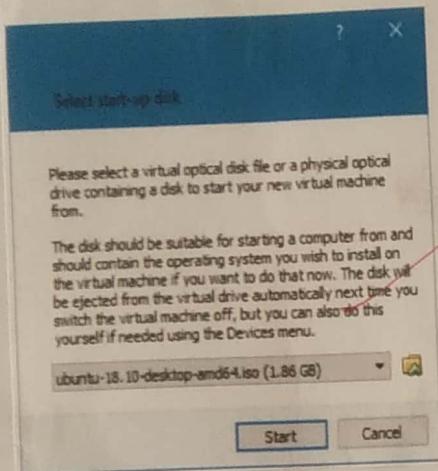
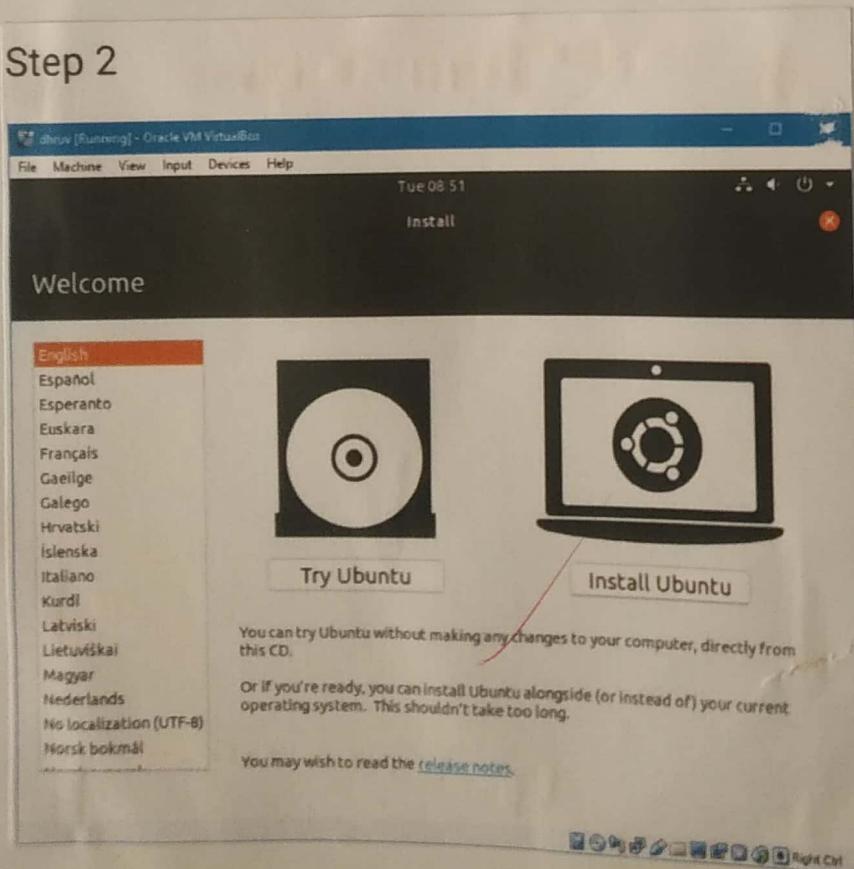


aso

Step1



Step 2



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 union.

All the editions can be runned on the computer alone or a virtual box machine.

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

* Steps for installing Ubuntu in a virtual machine.

Step 1: Select a virtual optical file or 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'.

Step 3: In 'Updates and add software' click on the normal installation.

Step 4: While configuring installation we need to click on 'Erase Disk and install Ubuntu'.

FSO

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

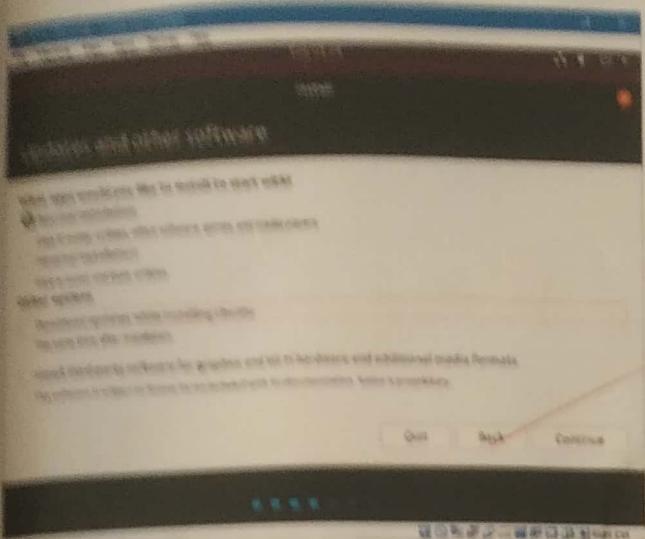
Step 6: In this type you need to choose username and password for the login in Ubuntu and click on continue.

Step 7: Here, you simply need to type password again and is done.

Step 8: Type name on virtual disk and recommended size to be given is 2048 MB or 2GB.

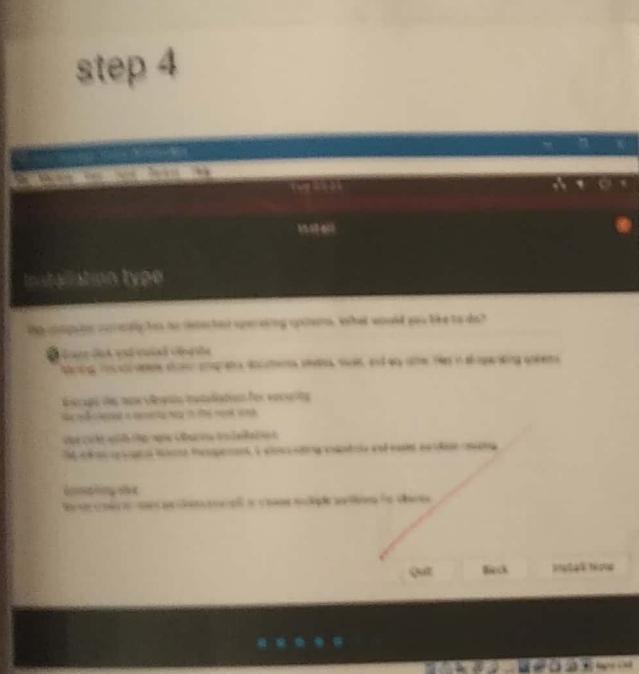
Therefore, now the VirtualBox is ready to use.

21003

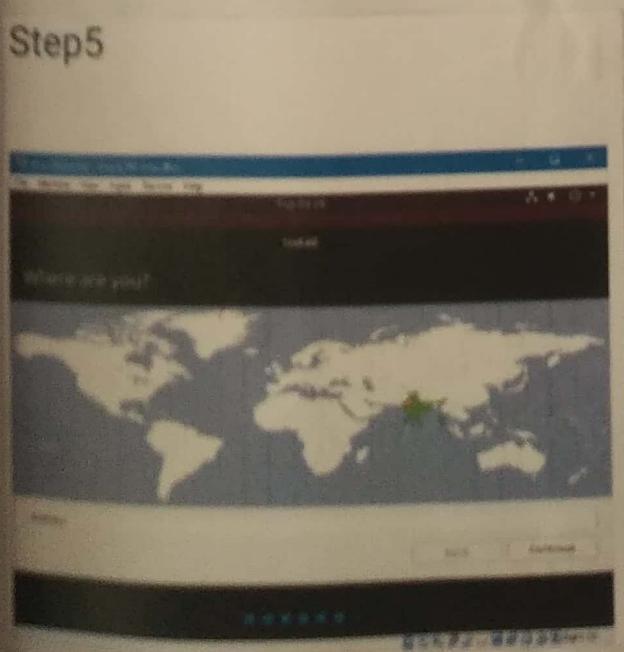


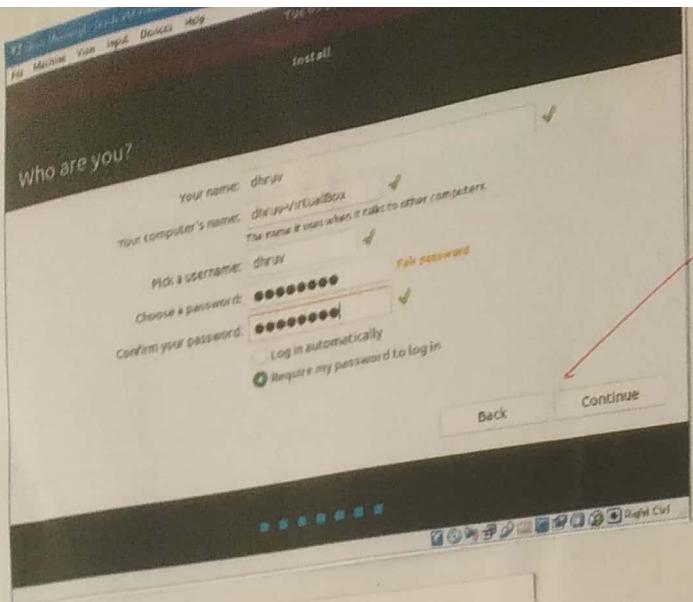
028

step 4

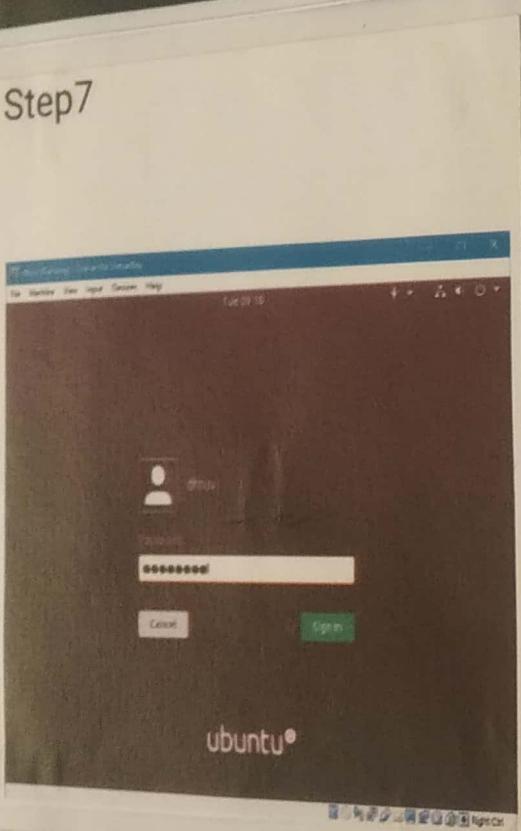


Step5

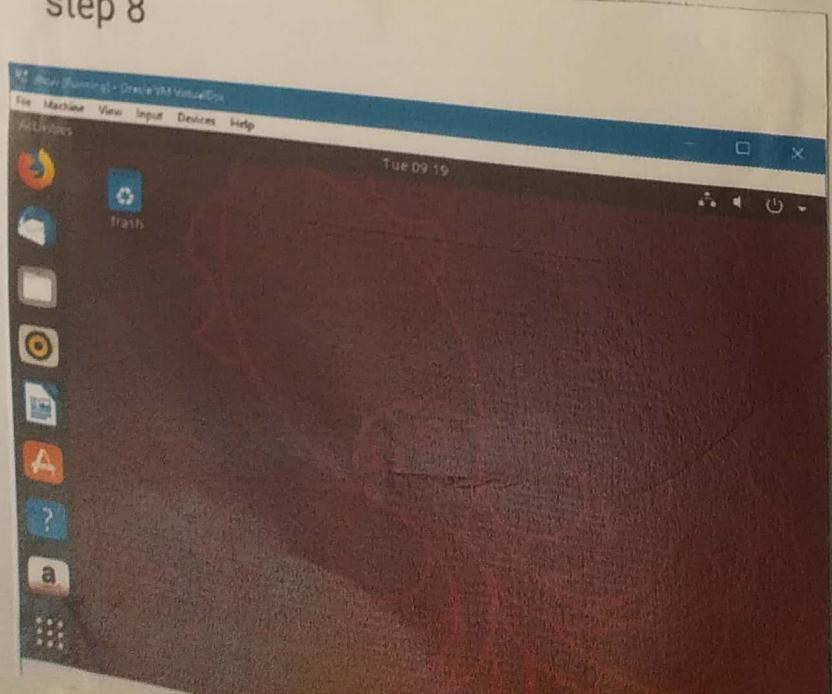




Step 7



step 8



- b) Customise desktop environment by changing different default options like changing default background, themes, etc.

Accessing Appearance settings:

- 1) To access appearance settings in Ubuntu, let's click on user menu at the top right corner on the top menu bar and select system settings.
- 2) A window will pop-up with All settings, divided in personal, hardware and system options icons. Select the appearance icon.

Changing Wallpaper Picture:

- 1) On the left side of Background part, you can see your current wallpaper.
- 2) 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.
- 3) If you want to select wallpaper from your picture folder, click the drop-down menu above thumbnails and select the pictures folder.

ESO

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

Changing Ubuntu Theme:

- 1) Ubuntu also has an option to change the Desktop Theme, which in one click will change the entire way your computer looks.
- 2) To do that, click on drop-down menu below the wallpaper, and choose between Ambiance, Radiance or High Contrast.
- 3) Ambiance is a light theme that looks a bit more Mac-like, while Radiance is darker brown than used in Ubuntu by default.
- c) Screen Resolution: As certain the current screen resolution from your desktop.

Changes the size or resolution of the screen:

- 1) You can change how big things appear on the screen by changing the screen resolution.
- 2) Click the icon on the very right of the menu bar and select System settings.

- a) Open screen display.
- b) 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.
- c) Select your desired resolution.
- d) Click Apply. The new setting will be applied for 30 seconds before reverting back.
- e) Time settings change the time zone of your system.
 - i) If you are currently in Indian Time. How does the displayed time change?
 - ii) After noting the time change, change the time zone back to your local time zone.
 - iii) Just click on the clock on the top bar, and choose time and date settings, once time and date window opens. Choose manually, so you can change the time and date manually, otherwise choose your timezone from the map, and choose automatic.

W/O -
= 10 -

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 dont 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.

032

030

How to ^{un}install GCC compiler:

In GCC 5.1.0, although there is no top level ~~un~~install 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 executables like gcc, g++, cpp..... contained in that directory.

8/11/01

PRACTICAL No 03

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.

Ans :- To find info about any command 'info' command is used. The Syntax of info command "info command is" info(command name).

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

Open the terminal (ctrl+Alt+T) and type : info group

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

You can also scroll through pages using (space=up & (backspace = down) keys.

Other summarized form of showing info is the 'man' command. The command is same as 'info', but requires data.

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

~~Self~~
To use the 'man' command simply type
'man (command name)'.

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

Simply type : 'man ls'

c] finding man pages by topic : what man pages are available that document file compression.

~~simply~~ type : man zip
man tar

D] finding man pages by section from the cmd line
 bring up the man page for the printf. function.
 Which manual page section are library function found?

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 std

There are certain terms that have different (eg: 'printf' as a command appears in section 1) pages in different sections. 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'. It will do substring matches too so you ~~need~~ need to use "term" to limit it.

c] Command-line Help List the available options for the mkdir command. How can you do this?

\$ mkdir -m a=rwx directoryname.

~~8/10~~

PRACTICAL NO 4

* Command Line Operation :

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) find the passwd file in using find command.

• / find / -name passwd

• /usr/share/doc/nss_ldap-253/pam.d/passwd

• /usr/bin/passwd

• /etc/pam.d/passwd

• /etc/passwd -

find the directory passwd file under root and one level down.

#find / -max_depth 2 -name passwd
• /etc/passwd

find the passwd file under root

#find / -max_depth 3 -name passwd

• /usr/bin/passwd

• /etc/pam.d/passwd

find the password file b/w sub-directories level 2 & 4.

```
# find -maxdepth 3 -maxdepth 5 -name password
./user/bin/password
./etc/pam.d/password
```

- d] Create a symbolic link to the file you found in last step.

```
# ln -s file1 file2
```

- e] Create an empty file example.txt & 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 the 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/mops/bin/ps /usr/share/man/man1/ps.1.gz

where is bash

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

✓
89
1101

PRACTICAL - 05

TOPIC : FILE OPERATIONS

- 1] Explore mounted file Systems on your computer.
 → 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:~$
```

- 2] 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,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,nodev,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/binfmt_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 text from files
→ cp command, mv command

```
jeba@jeba-VirtualBox:~ ls
Desktop    Downloads      Music
Documents  examples.desktop 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
^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
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 directly using tar, gzip and bzip2 commands.

→ gzip filename.txt Bzip2 filename.txt.

- 5] Use diff command to create diff of two files
 → diff filename1 filename2

```
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz aa.txt.gz
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 use patch a file. And analyse 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$ █
```

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PRACTICAL - 6

TOPIC: User Environment

- a) Which account you are logged in? How do you find out?

```
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          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
```

- b) Display /etc/shadow file using cat command and understand the importance of shadow file. How its diff. than passwd.

→ cat /etc/shadow

As with the passwd file, each field is also separated with ":" characters, and are as follows:

- Username, up to 8 characters. Case-sensitive, usually lowercase
- Password, 13 character encrypted.
- The number of days since password was changed.

[40]

- the number of days after which password should be changed
- the number of days after password expires that account is disabled.
- A reserve 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:::
```

Each field in a passwd entry is separated with ":".

- Username, upto 8 characters, usually all lowercase.
- An 'x' in the password field. Passwords are stored in "/etc/shadow" file.
- Numeric user id, Numeric group id.
- Full name of user.
- User's home directory
- User's "Shell account".

```
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
→ pwd

```
jebao{jeba=VirtualBox:~$ pwd
/home/jeba=VirtualBox
```

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

→ history

Line number

```
jebao{jeba=VirtualBox:~$ history
1 whoami
2 whoami
3 whoami
4 clear
5 w
6 w -t
7 w -b
8 w -f
9 cat /etc/shadow
10 sudo cat /etc/shadow
11 clear
12 sudo cat /etc/passwd
13 pwd
14 clear
15 history
jebao{jeba=VirtualBox:~$ ls
whoami   .xvi  2020-01-15 20:30
jebao{jeba=VirtualBox:~$
```

789 1d=atty3

e) Create alias to most commonly used commands.

→ Alias command instructs shell to replace one string with another
alias label="command"

```
jebao{jeba=VirtualBox:~$ alias m="mkdir -p"
jebao{jeba=VirtualBox:~$ m
jebao{jeba=VirtualBox:~$ ls
Desktop  Downloads  Home  Pictures  Templates
Documents examples.desktop  new  Public  Videos
jebao{jeba=VirtualBox:~$
```

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Practical - 07

TOPIC: LINUX EDITORS : vi

a] Create, modify, search and navigate a file in editor:

i) Creating a file.

To create 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 a file.

T- ~~to~~ find a word in a file press / followed by word to search.

iv) Navigate:

Movement in four directions

Key	Action
k	Cursor Up
j	Cursor Down
h	Cursor Left
l	Cursor Right

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Word Navigation

Key	Action
b	Moves to beginning of word.
e	Moves forward to end of word.
w	Moves forward to beginning of word.
0	Move to first character of line.
\$	Move to 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.

i) Replace

Syntax : /g/word to be replaced /s// new word /gc

The image shows a Linux terminal window with three distinct sections, each containing a different stage of a command-line session:

- Top Section:** Shows the command `:g/my/s//our/gc` being entered into the terminal.
- Middle Section:** Shows the command being run, displaying the original file content:

```
Hello
This is my Linux example
Welcome
Welldone
This is Vi Editor
Thank you
```
- Bottom Section:** Shows the result after the command has been executed, displaying the modified file content:

```
Hello
This is our Linux example
Welcome
Welldone
This is Vi Editor
Thank you
```

Red arrows on the right side of the terminal window indicate the flow from the top section down to the bottom section, corresponding to the execution of the command.

ii) Highlight

Use set hlsearch

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

iii) 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
7 Thank you
:~
```

Practical : 8

Topic : LINUX SECURITY

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

```
jeba@jeba-VirtualBox:~$ sudo useradd user1
[jsudo] 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.
```

e3

d] Modify expiration 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 : 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 before password is valid
- I : Account inactive
- W : Number of days of warning before a password change is required.

c] Delete newly added user.

046

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

SR
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Practical : 9

Topic: Network Management.

- a] Get IP address of your machine using ifconfig

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

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- 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.          91      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:~$
```

e) Troubleshooting network using traceroute, route command.

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```
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:~$
```

f) 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            enp0s3  
3
```

g) Use of host command

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

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h) Use of netstat command and Nmap Command

jeba@jeba-VirtualBox:~\$ netstat						
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	Type	State	
unix	2	[]	[]	DGRAM	42149	/run/user/1000/system
d/notify						
unix	2	[]	[]	DGRAM	9694	/run/systemd/journal/
syslog						
unix	16	[]	[]	DGRAM	9695	/run/systemd/journal/
dev-log						
unix	7	[]	[]	DGRAM	9704	/run/systemd/journal/
socket						
unix	3	[]	[]	DGRAM	9684	/run/systemd/notify
unix	3	[]	[]	STREAM	CONNECTED	@/tmp/dbus-CymTeI7AQG
unix	3	[]	[]	STREAM	CONNECTED	44042
unix	3	[]	[]	STREAM	CONNECTED	43331
unix	3	[]	[]	STREAM	CONNECTED	42988
unix	3	[]	[]	STREAM	CONNECTED	42690
unix	3	[]	[]	STREAM	CONNECTED	13242
stdout						
unix	3	[]	[]	STREAM	CONNECTED	43113
stdout						
unix	3	[]	[]	STREAM	CONNECTED	43013
unix	3	[]	[]	STREAM	CONNECTED	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					

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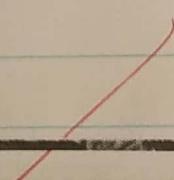
Practical: 10

AIM: Shell Scripting

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.
- #!/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"~~

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```
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.
- Open terminal
 - Navigate to the place where you want to create script using cd command
 - Touch filename.sh

i) vi filename.sh
ii) chmod 777 filename.sh
iii) sh filename.sh or ./filename.sh

050

Program to display → your name.

#!/bin/bash

echo "Enter your name:"

read name

echo "My name is: \$name"

```
tcs@tcs-VirtualBox: ~  
#!/bin/bash  
'echo "Enter your name:"  
read name  
'echo "My name is: Sname"  
'
```

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

080

Program to find sum of two variables

vi filename.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

```
tcsc@tcsc-VirtualBox:~$ vi lin.sh
#!/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 very powerful utility offered by Linux Systems. It is mainly used for text substitution, find & 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
green tech
softskill
stats
calculus
computer basic

- 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

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

3) Deleting a line

T - delete a line, use line number followed by 'd'. 052

```
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
```

5) Replace a string → a Particular String.

To replace a string on a particular line, use 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
```

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6) Add a line after/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 `g` matched pattern.
 a 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
calclus
computer basic
```

Appending lines

To add some content, before every line with `sed`, use `*` and do 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
```

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