

Practical-01

Aim:- Install your choice of Linux Distribution.
eg:- Ubuntu, Fedora, Debian

Ubuntu:- Ubuntu is a free and open source software based on Debian. Ubuntu is officially released under 3 editions - Desktop, Server, and. All the editions can be run on the computer alone or a virtual box machine.

It is a popular open source software for cloud computing with support of operator.

Steps for installing Ubuntu in a virtual machine

Step 1:- Select a virtual optical file on a physical drive to start Ubuntu in your virtual machine. Space given to it is 1.86 GB.

Step 2:- Select the language of your choice and click on 'Install Ubuntu'. You can also 'try Ubuntu' for free on computer device from this co

Step 3:- In 'Updates and add Software' click on the normal installation

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Step 4:- While configuring installation type we need to click 'Erase disk and install Ubuntu' this step would delete all types of documents, photos, etc in all operating systems

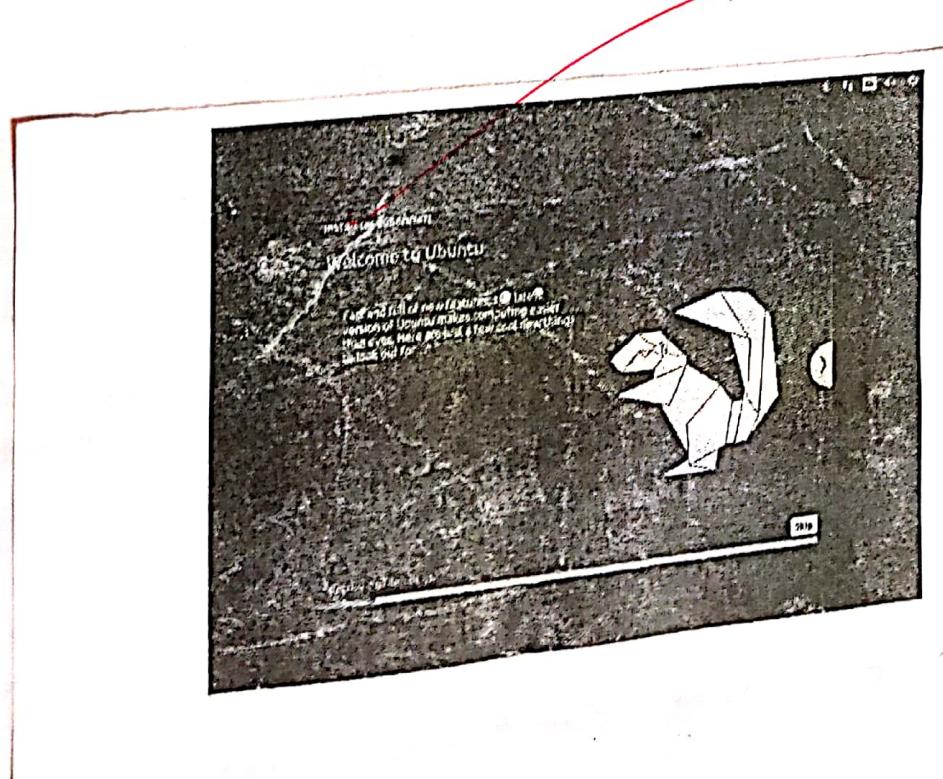
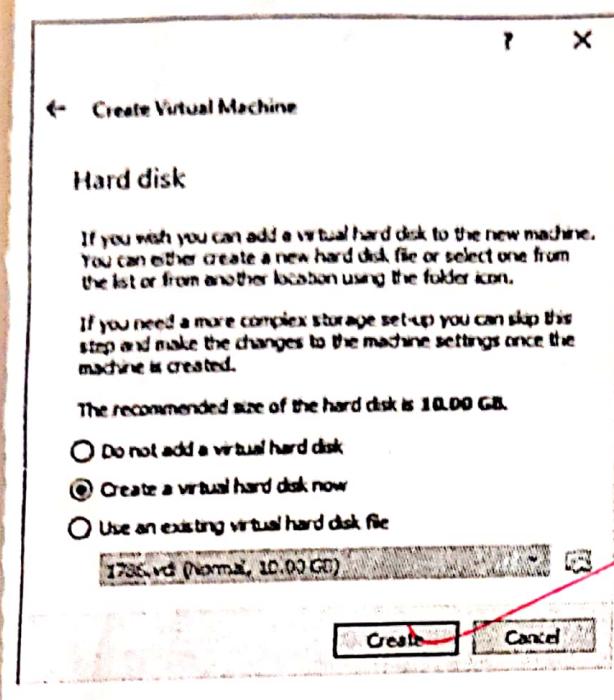
Step 5:- In this you only need to choose the location for the clock to work on Ubuntu.

Step 6:- In this type you need to choose username and password for the login in Ubuntu and then click on continue.

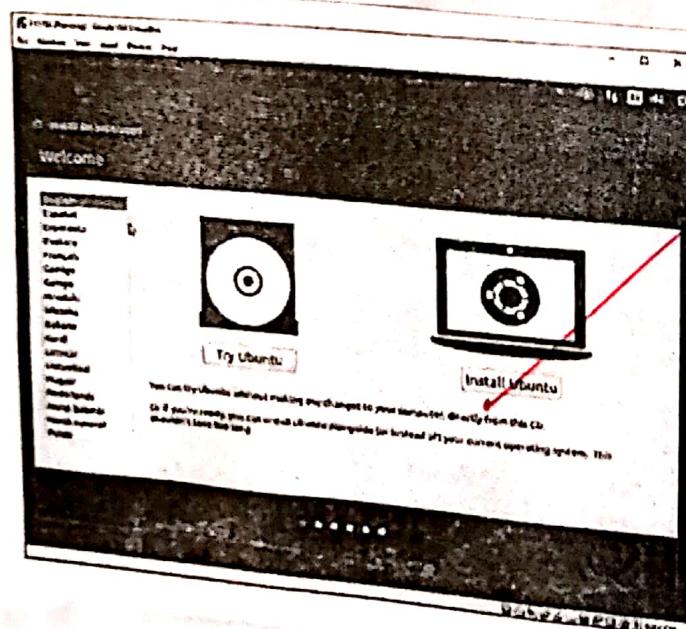
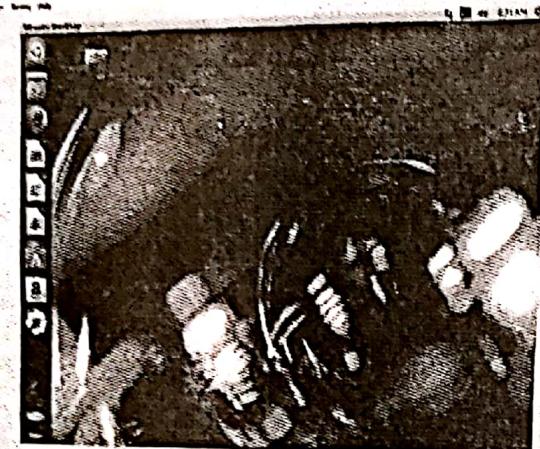
Step 7:- Here you likely need to type password again and it's done.

Step 8:- Type more of virtual disk and recommended size to be given is 2048 GB or 27 GB.

Therefore, now the virtual box is ready to use.



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b) Customize desktop environment by changing different default options like: changing default background, themes, screen savers.

Accessing Appearance settings:

To access Appearance settings in Ubuntu let's click on user menu at the top right corner on the top menu bar and select the appearance icon

Changing wallpaper picture

- i) On the left side of Background part, you can see your current wallpaper.
- ii) 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 feeling effect.
- iii) If you want to select wallpaper from your picture folder, click the drop-down menu above thumbnails and select the picture folder.

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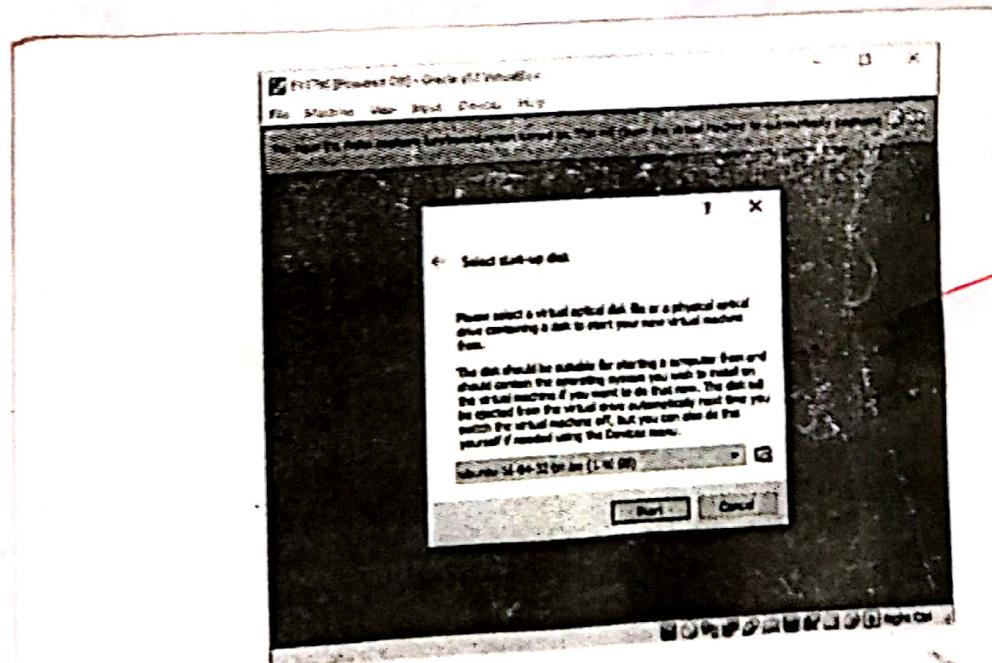
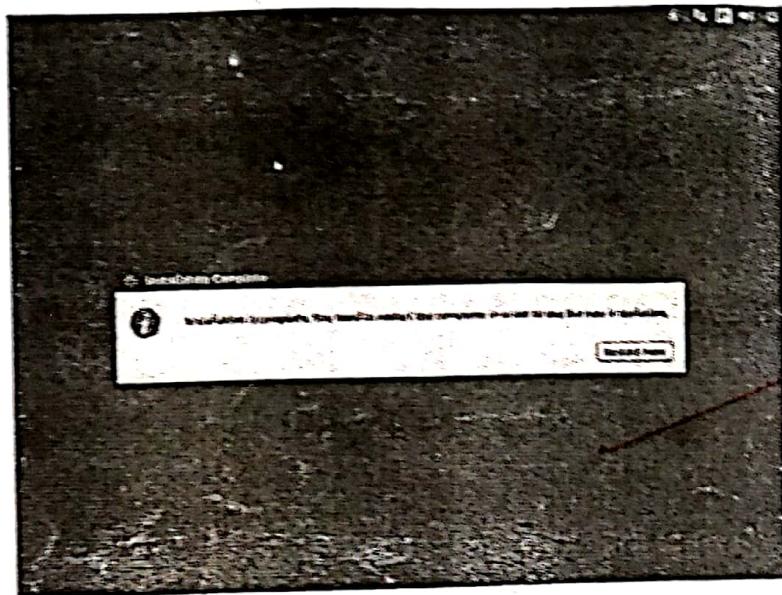
- 4) You will see all the pictures in your pictures folder as thumbnails, where you can select them as your wallpaper as well.

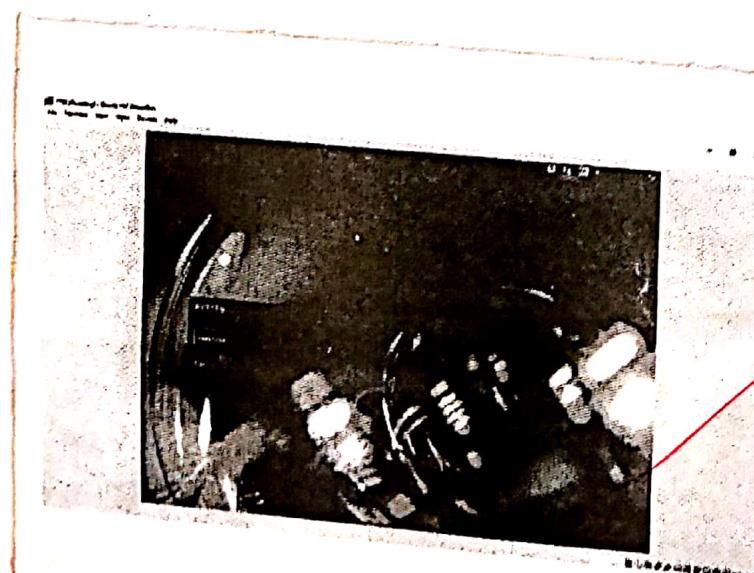
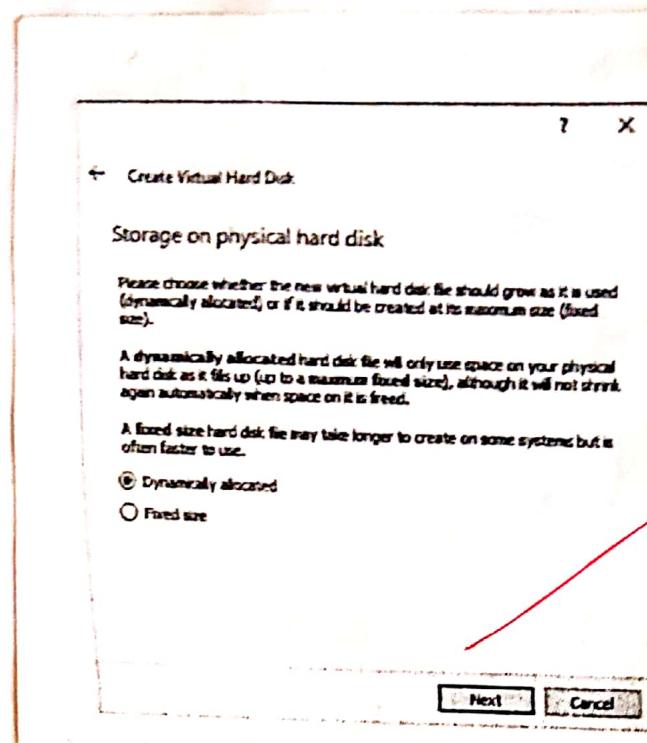
To add wallpaper that is in another folder just click the plus icon below the thumbnails and then in pop-up window Select the path to our custom folder and choose the picture inside of it.

Changing Ubuntu Themes

Ubuntu also has an option to change the desktop theme, which in one click will change the entire way your computer looks.

- 5) To do that click on the drop down menu below the wallpaper thumbnails and choose between Ambiance, Radiance or High contrast.
- 6) Ambiance is a light theme that looks a bit more mac-like, while Radiance is the darker brown theme used in Ubuntu by default.



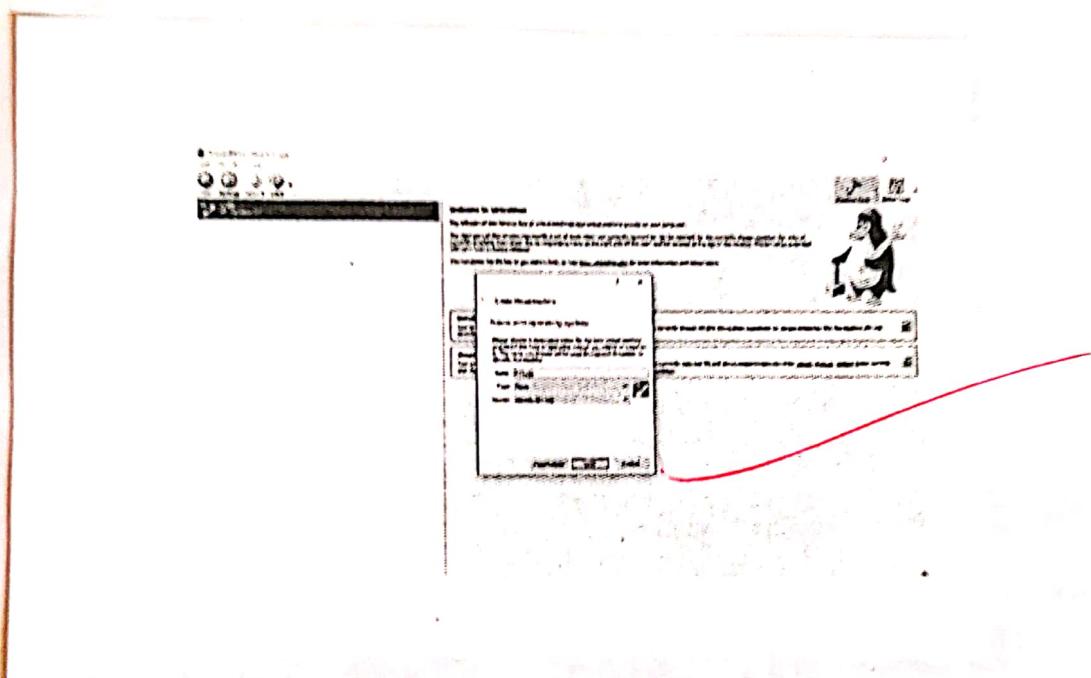


- i) Screen Resolution :- Ascertain the current screen resolution for your desktop.
- Changes the size or rotation of the screen
- You can change how big (or how obtained) things appears on the screen by changing the screen resolution
- You can change which way up things appear (for example, if you have a rotating display by changing the resolution)
- Click the icon on the very right of the menu bar and Select the System Settings
- Open Screen Display.
- If you have multiple display and they are not mirrored, you can have different setting on each display Select a display in the preview area
- Select your desired resolution and rotation
- ~~Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with the newer~~

Q8...

- 1) Time Settings change the time zone of your system to (or new York Time)
- 2) If you are currently in Indian Time
How does the display time change.
- 3) After nothing the time changes changes
the time zone back to your local time zone.
- 3) Just click on the clock on the top bar,
and choose time and Date Setting once
the time and date window open and
then choose manually

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Practical 2

Topic: Installing and Removing Software

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.

Now To install gcc compiler

In GCC 5.1.0, although there is no pre-installed target some directions have in particular gcc, so you can do

Type cd build/gcc then do make
make install. It will make install.

This does not remove everything that was installed; but it removes major executables like gce, g++ etc. contained in that directory.

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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 the usage section.
- b) To find info about any command info command is used the syntax of info command is info (command name):

We are giving 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) & (backspace = down) keys.

Another one summarized form of showing info is the man command:

EE

Example

h) Finding man pages from the command line. Bring up the man page for the 'tar' command. Scroll down to the example section.

→ To use the 'man' command Simplify type 'man (command name)' for eg. 'tar'. Now we are going to find the manual for 'tar' command.

Simplify type: man tar

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

→ 'tar' zip are some man pages which are available for document file comparison. Simply type man file zip
man tar

- it is often used to determine and at the same time to know what file of which library is being used.
- It is also used to find out new system calls, while there are many more possibilities of doing so.
- Let's see how to find them.
- 1) finding man pages by section from the cat lines bring up the man page for the printf function which manual page section are library function found.
 - 2) The number corresponding to what section of the manual page is from its user command while it is displayed in stuff. The man page for itself explains it and list the section of the other functions available to use for the library.

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

~~With the use of wildcards and regex we can search for what command line options are provided. We can also search for command aliases.~~

~~The use of wildcards or regular expressions to determine what command line options are provided. We can also search for command aliases.~~

~~You can tell what section a term falls in with `man -s` (equivalent to `grep`) approached command `man` with the matching matches too. So you can use the "term" to limit it.~~

command line operations:-

i) Install new package on your system

sudo apt-get install (package-name)

ii) Remove the package installed

sudo apt-get remove (package-name)

iii) find the password file in (using find command)

✓ # find | name password

· | wws | share | doe | lines-2-hap-283 | bin | password

· | user | bin | password

· | etc | spm.d | password

· | etc | password

iv) find the directory password file under root and one level down

find :/ - max depth 2 - name password

· | etc | password

v) find the password file under root and 2 level down

find / - max depth 3 - name password

```

·| user/bin/password
·| etc/passwd/password
·| etc/password

```

- 8) find the password file b/w sub-directories
 level 2 to 4
 # find - max depth 3 -max depth 5 -name
 pass
 ·| user/bin/password
 ·| etc/passwd/password
- 9) Create a symbolic link to the file you
 found in last step
 # ln -s file1 file2
- 10) Create an empty file example.txt at
 move it to /tmp directory using relative
 path names
 # touch example.txt
 # mv example.txt /tmp
- 11) Delete the file moved to /tmp. in previous
 step by absolute method
 # rm /tmp/example.txt

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a) find the location of ls, ps, bark commands

where is ls

Is. I sin | Is | ever | share | nor | nor | Is. I · g 2

where is PS

ps: I bin | bes|ver | share | mərə | Ibin | bəs|vər | share |
mər | mər | bəs·1·92

where is back

where~~s~~ back
back: | bin | back | etc | back | back | ur | share |
man | man | back | g2.

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Practical No 5

File Operations

explore mounted file systems on your computer
if -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  3326824  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 ways of exploring mounted file systems on Linux?

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,relative,size=494436k,nr_inodes=123689,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,relative,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type cgroup (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-agent, name=systemd,nsroot=/)
ostore on /sys/fs/pcbstore type ostore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpuacct,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/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot=/)
cgroup on /sys/fs/cgroup/cpuset,cpuswtct 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,mem,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/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages,nsroot=/)
systemd-journal on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,id=32,pgrp=1,timout=0,mirror=1)
rotors_maxproto=5,direct)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

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- 3) Copying text from files
-> cp command, mv command

```
jeba@jeba-VirtualBox:~$ ls
jeba@jeba-VirtualBox:~$ touch gg.txt
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
^C
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
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
jeba@jeba-VirtualBox:~/jeb$ touch ss.txt
```

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- 4

Archiving and backup the work directory with tar command.

tar, gzip and bzip2. commands

grip filename.txt

Brip2 filenare.txt

```
jeb@jeba-VirtualBox:~$ bzip2 ss.txt
jeb@jeba-VirtualBox:~$ ls
dd.txt
jeb@jeba-VirtualBox:~$ cat ss.txt.bz2
jeb@jeba-VirtualBox:~$ ls
jeb@jeba-VirtualBox:~$ gzip dd.txt
jeb@jeba-VirtualBox:~$ ls
jeb@jeba-VirtualBox:~$ cat dd.txt.gz
jeb@jeba-VirtualBox:~$ ls
jeb@jeba-VirtualBox:~$
```

- 3) Use diff command to create diff to two files
 → diff fileone1 fileone2

```
jeb@jeba-VirtualBox:~$ cat >hi.txt
hi
hi
hi
AC
jeb@jeba-VirtualBox:~$ cat >hii.txt
hello
Hello
hello
AC
jeb@jeba-VirtualBox:~$ diff -u hi.txt hii.txt >sam.patch
jeb@jeba-VirtualBox:~$ patch . sam.patch
AC
jeb@jeba-VirtualBox:~$ patch < sam.patch
patching file hi.txt
jeb@jeba-VirtualBox:~$ cat sam.patch
--- hi.txt    2020-01-08 22:14:55.463569834 +0530
+++ hii.txt   2020-01-08 22:15:16.259898739 +0530
@@ -1.3 +1.3 @@
-hi
+hi
+hi
+hello
+hello
+hello
jeb@jeba-VirtualBox:~$
```

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

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

- a) which account you are logged in? How do you find out?
- who command & whoami

```
jeba@jeba-VirtualBox: ~
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
jeba@jeba-VirtualBox: ~$ 780 id=tty1

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          LOGIN@     IDLE     JCPU      PCPU 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      :0          20:32      5:36   9.00s  0.33s /sbin/upstart --user
```

- 1) Display /etc/shadow file using cat command and understand the importance of shadow file. How it's different than password file.
- cat /etc/shadow

As with the password file, each field in the shadow file is also separated with ":". colons characters are as follows:
 Username up to 8 characters. Case-sensitive, usually all lowercase. A direct match to a username in the /etc/passwd file.

password 18 character encrypted. A blank entry (eg.) indicates a password is not required to log in (usually a bad idea) or a entry (eg.) indicates the account has been disabled.

The number of days (since January 1, 1970) the password was last changed.

The number of days to warn of an expiring password (+ for a full week)
A reserved field for possible future use.



```
root@kali:~# cat /etc/shadow
root:$1$KuXZL$CzJGQHdRfjBqWuSd$u2o/cAtPhy
```

Each field in a password entry is separated by a colon character and ends at a delimiter or a newline. The "password" field contains the password in the "clear" (unencrypted) state. Passwords are stored in the "salt" field. Passwords are stored in the "salt" field. This is assigned by the "admin" field owing to this field. Thus the

list name of user. I'm not sure what the minimum length for this field is. But try to keep it reasonable (under 30 characters)

```
root:0:0:root:/root:/bin/bash  
daemon:1:1:daemon:/usr/sbin/nologin  
bin:2:1:bin:/bin:/usr/sbin/nologin  
sys:3:1:sys:/dev:/usr/sbin/nologin  
sync:4:1:sync:/bin:/bin/sync  
games:5:100:games:/usr/games:/usr/sbin/nologin  
man:6:1:man:/var/cache/man:/usr/sbin/nologin  
lp:7:1:lp:/var/spool/lpd:/usr/sbin/nologin  
mailx:8:mail:/var/spool/mail:/usr/sbin/nologin  
news:9:news:/var/spool/news:/usr/sbin/nologin  
uucp:10:uucp:/var/spool/uucp:/usr/sbin/nologin  
proxy:11:13:proxy:/bin:/usr/sbin/nologin  
www-data:13:33:www:/var/www:/usr/sbin/nologin  
backup:14:33:backup:/var/backups:/usr/sbin/nologin  
list:15:33:MailingList Manager:/var/list:/usr/sbin/nologin
```

c) list your current working directory.

cd



d) explore different ways of getting command history

→ history

! line number

A screenshot of a terminal window titled "VirtualBox" showing command history. The terminal is black with white text, and the history shows various commands like "ls", "cd", "whoami", "cat", "sudo", "clear", "pwd", "history", and "exit".

```
jeb@jeb-VirtualBox: ~$ history  
1 whoami  
2 ls  
3 cd  
4 cat  
5 sudo  
6 clear  
7 pwd  
8 history  
9 exit  
10 cat /etc/passwd  
11 sudo echo $SHELL  
12 clear  
13 sudo cat /etc/passwd  
14 clear  
15 exit  
jeb@jeb-VirtualBox: ~$
```

c) ~~alias alias do most commonly used commands~~
~~Alias command instructs the shell to replace~~
~~one string with another string while executing~~
~~the command~~

→ alias label = "command"



A screenshot of a terminal window. The text inside the window is:

```
$ alias m='mkdir' new  
$ m  
$ ls  
$ ls
```

The terminal window has a dark background and light-colored text. A red arrow points from the word "alias" in the handwritten note to the "alias" command in the terminal window.

(28%)

Linux editor vi

- i) Create, modify, Search and navigate a file in editor.
- ii) Create, modify, Search and navigate a file in editor.

Creating a file

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

ii) Redefining the file:

To redefining a file on the vi editor type 'o'

Search in a file:

To find a word (forward search) press 'f' followed by the word to search

iii) Navigate:

No movements in four directions

Action
key 'k' up
key 'j' down
key 'l' left
key 'h' right

h j k l

Word Navigation

Key	Action
←	Moves back to the beginning of the word
→	Moves forward to the end of the word
Shift + ←	Moves forward to the beginning of the word
Shift + →	Moves to first character of a line
Shift + End	Move to the end of line

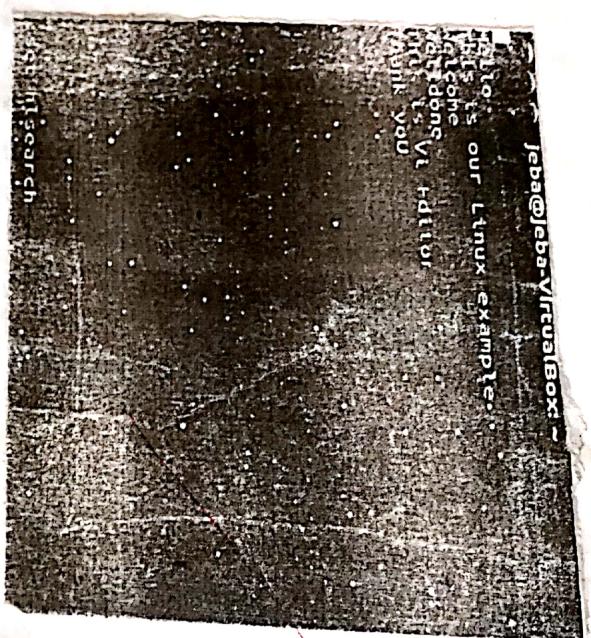
Scrolling

Key	Action
Ctrl + ↑	Scrolls forward
Ctrl + ↓	Scrolls backward
Ctrl + ⌘ + ↑	Scrolls backward
Ctrl + ⌘ + ↓	Scrolls half page backward

Symbol:- if word to be replaced ||S|| new word |g|

jeba@jeba-VirtualBox ~

Follows our Linux example:
Install the
Welcome
file is Vi Editor
Thank you



Issue Authority

jeba@jeba-wiswawbox.n

jeba@jeba - Virtual Box : \$ sudo wpa_supplicant
[brk] password for jeba:

ba @ yeha - Virtual Box : \$ sudo passwd user
Enter new UNIX password:

To give some users such privileges edit etc/

Terms were 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/bin:
Defaults !/sbin:/bin"

# Host alias specification
# User alias specification
# Cmnd alias specification
# User privilege specification
# User ALL=(ALL:ALL) ALL

user1 ALL=(ALL:ALL) ALL
```

~~Identify operations that require sudo privileges~~

su user1
password:
user1@jebas-virtualbox:~/more/jebas/mkdir/folder1
user1@jebas-virtualbox:~/more/jebas/mkdir/folder1: Permission denied
mkdr1: cannot create directory 'folder1': Permission denied
user1@jebas-virtualbox:~/more/jebas\$ sudo mkdr1
user1@jebas-virtualbox:~/more/jebas\$ su user1
user1@jebas-virtualbox:~/more/jebas\$ password:
user1@jebas-virtualbox:~/more/jebas\$ This incident will be reported
user1@jebas-virtualbox:~/more/jebas\$

c)

modify combination date for new user using
password ageing

```
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 : 9
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.
Last password change -l user1
Password change
Password expires
Password inactive
Account expires
Maximum number of days between password change : 100
Number of days of warning before password expires : 5
jeba@jeba-VirtualBox: ~$
```

Expiration Date

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- i. minimum number of days before password change.
- ii. accounts inactive
- iii. Number of days of warning before a password change is required.

Delete newly added user

~~jeba @ jeba - Virtual Box :-~~

~~jeba @ jeba - Virtual Box : \$ sudo userdel user1~~

~~(user1) password for jeba~~

~~jeba @ jeba - Virtual Box : \$ rm user1~~

~~jeba @ jeba - Virtual Box : \$ rm user1~~

~~Not passed entry for user 'user1'~~

~~jeba @ jeba - Virtual Box : \$~~

~~✓
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Network management

act 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)
```

Get hostname of your machine

g) Use of host command

```
: $ host -v  
host.s.10.3-P4-Ubuntu : $ █
```

Use ping to check the network connectivity to remote machines.

```
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=57.1 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=88.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=81.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=80.9 ms
^C
11+ stopped
```

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Q) 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. IN A
: ANSWER SECTION:
www.google.com. 91 IN A 172.217.106.100
: 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: $
```

E) Troubleshooting network using Traceroute, route

Troubleshooting network using traceroute, route command

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: ~ traceroute www.google.com
traceroute to www.google.com (172.217.106.100), 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: ~ traceroute: $
```

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							

4) Use of arp command

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: ~ $ arp
Address      HWtype  HWaddress          Flags Mask Iface
10.0.2.2     ether   00:0c:29:12:35:02  flags Mask enp0s
```

i) Use of host command

jeba@jeba-VirtualBox: \$ host -v

host 9.10.3.34 - Ubuntu

jeba@jeba-VirtualBox:

ii) Use of netstat command and Nmap command

jeba@jeba-VirtualBox: \$ netstat			
Active Internet connections (w/o servers)		Foreign Address	
Proto	Recv-Q	Send-Q	Local Address
Active UNIX domain sockets (w/o servers)			Type State
Proto RefCnt Flags			DGRAM
unix 2 []			DGRAM
d/notify	[]		DGRAM
unix 2 []			DGRAM
syslog	[]		DGRAM
unix 16 dev-log	[]		DGRAM
unix 7 []			DGRAM
socket	[]		CONNECTED
unix 3 []			STREAM
unix 3 []			CONNECTED
unix 3 []			STREAM
unix 3 []			CONNECTED
unix 3 []			STREAM
unix 3 []			CONNECTED
stdout 3 []			STREAM
unix 3 []			CONNECTED
stdout 3 []			STREAM
unix 3 []			CONNECTED
unix 3 []			CONNECTED

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Practical - 10

Intro Shell Scripting

Basics of Shell Scripting

- a) To get a shell , you need to start a terminal
- b) To see what shell you have run: echo \$SHELL
- c) In Linux , the dollar sign (\$) stands for shell variable
- d) The echo command just returns whatever you type in.
- e) #! /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:~$ echo $SHELL
/bin/bash
tcsc@tcsc-VirtualBox:~$
```

ii) filename.sh

```
#!/bin/bash
echo "THIS IS LINUX!"
```

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

```
vi /bin/bash
```

```
echo "THIS IS LINUX" > linux.sh
```

```
"linux.sh" [New File]
```

• chmod 777 filename.sh [for making executable]
• ./filename.sh [for running the script]

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

```
vi linux.sh
```

```
chmod 777 linux.sh
```

```
./linux.sh
```

```
THIS IS LINUX!
```

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

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

- a) Open terminal
- b) Navigate to the place where you want to create.
- c) Touch filename.sh
vi filename.sh [You can use your favourite editor to edit the script]
- d) chmod 777 filename.sh (for making the script executable)
or ./filename.sh (for running the script)

program to display your name

#!/bin/bash

echo "Enter your name"

read name

echo "My name is: \$name"

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

```

Output

* Program to find the sum of two variables

w file name .sh

#!/bin/bash

a=100

b=25

sum=\$((a+b))

echo "Sum is: \$sum"

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

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

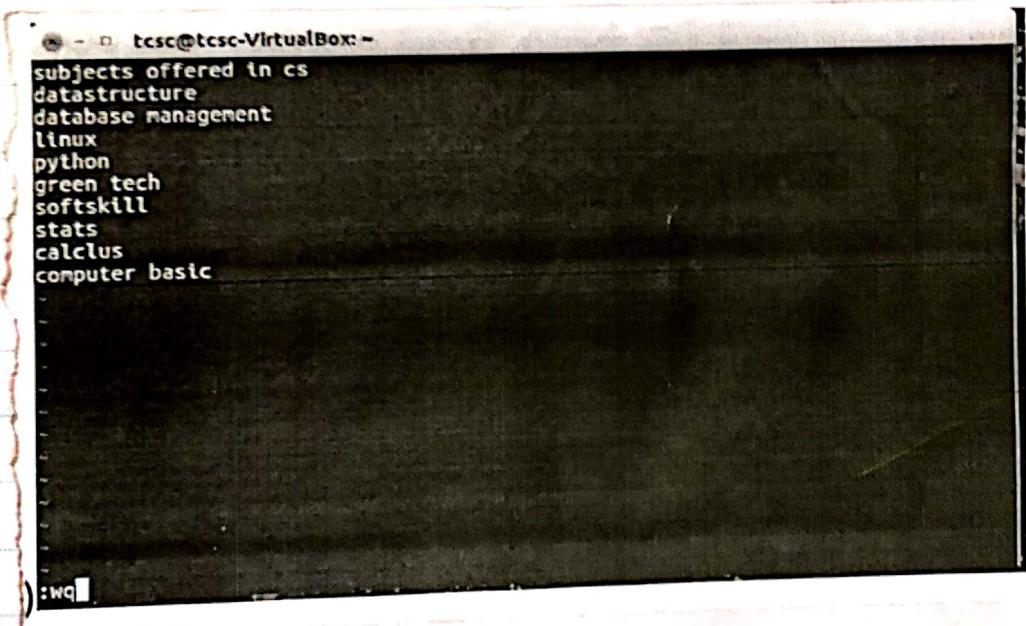
Program to find the sum of two numbers (values passed at execution)

```
tcsc@tcsc-VirtualBox:~$ vi lin.sh  
#!/bin/bash  
sum=$((s1+s2))  
echo "sum is:$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:~$
```

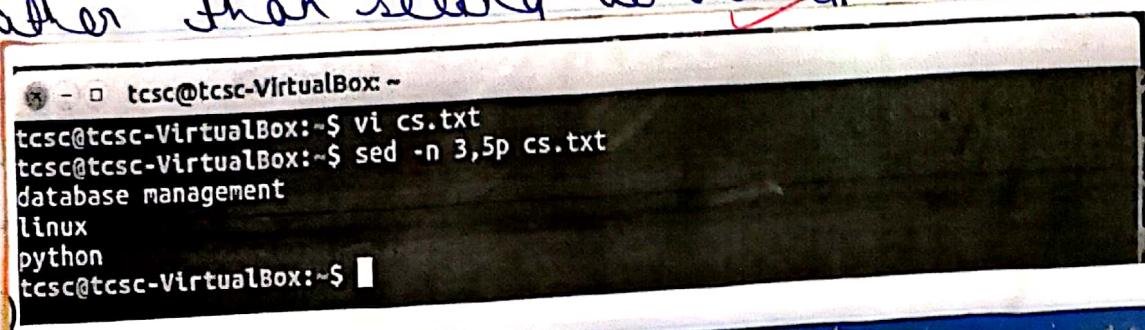
~~sed~~ command or Stream Editor is very powerful utility offered by Linux system. It is mainly used for text substitution, find & replace but it can perform other text manipulation like insertion, deletion, search etc. With sed, we can edit complete files without actually having to open it.

Consider the following text file.



```
tcsc@tcsc-VirtualBox:~$  
subjects offered in cs  
datastructure  
database management  
linux  
python  
green tech  
softskill  
stats  
calculus  
computer basic  
tcsc@tcsc-VirtualBox:~$
```

1) Displaying partial text of a file
With sed, we can view only part of a file rather than seeing whole file.



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

- 2) Display all except some lines
To display all content of a file except for some portion, we 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 file
To delete a file, use file number followed by 'j'

```
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: ~
```

- 4) Search and replacing 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
calculus
computer basic
```

3) Replace a string on a particular line

To replace a string a particular line we 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
calculus
computer basic
```

4) Add a line after/before the matched string.

To add a new line some content after every pattern match , we 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
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

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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  
calculus  
computer basic  
tcsc@tcsc-VirtualBox:~$
```

?) To change a whole line with matched pattern

To change a whole line to a new line when search pattern matches , use option 'c'

```
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  
calculus  
computer basic
```

?) Appending lines

To add some content before every line with sed we * and & as follows

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

BB
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