  
 Usage of /:   0.4% of 250.98GB  Users logged in:     0  
 Memory usage: 2%            IPv4 address for eth0: 172.24.46.235  
 Swap usage:   0%  
  
0 updates can be installed immediately.  
0 of these updates are security updates.  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
This message is shown once once a day. To disable it please create the  
/home/sam/.hushlogin file.  
sam@LAPTOP-2S6KTBFB:~$
```

- Reboot Windows.

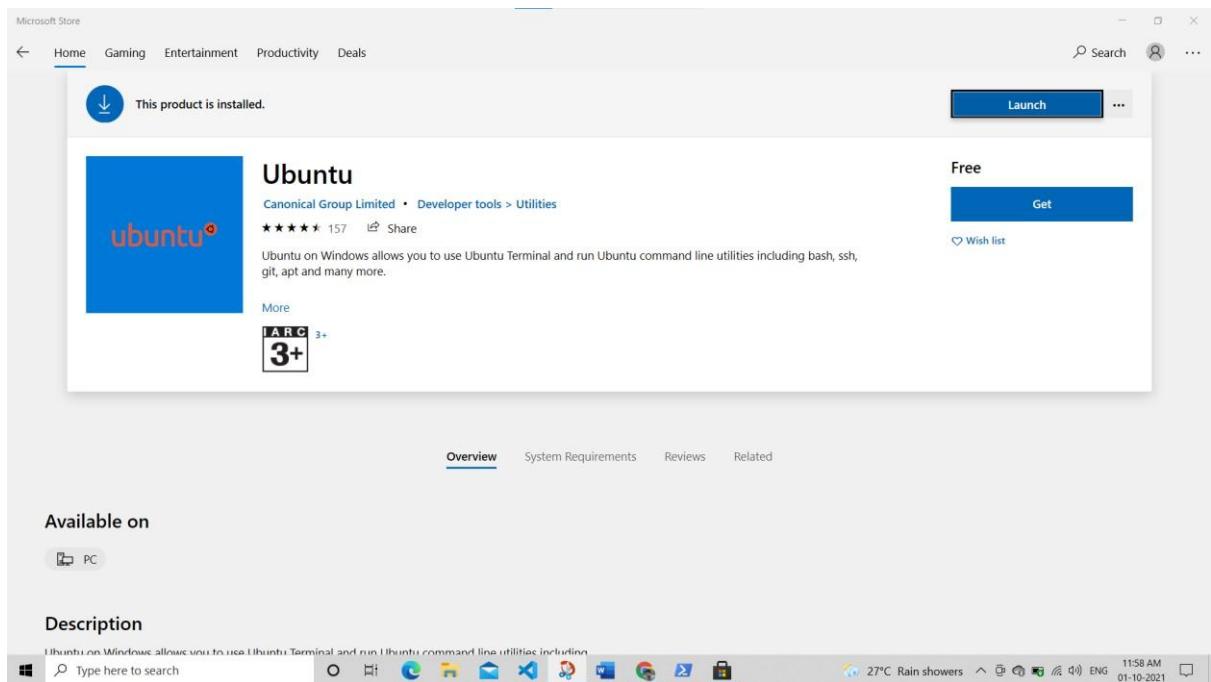
- Again, from the Windows Search Type "powershell" then right-click on Windows PowerShell and then Run as administrator.
- In the PowerShell window run "**wsl --set-default-version 2**".

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Windows\system32> wsl --set-default-version 2
For information on key differences with WSL 2 please visit https://aka.ms/wsl2
The operation completed successfully.
PS C:\Windows\system32>
```

- Next install a Linux distribution from the [Microsoft Store](#)



- You will now be able to run Linux commands in the Ubuntu terminal window.

```
 sam@LAPTOP-2S6KTBF: ~
  To run a command as administrator (user "root"), use "sudo <command>".
  See "man sudo_root" for details.

 sam@LAPTOP-2S6KTBF:~$ ls
 sam@LAPTOP-2S6KTBF:~$ exit
```

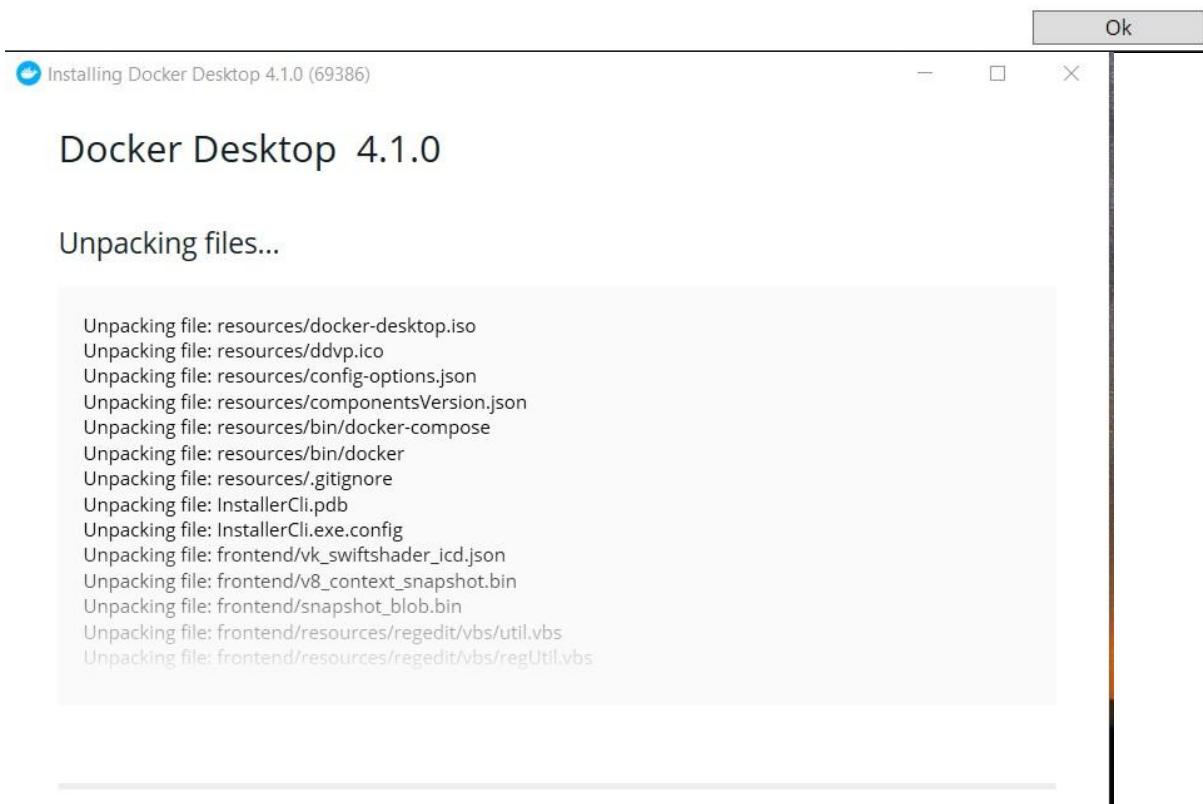
Now you can install [Docker Desktop for Windows](https://www.docker.com/products/docker-desktop)

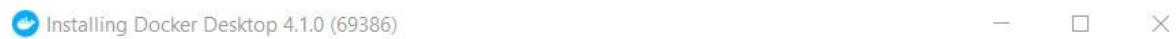
- Download the Docker Desktop for Windows installer from <https://www.docker.com/products/docker-desktop>
- Run the installer.



Configuration

- Install required Windows components for WSL 2
- Add shortcut to desktop





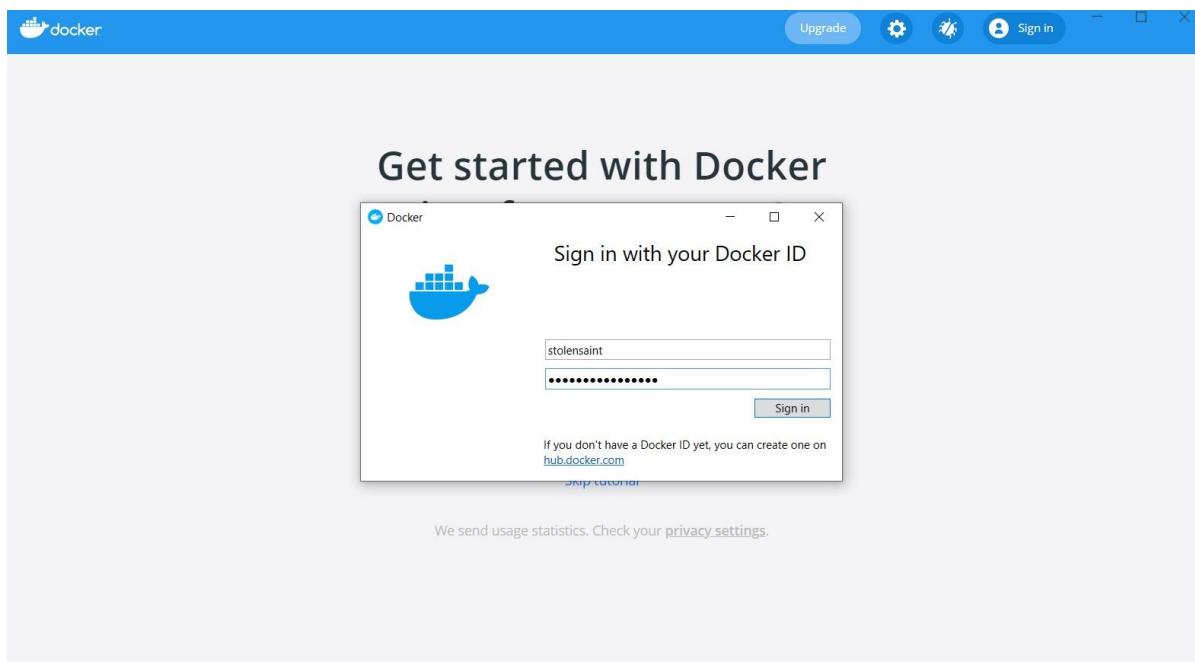
Docker Desktop 4.1.0

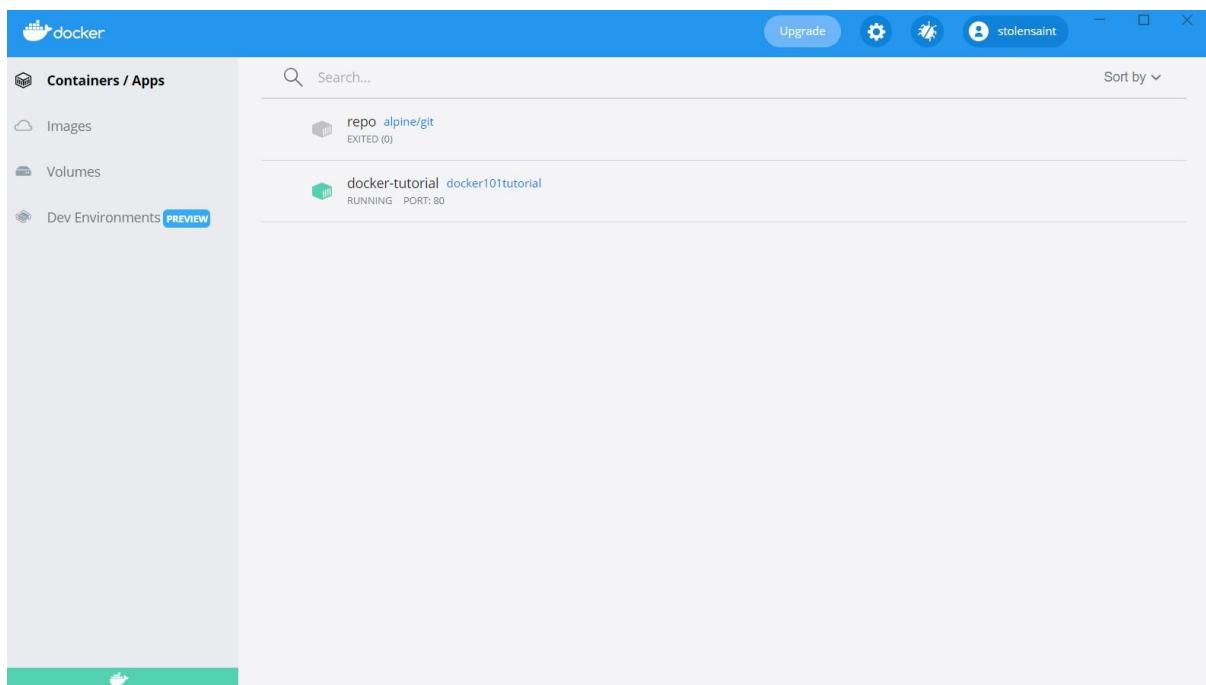
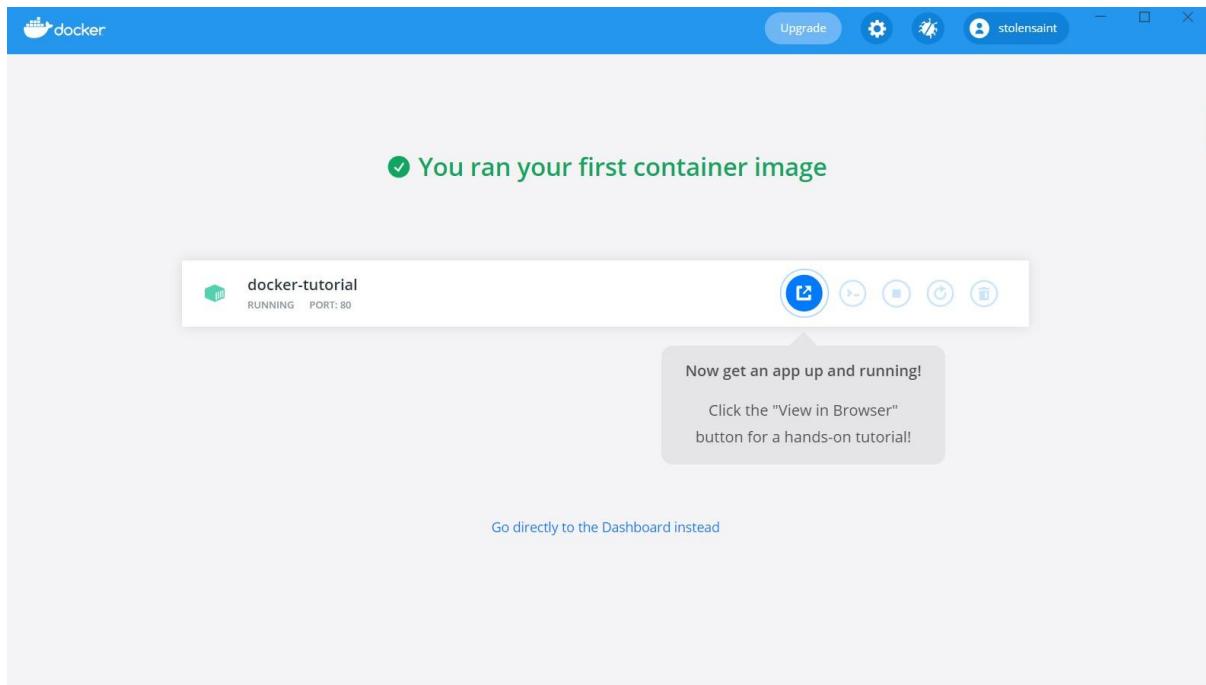
Installation succeeded

You must log out of Windows to complete installation.

[Close and log out](#)

-
- Reboot Windows.
 - Login to Windows and let Docker finish setting up. This can take a few minutes depending on your machine.





- Run the docker “Hello World” from an Ubuntu Terminal run "docker run hello-world".

```

sam@LAPTOP-2S6KTBFB:~$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:9ade9cc2e26189a19c2e8854b9c8f1e14829b51c55a630ee675a5a9540ef6ccf
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

```

Running the Ubuntu Machine

- Run the command “**docker run -t -i ubuntu /bin/bash**” in powershell
- This is a Linux root bash, try some commands

```

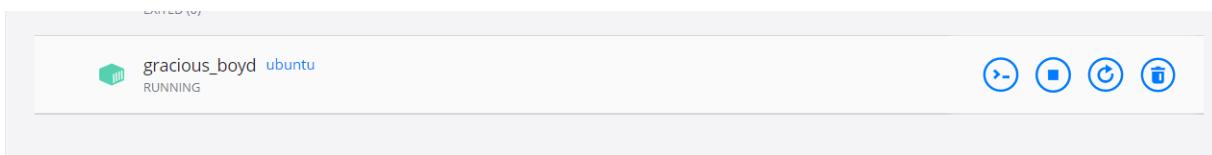
root@afab3919c935:~/WindowsPowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Windows\system32> docker run -t -i ubuntu /bin/bash
root@afab3919c935:/# ls
bin boot dev etc home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys tmp usr var
root@afab3919c935:/# cd demo
root@afab3919c935:/demo# cat >> demo.txt
Hi I'm Sam
^C
root@afab3919c935:/# cat demo.txt
Hi I'm Sam
root@afab3919c935:/# mkdir demo
root@afab3919c935:/# mv demo.txt demo
root@afab3919c935:/# cd demo
root@afab3919c935:/demo# ls
demo.txt
root@afab3919c935:/demo# rm demo.txt
root@afab3919c935:/demo# ls
root@afab3919c935:/demo# cd ..
root@afab3919c935:/# rmdir demo
root@afab3919c935:/# ls
bin boot dev etc home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys tmp usr var
root@afab3919c935:#

```

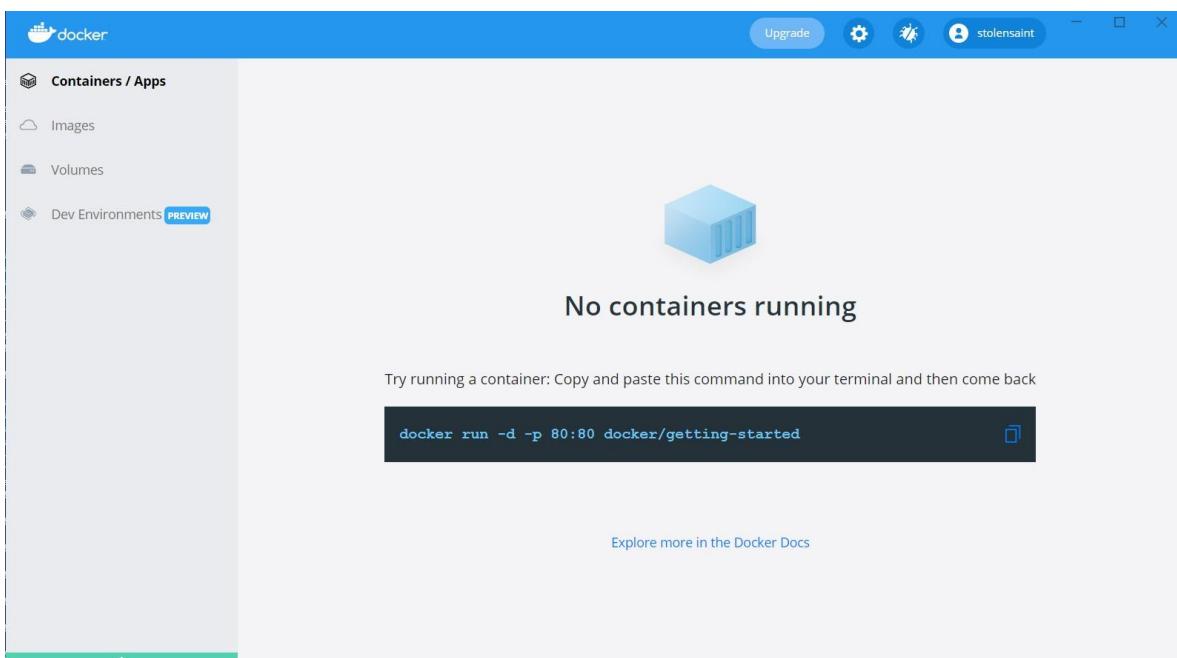
Docker GUI-Containers



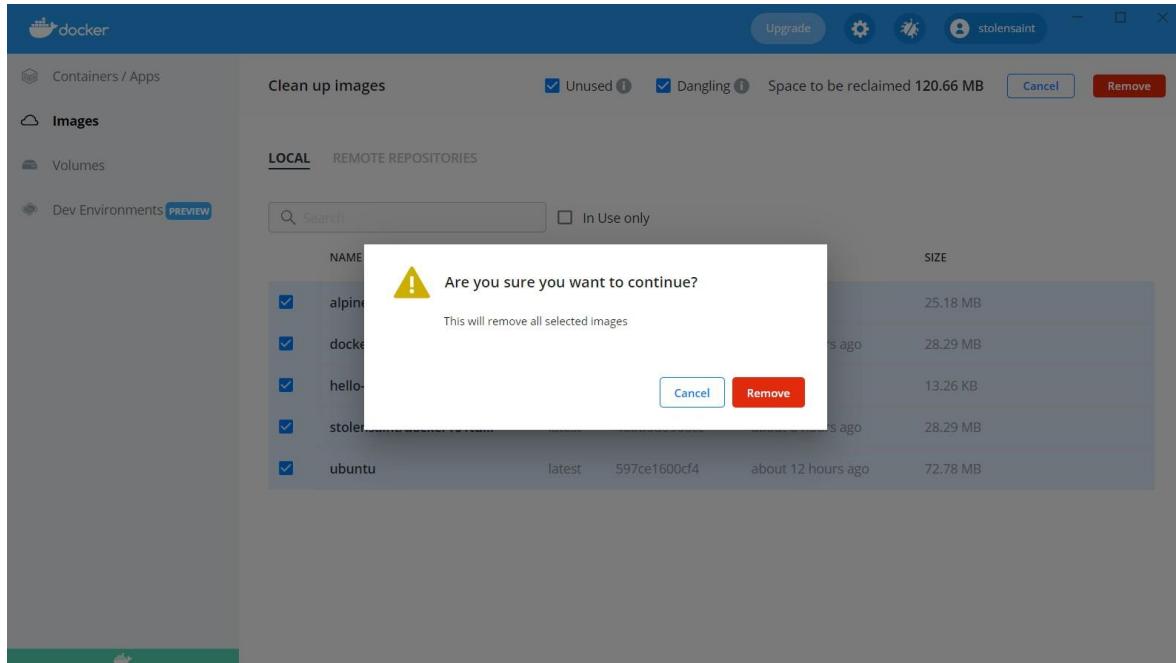
Removing All Containers

```
root@afab3919c935:/# exit
exit
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
acious_boyd 8d21c1d81c22 ubuntu:latest "bash" 6 hours ago Exited (255) 8 minutes ago busy_maxwell
1b0186a069a3 ubuntu "bash" 6 hours ago Exited (0) 6 hours ago serene_dubinsky
48ab9a4423d5 ubuntu "bash" 7 hours ago Exited (0) 7 hours ago serene_bhaskara
fd9061619454 ubuntu "bash" 7 hours ago Exited (0) 7 hours ago beautiful_tereshkova
398156a697cc hello-world "/hello" 8 hours ago Exited (0) 8 hours ago jolly_torvalds
a7e83e3eeda docker101tutorial "/docker-entrypoint..." 8 hours ago Exited (0) 7 hours ago docker-tutorial
e750d0f55bb4 alpine/git "git clone https://g..." 8 hours ago Exited (0) 8 hours ago repo
PS C:\Windows\system32>

PS C:\Windows\system32> docker rm -f busy_maxwell
busy_maxwell
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
afab3919c935 ubuntu "/bin/bash" 7 minutes ago Exited (0) 2 minutes ago gracious_boyd
1b0186a069a3 ubuntu "bash" 6 hours ago Exited (0) 6 hours ago serene_dubinsky
48ab9a4423d5 ubuntu "bash" 8 hours ago Exited (0) 7 hours ago serene_bhaskara
fd9061619454 ubuntu "bash" 8 hours ago Exited (0) 7 hours ago beautiful_tereshkova
398156a697cc hello-world "/hello" 8 hours ago Exited (0) 8 hours ago jolly_torvalds
a7e83e3eeda docker101tutorial "/docker-entrypoint..." 8 hours ago Exited (0) 8 hours ago docker-tutorial
e750d0f55bb4 alpine/git "git clone https://g..." 8 hours ago Exited (0) 8 hours ago repo
PS C:\Windows\system32> docker rm -f gracious_boyd
gracious_boyd
PS C:\Windows\system32> docker rm -f serene_dubinsky
serene_dubinsky
PS C:\Windows\system32> docker rm -f serene_bhaskara
serene_bhaskara
PS C:\Windows\system32> docker rm -f beautiful_tereshkova
beautiful_tereshkova
PS C:\Windows\system32> docker rm -f jolly_torvalds
jolly_torvalds
PS C:\Windows\system32> docker rm -f docker-tutorial
docker-tutorial
PS C:\Windows\system32> docker rm -f repo
repo
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
PS C:\Windows\system32>
```



Cleaning Up Images



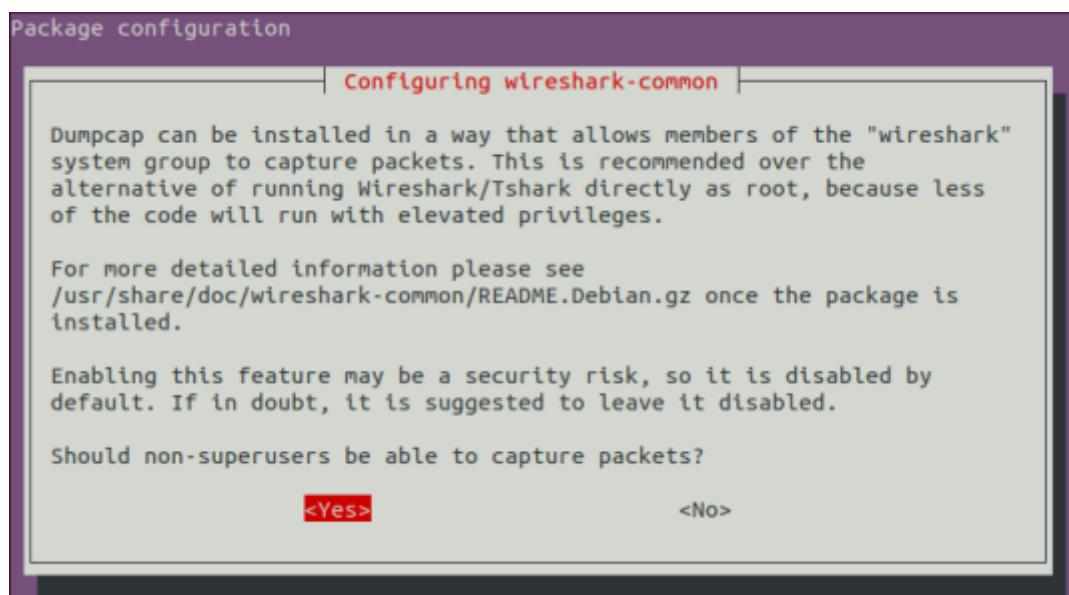
Wireshark installation

1.Command: sudo apt-get install wireshark

```
swathi@swathi:~/Desktop$ sudo apt-get install wireshark
[sudo] password for swathi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required
  linux-headers-5.8.0-43-generic linux-hwe-5.8-headers-5.8.0-43
  linux-image-5.8.0-43-generic linux-modules-5.8.0-43-generic
  linux-modules-extra-5.8.0-43-generic
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libc-ares2 libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5
  libqt5guis5 libqt5multimedia5 libqt5multimedia5-plugins
  libqt5multimediasupports5 libqt5multimediawidgets5 libqt5networks5
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2l5
  libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13 libwiretap10
  libwsutil11 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:
  libc-ares2 libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5
```

2.Command: sudo dkpg-reconfigure wireshark-common

3.Command: Select Yes and press enter



4. Open wireshark from the applist

