

- Aim:
- 1) Install your choice of linux distribution  
eg: Ubuntu, Fedora
  - 2) Customize desktop environment by changing different default options like changing default background, themes, screensaver.
  - 3) Screen Resolution
  - 4) Time Settings.

Using a USB drive:

- Most newer computers can boot from USB. You should see a welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.
- If your computer doesn't automatically do so, you might need to first press the F12 key to bring up the boot menu, but be careful not to hold it down that can cause an error message.

### 1. Prepare to install Ubuntu

- We recommend you plug your computer into a power source
- You should also make sure you have enough space on your computer to install Ubuntu.
- We advise you to select Download updates while installing and Install this third-party software now.

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You should also stay connected to the internet so you can get the latest updates while you install Ubuntu.

- If you are not connected to internet, you will be asked to select a wireless network, if available. We advise you to connect during the installation so we can ensure your machine is up to date.

## 2 Allocate drive space

- Use the checkboxes to choose whether you'd like to install Ubuntu alongside another OS, delete your existing OS and replace it with Ubuntu or (if you are an advanced user) choose the Something else option.

## 3) Begin the installation

- Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu.
- The installation process will begin when you click the install now button.
- Ubuntu needs about 4.5 GB to install, so add a few extra GB to allow for your files.

#### 4) Select your location

- If you are connected to the internet, this should be done automatically. Check your location is correct and click 'forward' to proceed. If you are unsure of your time zone, type the name of the town you are in or click on the map and we will help you find it.

- TIP:- If you are having problems connecting to the internet, use the menu in the top-right corner to select a network.

#### 5) Select your preferred keyboard layout.

- Click on the language option you need. If you're not sure, click the 'Select keyboard layout' button for help.

#### 6) Enter your login and password details

7) Learn more about Ubuntu while the system installs

#### 8) That's it

All that's left is to restart your computer and start enjoying Ubuntu.

## 2) Customize desktop environment.

### Accessing Appearance Settings

- To access appearance settings in Ubuntu, click on User menu at the top right corner, on the top Menu bar and select System Setting.
- A window will pop-up with all settings divided into Personal, Hardware and System options icons. Let's first select the Appearance icon.

### Changing wallpaper settings.

- On the left side of Background part, you can see your current wallpaper.
- On the right side is part where we can select one of Ubuntu wallpapers. Clicking on any thumbnail our wallpaper will be changed right away, with a fading effect.
- If you want to select wallpaper from your picture folder, click the drop-down menu above thumbnails and select the Pictures folder.
- You will see all the pictures in your folder as thumbnails, where you can select them as your wallpaper.
- To add wallpaper that is in another folder, just click the plus icon below the thumbnails and then in pop-up window, select the path to our

custom folder and choose the picture inside of it.

### Changing Ubuntu theme.

- Ubuntu also has an option to change the desktop theme, which in one click will change the entire way your computer looks.
- To do that, click on the drop-down menu below the wallpaper thumbnails, and choose between Ambiance, Radiance or High Contrast.
- Ambiance is a light theme that looks a bit more Mac-like, while Radiance is the darker brown theme used in Ubuntu by default.

### 3) Screen Resolution

Change the size or rotation of the screen.

You can change how big (or how detailed) things appear on the screen by changing the screen resolution. You can change which way up things appear by changing the rotation.

1) Click the icon on the very right of the menu bar and select System settings.

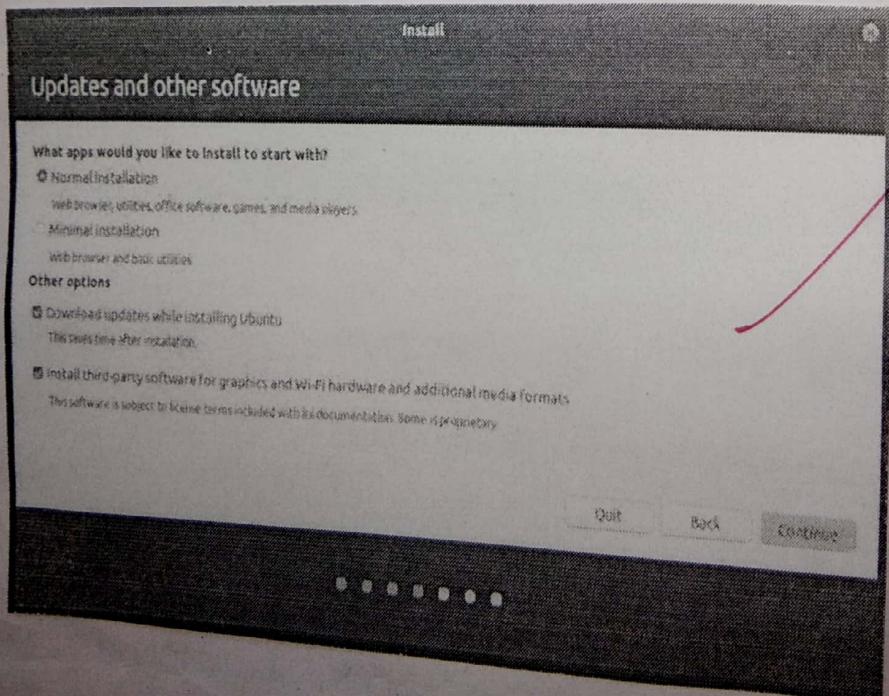
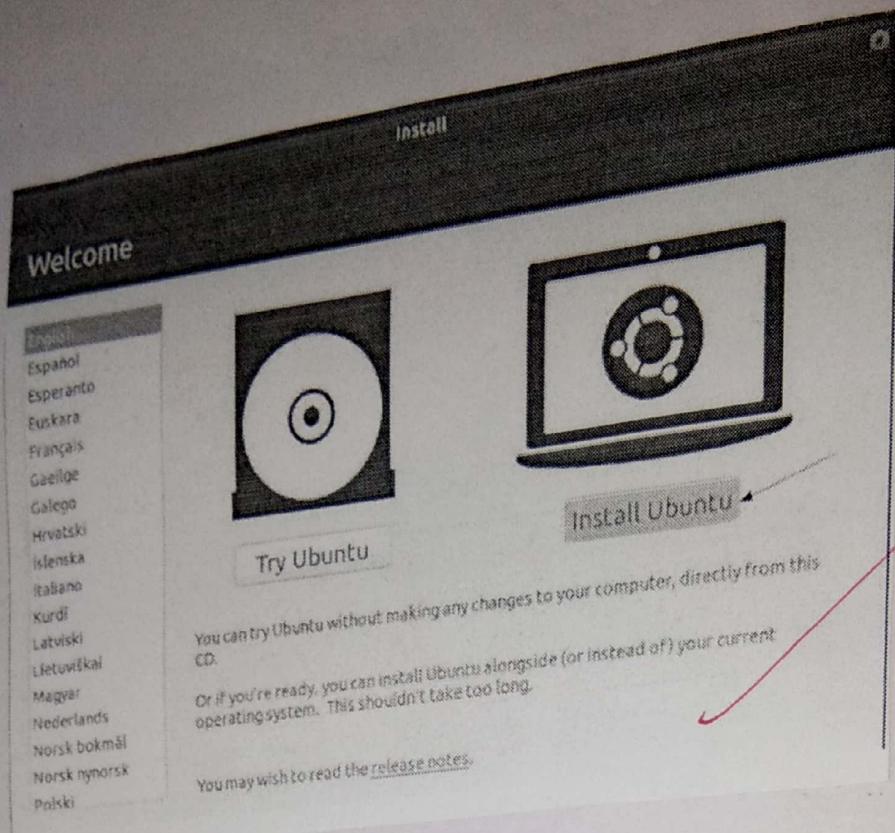
2) Open Screen Display.

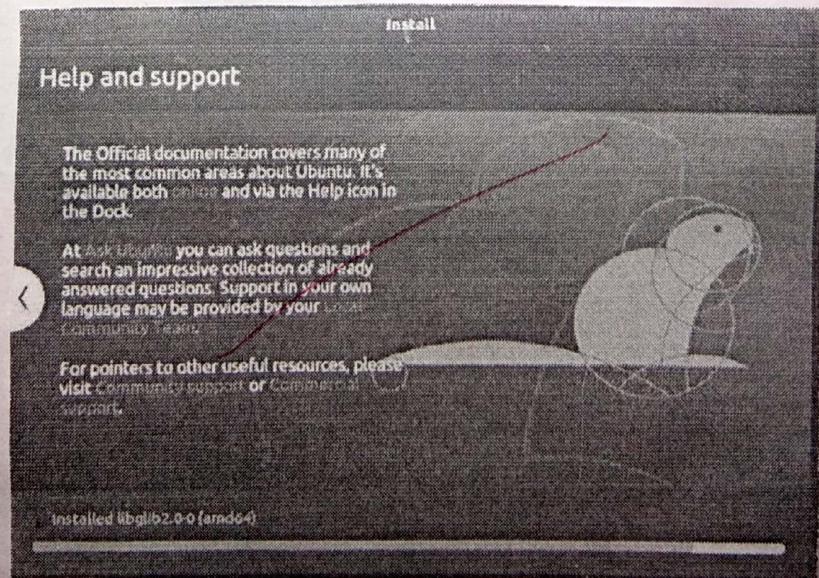
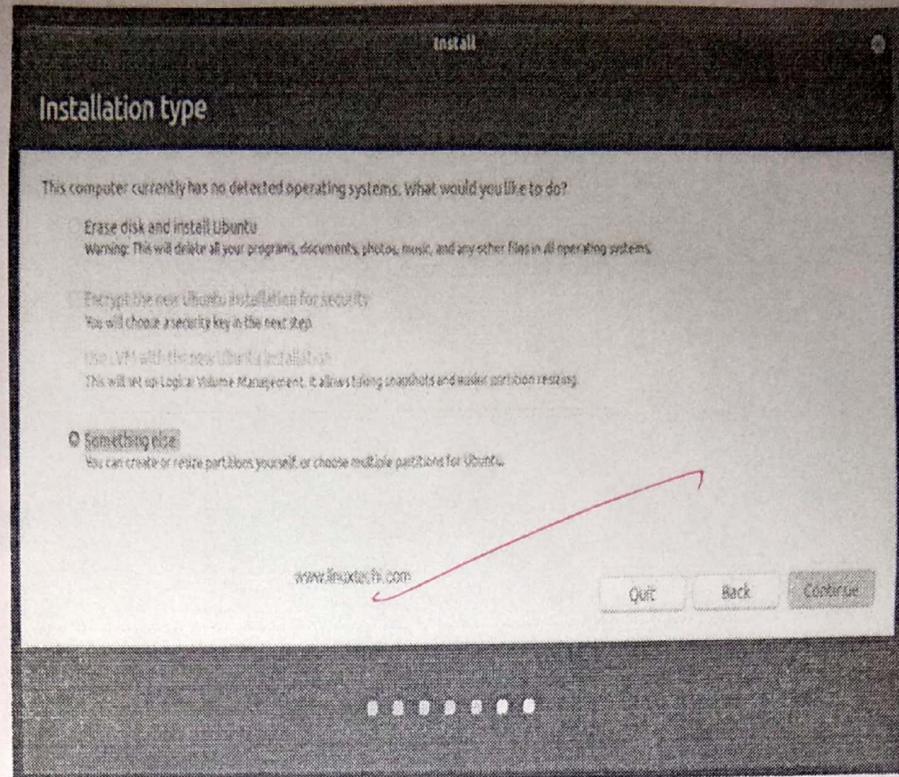
3) If you have multiple displays and they are not mirrored, you can have different settings on each display. Select a display in the preview area.

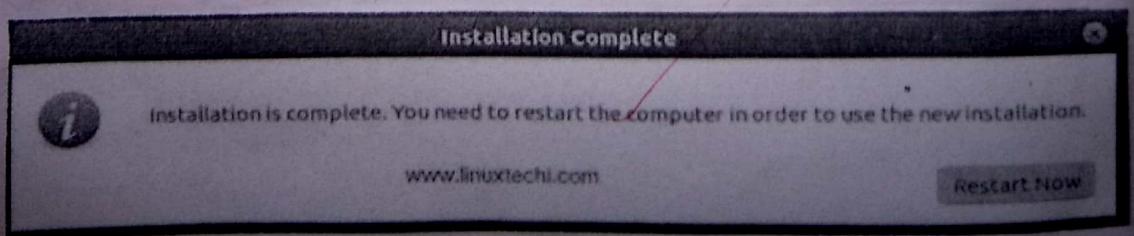
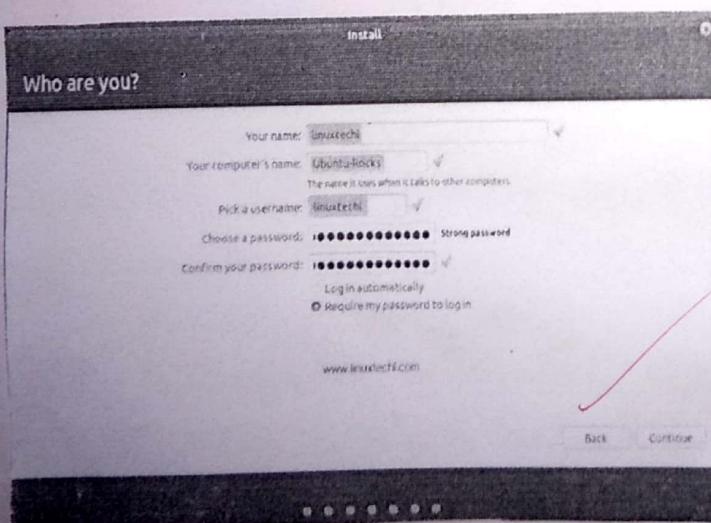
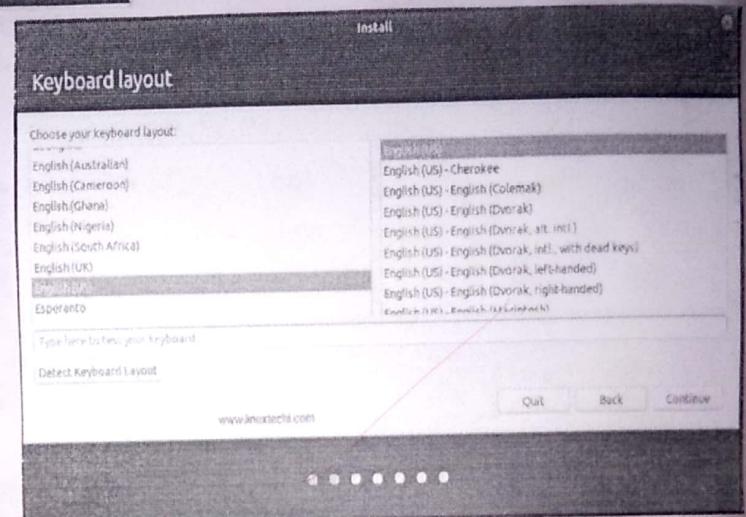
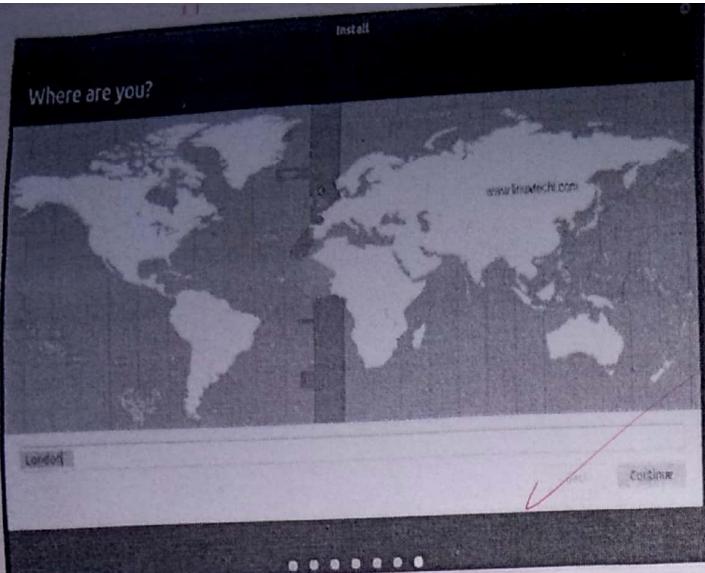
4) Select your desired resolution and rotation  
5) Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with the new

g) Time Settings Change the time zone of your system

- If you are currently in Indian time. How does the displayed time change?
- After noting the time change the time zone back to your local time zone.
- Just click on the clock on the top bar, and choose Time and Date Settings, once the Time and Date window opens, choose Manually, so you can change the time and date manually, otherwise choose your time zone from the map, and choose Automatic.









Firefox Web Browser

Date & Time

About

Date & Time

Users

Default Applications

Automatic Date & Time  
Requires internet access  ON

Automatic Time Zone  
Requires internet access  OFF

Date & Time 23 January 2019, 23:59

Time Zone UTC (London, United Kingdom)

Time Format 24-hour ▾

Scanned with CamScanner

## PRACTICAL No: 2

Aim:- Installing and removing software.

- a) Install gcc package, Verify that it runs and then remove it.

Step 1:

first type 'gcc -v' to know if you have already installed gcc compiler or not. If the output is blank then it means that you don't have gcc installed.

Step 2:

Type 'sudo apt - get install gcc'. After typing the following command installation will take place.

Step 3:

Type 'sudo apt - get install build-essential'. This will install all the libraries required for C and C++ programming language.

## How To Uninstall GCC

In GCC 5.1.0, although there is no top level uninstall target, some directories do have it, in particular gcc, so you can do:

Type: cd build/gcc  
sudo make uninstall

This does not remove everything that was installed, but it removes major executable like gcc, g++ .cpp ... contained in that directory.

✓ ✓ ✓

Aim - Utilization of grep, man commands.

### Documentation:

- a) finding info documentation from the command line. bring up the info page for the grep command. Bring up its usage section.

Ans: To find info about any command 'info' command is used the syntax of info command is 'info (command name)'.

We are going to find the info about the 'grep' command:

Open the terminal ( $Ctrl + Alt + T$ ) and type:  
info grep

After typing this command following output will be displayed onto your screen.

You can also scroll through pages using (Space = up) and (backspace = down) keys.

Another more summarized form of showing info is the 'man' command. The command is same as 'info', but required data.

b) finding man pages from the cmd line:  
 Bring up the man page for the 'ls' command scroll down to the examples section.

Ans: To use the 'man' command simply type  
 'man(command name)'

Now we are going to find the manual for 'ls' command

Type: man ls

c) finding man pages by topic : What man pages are available that document file compression.

Type: man zip  
 man tar

d) finding man pages by section from the cmd line  
 bring up the man page for the printf lib function which ~~moment~~ manual page section are library function found.

Ans: The number corresponds to what section of the manual page is from; 1 is user command, while 8 is sysadmin stuff. The man page for man itself explain it and list the old out.

There are certain terms that have different pages in different sections (e.g. 'printf' as a command appears in Section 1, as a 'stdlib' function, appears in Section 3; in cases like that you can pass the section no. to the man before the page name to choose which one you want or use man -a to show every matching page in a row.)

You can tell what section a term falls in with 'man -k' (equivalent to apropos command). It will do substring matches too. So you need to use "term" to limit it.

e) Command-line Help list the available options for the mkdir command. How can you do this

~~\$ mkdir -m a = rwx directoryname.~~

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:~ \$ info

Output: This is the info main menu (directory mode).  
A few useful info commands:

'q' quits;

'?' list all info commands;

'h' state the info tutorial,

'm Texinfo RET' visits the Texinfo manual, etc.

: ~\$ man ls

Output: Name:

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b - list directory contents

Synopsis

ls [Options] ... [file]

Description:

list information about the FSLES sort entries  
alphabetically if none of -cftuvwxyz  
nor -- sort is specified

-a, -- all

do not ignore entries starting with .

-A, == -- almost-all

do not list implied and  
-- author

with -L, point print the author of each file.

-b, -- escape

print C-style escapes for nongraphic  
character

-c,

list entries by column

: ~\$ man tar

Output: Name: The (TAR) version of the tar archiving  
Synopsis: ~~(tar)~~

tar [-] A... concatenated c | C -- create

d -= diff -- compare | - delete | e -- append |

4. ~list | --list - label / v -- update | x -- extract  
!!B -- get [option] [path name]

### Description:

Top stores and extracts file from a top or disk archive

### Function letters

- A -- catenate, - - concatenate  
append tar files to an archive

- C, - - create  
create a new archive

- d, - - diff, - - compare  
find difference between archive and  
file system

-- delete  
delete from the archive

- x, - append  
append files to the end of an archive

:- \$ Mar 3 printf:

Name: printf, sprintf, fprintf, dprintf, snprintf,  
vprintf, vsprintf, vfprintf, formatted, output version

### Description:

The function in the printf() family produce  
output according to a format as described  
below.

## PRACTICAL No: 4

### AIM:- COMMAND LINE OPERATIONS

- a) Install new package on your system

`Sudo apt-get install [package name]`

- b) Remove the package installed.

`Sudo apt-get remove [package name]`

- c) i) find the password file in / using find command

`# find / -name password`

`/usr/bin/password`

`/usr/share/lintian/overrides/password`

`/usr/share/doc/password`

`/etc/pam.d/password`

`/etc/password`

`/etc/cron.daily/password`

- ii) find the directory password file under root and one level down.

`# find / -maxdepth 2 -name password`

`/etc/password`

iii) find the password file under root and 2 level down.

# find / -maxdepth 2 -name password

/usr/bin/password

/etc/pam.d/password

/etc/password

/etc/cron.daily/password

iv) find the password file between sub-directories level 2 and 4

# find -maxdepth 3 -maxdepth 5 -name password

/usr/bin/password

/usr/share/lintian/overrides/password

/usr/share/doc/password

/etc/pam.d/password

/etc/password

/etc/cron.daily/password

d) Create ~~asym~~ symbolic link to the file you found in test step

ln -s file1 file2

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- e) Create an empty file example.txt and move it to /tmp directory using relative pathname.

touch example.txt  
mv example.txt /tmp

- f) Delete the file moved to /tmp in previous step by absolute method.

rm /tmp/example.txt

- g) find location of ls , ps , bash commands.

# whereis ls

ls: /bin/ls /usr/share/man/man1/ls.1.gz

# whereis ps

ps: /bin/ps /usr/share/man/man1/ps.1.gz

# whereis bash

bash: /bin/bash /etc/bash.bashrc /usr/share/man/man1/bash.1.gz

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# PRACTICAL NO:5

## FILE OPERATIONS

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Explore mounted file systems on your computer

Ans.: df -k

```
jeba@jeba-VirtualBox:~$ df -k
Filesystem      1K-blocks    Used Available Use% Mounted on
udev              494436       0   494436  0% /dev
tmpfs             102416    3676   98740  4% /run
/dev/sda1        7092728  3383372  3326024 51% /
tmpfs             512076     216   511860  1% /dev/shm
tmpfs              5120       4    5116  1% /run/lock
tmpfs             512076       0   512076  0% /sys/fs/cgroup
tmpfs             102416      48   102368  1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

What are the different way of exploring mounted file systems on linux?

Ans: mount

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=102416k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,dddev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot=/)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio,nsroot=/)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot=/)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsroot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot=/)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsroot=/)
systemd-1 on /proc/sys/fs/blnfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

3) Copying file from files.  
Ans: cp command or command.

```
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  Music  Pictures  Public  Templates  Videos
Documents  examples.desktop  jj  Pictures
jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat .gg.txt
cat: .gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat >gg.txt
welcome
Linux
Linux
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~/jeb$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ touch ss.txt
jeba@jeba-VirtualBox:~/jeb$ mv gg.txt ss.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

4) Archiving and backup the work directory using tar, gzip and bzip2 commands.

Ans:- gzip filename.txt  
bzip2 filename.txt

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /mn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable: exiting now
jeba@jeba-VirtualBox:/$ sudo tar -cvf data.tar /mn
tar: Removing leading '/' from member names
/mn/
/mn/hd/
jeba@jeba-VirtualBox:/$ ls
bin  data.tar  etc    lib      mn   opt   run   srv  usr
boot dd      home   lost+found  mn1  proc  sbin  sys  var
cdrom dev    initrd.ing media   mn11  root  snap  mn2  vmlinuz
jeba@jeba-VirtualBox:/$ cat data.tar
mn/0000755000000000000000000000000013605376557010365 Sustar  rootrootmn/mn/0000755000000000000000000000000013605376557010760 Sustar  rootrootjeba@jeba-VirtualBox:/$
```

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2
BZh9lAY&SY+H
jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
d.txt+OeIeeMeee+eoXzjeba@jeba-VirtualBox:~/jeb$
```

- 3) Use diff command to create diff of two files  
 Ans: diff filename1 filename2

```
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat >aa.txt
hello world
^C
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
this is linux^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
1d0
< hello world
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt
this is Linux
^C
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt
1c1
< hello world
---
> this is Linux
jeba@jeba-VirtualBox:~/jeb$ gzip aa.txt
jeba@jeba-VirtualBox:~/jeb$ gzip bb.txt
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt.gz bb.txt.gz
Binary files aa.txt.gz and bb.txt.gz differ
```

- 6) Use patch command to patch a file. And analyze the patch using patch command again

```
jeba@jeba-VirtualBox:~/jeb$ cat >hi.txt
hi
hi
hi
^C
jeba@jeba-VirtualBox:~/jeb$ cat >hii.txt
hello
hello
hello
^C
jeba@jeba-VirtualBox:~/jeb$ diff -u hi.txt hii.txt >sam.patch
jeba@jeba-VirtualBox:~/jeb$ patch ,sam.patch
^C
jeba@jeba-VirtualBox:~/jeb$ patch <sam.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/jeb$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55.463569834 +0530
+++ hii.txt     2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$
```

# PRACTICAL No:- 6

## USE ENVIRONMENT

Q) Which account you are logged in? How do you find out?  
 Ans: who command and whoami

```
jeba@jeba-VirtualBox:~$ who
jeba@jeba-VirtualBox:~$ who
jeba    tty7          2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
LOGIN   tty1          2020-01-15 20:30          780 id=tty1
jeba@jeba-VirtualBox:~$ █
```

```
jeba@jeba-VirtualBox:~$ w
20:35:04 up 4 min, 1 user, load average: 0.70, 0.79, 0.38
USER      TTY      FROM           LOGIN@     IDLE     JCPU      PCPU WHAT
jeba      tty7      :0            20:32      4:28    8.19s  0.33s /sbin/upstart -
jeba@jeba-VirtualBox:~$ w -s
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37
USER      TTY      FROM           IDLE WHAT
jeba      tty7      :0            4:38   /sbin/upstart --user
jeba@jeba-VirtualBox:~$ w -h
jeba      tty7      :0            20:32      4:44    8.67s  0.33s /sbin/upstart -
jeba@jeba-VirtualBox:~$ w -f
20:36:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER      TTY      LOGIN@     IDLE     JCPU      PCPU WHAT
jeba      tty7      20:32      5:36    9.00s  0.33s /sbin/upstart --user
```

Display /etc/shadow file using cat command and understand the importance of shadow file. How its different than passwd file.

Ans: cat/etc/shadow

As with the passwd file, each file in the shadow file is also separated with colon characters and are as follows:

Username upto 8 characters. Case-sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.

- Password, 13 character encrypted. A blank entry (eg. ::) indicates a password is not required to log in (usually a bad idea). and a "\*" entry (eg. : \*) indicates the account has been disabled.
- The number of days (since January 1, 1970) since the password was last changed
- The number of days before password may be changed (0 indicates it may be changed at any time)
- The number of days after which password must be changed (99999 indicates user can keep his or her password unchanged for many, many years!)
- The number of days to warn user of an expiring password (7 for a full week)
- The number of days after password expires that account is disabled
- The number of days since January 1, 1970 that an account has been disabled.
- A reserved field for possible future use.

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root:!:18240:0:99999:7:::
daemon:*:16911:0:99999:7:::
bin:*:16911:0:99999:7:::
sys:*:16911:0:99999:7:::
sync:*:16911:0:99999:7:::
games:*:16911:0:99999:7:::
man:*:16911:0:99999:7:::
lp:*:16911:0:99999:7:::
mail:*:16911:0:99999:7:::
news:*:16911:0:99999:7:::
```

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Each entry in a password entry is separated with ":" colon characters, and are as follows:-

- Username - upto 8 characters. Case-sensitive, usually all lowercase
- An "x" in the password file. are stored in the "/etc/shadow" file.
- Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following group field, to identify which files belong to the user.
- Numeric group id. Red Hat uses group id's in a fairly unique manner for enhanced file security. Usually the group id will match the user id.
- Full name of user. Try to keep the full username of reasonable length (under 30 characters)
- User's home directory. Usually /home/username. All user's personal files, web pages, mail forwarding, etc. will be stored here.
- User's "shell account". Often set to "/bin/bash" to provide access to the bash shell

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

c) Get your current working directory  
Ans: pwd

```
● ● ● jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ pwd
/home/jeba
jeba@jeba-VirtualBox:~$ █
```

d) Explore different ways of getting command history.  
how to run previously executed command  
without typing it.

Ans: history, ! line number

```
● ● ● jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ history
 1 who
 2 whoami
 3 who -l
 4 clear
 5 w
 6 w -s
 7 w -h
 8 w -f
 9 clear
10 cat /etc/shadow
11 sudo cat /etc/shadow
12 clear
13 sudo cat /etc/passwd
14 pwd
15 clear
16 history
jeba@jeba-VirtualBox:~$ !3
who -l
LOGIN    tty1      2020-01-15 20:30
jeba@jeba-VirtualBox:~$ █
```

780 id=tty1

Create alias to most commonly used commands.  
Alias command instructs the shell to replace one string with another string while executing the commands.

Ans alias label = "command"

```
jeba@jeba-VirtualBox:~$ alias m="mkdir new"
jeba@jeba-VirtualBox:~$ m
jeba@jeba-VirtualBox:~$ ls
Desktop Downloads Music Pictures Templates
Documents examples.desktop new Public Videos
jeba@jeba-VirtualBox:~$ █
```

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20/01

## PRACTICAL NO.: 7

### LINUX EDITORS: Vi

a) Create, modify, search and navigate a file in editor.

i) Creating a file.

To create a file, on the terminal type 'vi' followed by filename.

ii) Modifying the file.

To modify a file, on the vi editor, type 'o'.

iii) Search in file:

To find a word (forward search) press / followed by the word to search.

iv) Navigate : Movement in four directions.

Key	Action
-----	--------

k Moves cursor up

j Moves cursor down

h Moves cursor left

l Moves cursor right.

## Word Navigation

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key	Action
b	Moves back to the beginning of the word.
e	Moves forward to the end of the word.
w	Moves forward to the beginning of the word.
0(zero)	Move to first character of line.
\$	Move to the end of line.

## Scrolling

key	Action
ctrl + f	scrolls forward
ctrl + b	scrolls backward
ctrl + d	scrolls half page
ctrl + u	scrolls half page backward

- b) learn all essential commands like search/replace, highlight, show line numbers.

Replace  
Syntax: :/g / word to be replaced/s// new word/g!

```
jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
  
I  
  
:g/my/s//our/gc
```

```
jeba@jeba-VirtualBox: ~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
  
replace with our (y/n/a/q/z/zq/w/wq) ?
```

```
jeba@jeba-VirtualBox: ~  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```

Highlight

Use `:set hlsearch`

```
jeba@jeba-VirtualBox: ~
Hello
This is our Linux example
Welcome
Welldone
This is Vi Editor
Thank you

:set hlsearch
```

Show the line number

Use `:set nu`

```
jeba@jeba-VirtualBox: ~
1 Hello
2 This is our Linux example
3 Welcome
4 Welldone
5 This is Vi Editor
6 Thank you

:set nu
```

22/01

# PRACTICAL No.: 8

## LINUX SECURITY

- a) Use of sudo to change privileges to root.  
Create a user named user1.

```
jeba@jeba-VirtualBox:~$ sudo useradd user1
[sudo] password for jeba:
jeba@jeba-VirtualBox:~$ sudo passwd user1
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
jeba@jeba-VirtualBox:~$
```

To give some users root privileges edit /etc/sudoers using visudo. Enter new line as highlighted below.

```
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults      env_reset
Defaults      mail_badpass
Defaults      secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/
sbin:/bin"
#
# Host alias specification
#
# User alias specification
#
# Cmnd alias specification
#
# User privilege specification
root    ALL=(ALL:ALL) ALL
user1  ALL=(ALL:ALL) ALL
```

- b) Identify operations that require sudo privileges.

```
jeba@jeba-VirtualBox:~$ su user1
Password:
user1@jeba-VirtualBox:/home/jeba$ mkdir folder1
mkdir: cannot create directory 'folder1': Permission denied
user1@jeba-VirtualBox:/home/jeba$ sudo mkdir folder1
[sudo] password for user1:
user1 is not in the sudoers file. This incident will be reported.
```

Modify expiration date for new user user using password aging.

```
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change : Jan 20, 2020
Password expires      : never
Password inactive     : never
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires : 7
```

```
jeba@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter the new value, or press ENTER for the default

    Minimum Password Age [0]: 100
    Maximum Password Age [99999]: 200
    Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21
    Password Expiration Warning [7]: 5
    Password Inactive [-1]:
    Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change      : Jan 21, 2020
Password expires           : Aug 08, 2020
Password inactive          : never
Account expires             : Jan 31, 2020
Minimum number of days between password change : 100
Maximum number of days between password change : 200
Number of days of warning before password expires : 5
```

```
jeba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change      : Jan 21, 2020
Password expires           : Apr 20, 2020
Password inactive          : May 20, 2020
Account expires             : Jan 01, 2022
Minimum number of days between password change : 10
Maximum number of days between password change : 90
Number of days of warning before password expires : 30
```

- E: Expiration Date
- m: Minimum number of days before password change
- M: # Number of days password is valid
- I: Account inactive
- W: Number of days of warning before a password change is required

d) Delete newly added user.

```
jeba@jeba-VirtualBox: ~$ sudo userdel user1
[sudo] password for jeba:
jeba@jeba-VirtualBox: ~$ su user1
No passwd entry for user 'user1'
jeba@jeba-VirtualBox: ~$
```

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## PRACTICAL No.: 9

## NETWORK MANAGEMENT

a) Get IP address of your machine using ifconfig.

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: ~$ ifconfig
enp0s3    Link encap:Ethernet HWaddr 08:00:27:0e:6b:69
           inet addr: 10.0.2.15 Bcast: 10.0.2.255 Mask: 255.255.255.0
           inet6 addr: fe80::c0cd:53a0:d5a3:848e/64 Scope: Link
             UP BROADCAST RUNNING MULTICAST MTU: 1500 Metric: 1
             RX packets: 2 errors: 0 dropped: 0 overruns: 0 frame: 0
             TX packets: 73 errors: 0 dropped: 0 overruns: 0 carrier: 0
             collisions: 0 txqueuelen: 1000
             RX bytes: 1180 (1.1 KB) TX bytes: 8518 (8.5 KB)

lo        Link encap: Local Loopback
           inet addr: 127.0.0.1 Mask: 255.0.0.0
           inet6 addr: ::1/128 Scope: Host
             UP LOOPBACK RUNNING MTU: 65536 Metric: 1
             RX packets: 53240 errors: 0 dropped: 0 overruns: 0 frame: 0
             TX packets: 53240 errors: 0 dropped: 0 overruns: 0 carrier: 0
             collisions: 0 txqueuelen: 1
             RX bytes: 4225072 (4.2 MB) TX bytes: 4225072 (4.2 MB)
```

b) Get hostname of your machine.

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: ~$ hostname
jeba-VirtualBox
jeba@jeba-VirtualBox: ~$
```

c) Use ping to check the network connectivity to remote machines.

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=
97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=
82.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=
84.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=
87.1 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=
93.5 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=
86.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=
98.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=
90.9 ms
^Z
[1]+ Stopped                  ping www.google.com
jeba@jeba-VirtualBox:~$
```

d) Use of dig command.

```
@@@ jeba@jeba-VirtualBox:~
jeba@jeba-VirtualBox:~$ dig www.google.com
; <>> DiG 9.10.3-P4-Ubuntu <>> www.google.com
; global options: +cmd
; Got answer:
; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 52068
; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
; QUESTION SECTION:
; www.google.com.

; ANSWER SECTION:
www.google.com.          IN      A          172.217.166.100
; Query time: 152 msec
; SERVER: 127.0.1.1#53(127.0.1.1)
; WHEN: Mon Jan 20 22:40:06 IST 2020
; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

Troubleshooting network using traceroute, route command. 50

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ traceroute www.google.com  
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets  
1 10.0.2.2 (10.0.2.2) 0.190 ms 0.143 ms 0.151 ms  
2 * * *  
3 10.0.2.2 (10.0.2.2) 68.568 ms 68.486 ms 68.405 ms  
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route  
Kernel IP routing table  
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface  
default         10.0.2.2      0.0.0.0       UG    100    0        0 enp0s3  
10.0.2.0        *             255.255.255.0  U     100    0        0 enp0s3  
link-local      *             255.255.0.0   U     1000   0        0 enp0s3  
jeba@jeba-VirtualBox:~$
```

Use of arp command

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ arp  
Address          HWtype  HWaddress           Flags Mask Iface  
10.0.2.2        ether    52:54:00:12:35:02  C      enp0s
```

Use of hostname command

```
jeba@jeba-VirtualBox:~$ host -v  
host 9.10.3-P4-Ubuntu  
jeba@jeba-VirtualBox:~$
```

h) Use of netstat command and Nmap command.

jeba@jeba-VirtualBox:~\$ netstat -an					
Active Internet connections (w/o servers)				Foreign Address State	
Proto	Recv-Q	Send-Q	Local Address	I-Node	Path
Proto	Recv-Q	Send-Q	Local Address	I-Node	Path
unix	2	[ ]	DGRAM	42149	/run/user/1000/system
d/notify	2	[ ]	DGRAM	9694	/run/systemd/journal/
unix	2	[ ]	DGRAM	9695	/run/systemd/journal/
syslog	16	[ ]	DGRAM	9704	/run/systemd/journal/
dev-log	7	[ ]	DGRAM	9684	/run/systemd/notify
socket	3	[ ]	DGRAM	44042	@/tmp/dbus-CymTeI7AQG
unix	3	[ ]	STREAM	43331	@/tmp/dbus-CymTeI7AQG
unix	3	[ ]	STREAM	42988	@/tmp/dbus-CMGGc6G7PS
unix	3	[ ]	STREAM	42690	/run/systemd/journal/
unix	3	[ ]	STREAM	13242	/run/systemd/journal/
stdout	3	[ ]	STREAM	43113	/run/systemd/journal/
stdout	3	[ ]	STREAM	43613	/run/systemd/journal/
untx	3	[ ]	STREAM	42935	

jeba@jeba-VirtualBox:~\$ nmap www.google.com

Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST  
Nmap scan report for www.google.com (216.58.196.68)  
Host is up (0.044s latency).  
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004  
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net  
Not shown: 998 filtered ports  
PORT STATE SERVICE  
80/tcp open http  
443/tcp open https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds

jeba@jeba-VirtualBox:~\$ █

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ostor

# PRACTICAL No.: 10

## SHELL SCRIPTING

AIM:-

Basics of shell scripting.

To get a shell, you need to start a terminal.

To see what shell you have, run: echo \$SHELL

In Linux, the dollar sign (\$) stands for shell variable.

The echo command just returns whatever you type in.

~~#!/bin/bash - It is called shebang. It is written at the top of a shell script and it passes the instruction to the program /bin/bash.~~

Echo \$SHELL

```
tcsc@tcsc-VirtualBox: ~
tcsc@tcsc-VirtualBox: ~$ echo $SHELL
/bin/bash
tcsc@tcsc-VirtualBox: ~$
```

vi filename.sh

~~#!/bin/bash~~

echo "This is Linux"

tcsc@tcsc-VirtualBox: ~  
#!/bin/bash  
echo "THIS IS LINUX!"

"linux.sh" [New File]

- chmod 777 filename.sh
  - ./filename.sh

tcsc@tcsc-VirtualBox: ~  
tcsc@tcsc-VirtualBox: ~\$ vi linux.sh  
tcsc@tcsc-VirtualBox: ~\$ chmod 777 linux.sh  
tcsc@tcsc-VirtualBox: ~\$ ./linux.sh  
THIS IS LINUX!  
tcsc@tcsc-VirtualBox: ~\$

- Step to write and execute a shell script

Shell script is just a simple text file with .sh extension, having executable permission.

- ① Open terminal.

- 1) Navigate to the place where you want to create script using cd command.
- 2) Touch filename.sh
- 3) vi filename.sh [You can use other editor also]
- 4) chmod 777 filename.sh (for making the script executable)
- 5) sh filename.sh or ./filename.sh (for running the script)

Program to display your name

```
#!/bin/bash
echo "Enter your name:"
read name
echo "The name is: $name"
```

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
echo "Enter your name:"
read name
echo "My name is: $name"
:wq
```

```
tcsc@tcsc-VirtualBox: ~  
tcsc@tcsc-VirtualBox:~$ vi ubuntu.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 ubuntu.sh  
tcsc@tcsc-VirtualBox:~$ ./ubuntu.sh  
'Enter your name:  
'TANVI  
My name is: TANVI  
tcsc@tcsc-VirtualBox:~$
```

Program to find the sum of two variables.

Vi filerane.sh

```
#!/bin/bash  
a=100  
b=25  
sum=$((a+b))
```

```
echo "Sum is: $sum"
```

```
tcsc@tcsc-VirtualBox: ~  
#!/bin/bash  
a=100  
b=25  
sum=$((a+b))  
echo "Sum is:$sum"
```

```
:wq
```

```
tcsc@tcsc-VirtualBox: ~  
tcsc@tcsc-VirtualBox:~$ vi linux2.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 linux2.sh  
tcsc@tcsc-VirtualBox:~$ ./linux2.sh  
Sum is:125  
tcsc@tcsc-VirtualBox:~$
```

Program to find the sum of two numbers (values passed during execution)

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
sum=$(( $1+$2 ))
echo "sum is:$sum"

"lin.sh" 3 lines, 46 characters
```

```
tcsc@tcsc-VirtualBox: ~$ vi lin.sh
tcsc@tcsc-VirtualBox: ~$ chmod 777 lin.sh
tcsc@tcsc-VirtualBox: ~$ ./lin.sh 50 70
sum is:120
tcsc@tcsc-VirtualBox: ~$
```

## SED

Sed command or Stream Editor is a very powerful utility offered by linux systems. It is mainly used for Text substitution, find and replace but it can perform other text manipulations like insertion, deletion, search, etc. With Sed, we can edit complete files without actually having to open it.

Consider the following text file:

```
* - tcsc@tcsc-VirtualBox: ~
```

```
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
```

```
:wq
```

i) Displaying partial text of a file.

With sed, we can view only part of a file rather than seeing whole file.

```
* - tcsc@tcsc-VirtualBox: ~
```

```
tcsc@tcsc-VirtualBox:~$ vi cs.txt
tcsc@tcsc-VirtualBox:~$ sed -n 3,5p cs.txt
database management
linux
python
tcsc@tcsc-VirtualBox:~$
```

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- 3) Displaying all except some lines  
To display all content of a file except for some portion, use option 'd'.

```
tcsc@tcsc-VirtualBox:~$ sed 3,5d cs.txt
subjects offered in cs
datastructure
green tech
softskill
stats
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

- 3) Deleting a line  
To delete a line, use line number followed by 'd'.

```
tcsc@tcsc-VirtualBox:~$ vi linux.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 linux.sh
tcsc@tcsc-VirtualBox:~$ ./linux.sh
THIS IS LINUX!
tcsc@tcsc-VirtualBox:~$
```

- 4) Search and Replace a string  
's' option is for searching a word

```
tcsc@tcsc-VirtualBox:~$ sed 's/cs/computer/' cs.txt
subjects offered in computer
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
```

5) Replace a string on a particular line

To replace a string on a particular line, use line number with 's' option.

```
tcsc@tcsc-VirtualBox:~$ sed '6 s/cs/computer system /' cs.txt
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
```

6) Add a line after and before the matched string.

To add a new line with some content after every pattern match, use option 'a'.

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/a "this is linux"' cs.txt
subjects offered in cs
>this is linux"
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

To add a new line with some content before every pattern match use option 'i'.

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/i "this is linux"' cs.txt
>this is linux"
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

- 1) To change a whole line with matched pattern.  
 To change a new line to a whole new line when a search pattern matches, use option 'i'.

```
tcsc@tcsc-VirtualBox:~$ sed '/linux/c "this is linux"' cs.txt
subjects offered in cs
datastructure
database management
>this is linux"
python
green tech
softskill
stats
calclus
computer basic
```

- 2) Appending lines  
 To add some content before every line with sed, use \* and & as follows.

```
tcsc@tcsc-VirtualBox:~$ sed -e 's/.*/Thanks &/' cs.txt
Thanks subjects offered in cs
Thanks datastructure
Thanks database management
Thanks linux
Thanks python
Thanks green tech
Thanks softskill
Thanks stats
Thanks calclus
Thanks computer basic
```