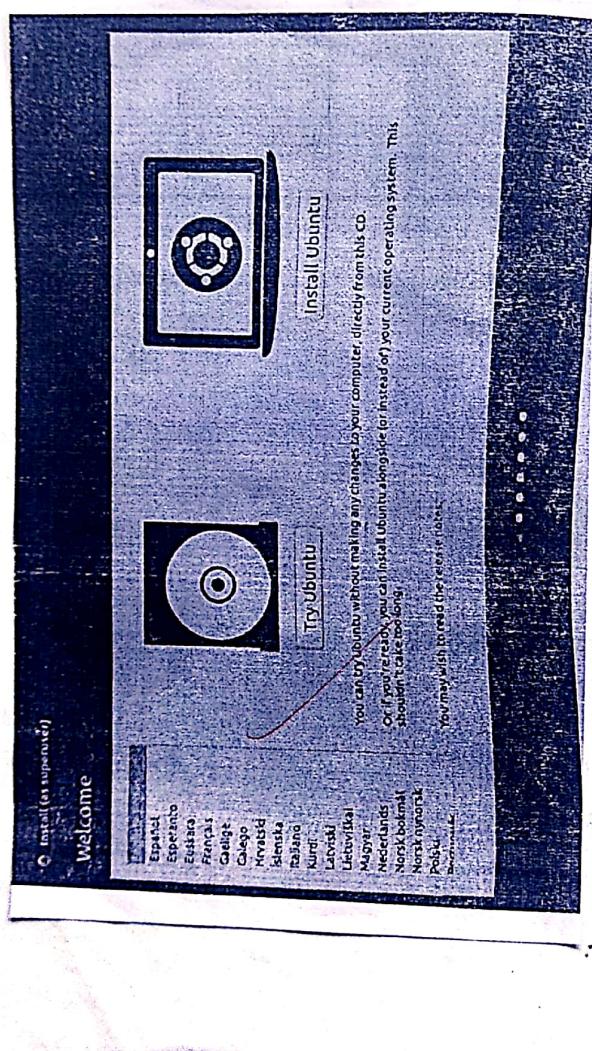


080



SEM - II

Linux

021

Practical - 1

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, screen savers.
3. Screen Resolution.
4. Time settings.

Q4 Step to install operating system in Virtual box.

- The first step is to choose the installing language.
- Choose a language.
- A screen appears showing how prepared you are for installing Ubuntu. If you are using a laptop make sure your laptop is either plugged in or has enough battery life we recommended you connect.
- There are two checkboxes at the bottom of the screen choose whether to install updates as you go.
- Click continue.
- The installation type screen ask you how you wish to partition the hard drive.

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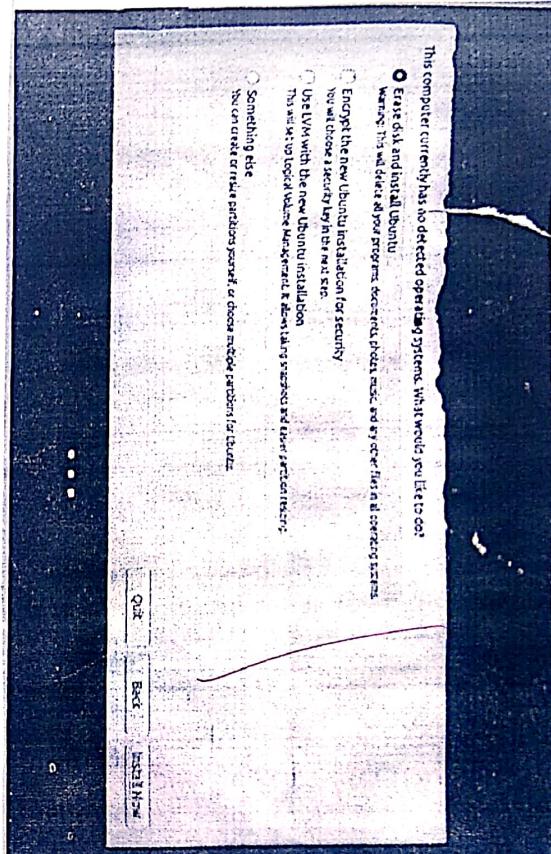
- Select erase disk and install Ubuntu
- Click install now
- The installation begins and the files are copied to the virtual hard drive.
- Click the map to choose your location.
- Choose the language for your keyboard.
- Create a user
 - Enter a username
 - Add a password and request the password.
- Choose whether you want the login automatically or require a login.
- The final stage is to wait for files to finish copying and installation is complete.

Q* Customize desktop environment by changing different default options like change default background, themes & screensaver.

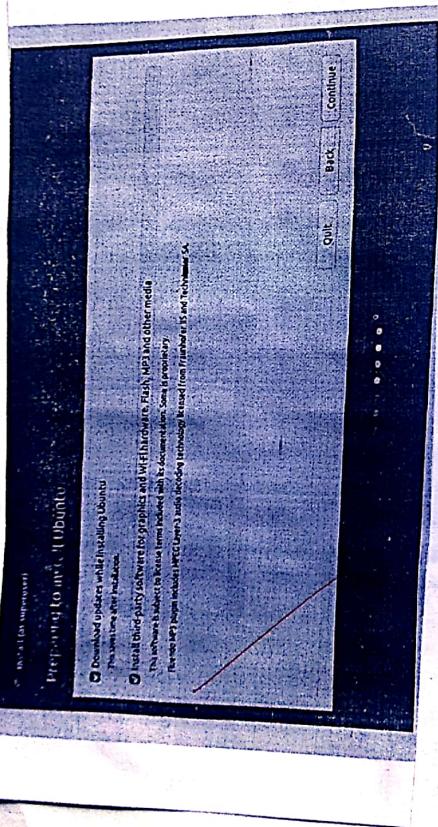
Accessing Appearance settings

- To access Appearance settings in Ubuntu, click on User menu at the top right corner on the top menu bar and select system settings.

022



SSO



023

- A window will pop-up with 3V settings divided into Personal, Hardware and System others tabs. Let's first select the appearance tab.

* Changing wallpaper picture

- 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 Klementi wallapers. 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 pictures folder as thumbnails, where you can select them as your wallpaper.

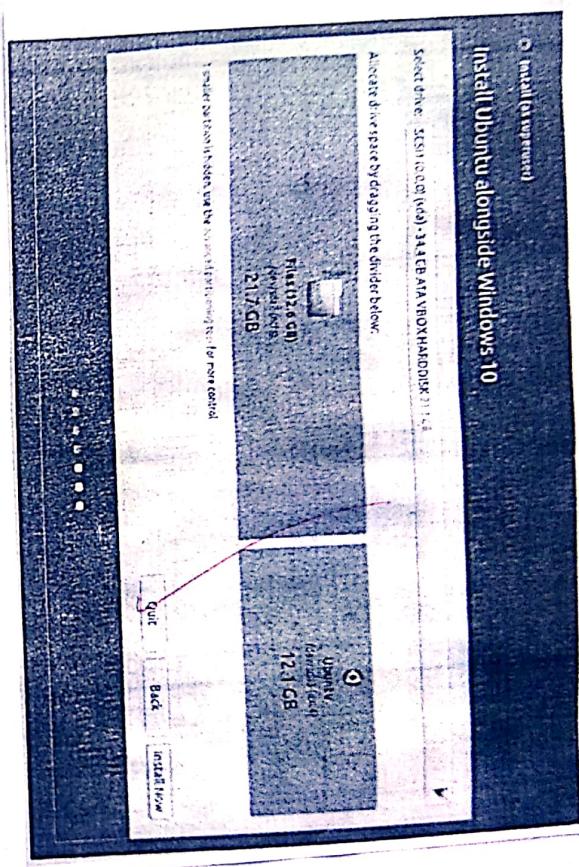
* Changing UBUNTU themes:

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

* Screen resolution is
decide the current screen
resolution for your desktop.

* Change the size or rotation of the screen.

- You can change how big things appear 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 rotation.
- 1. Click the menu on the very right of the screen 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.



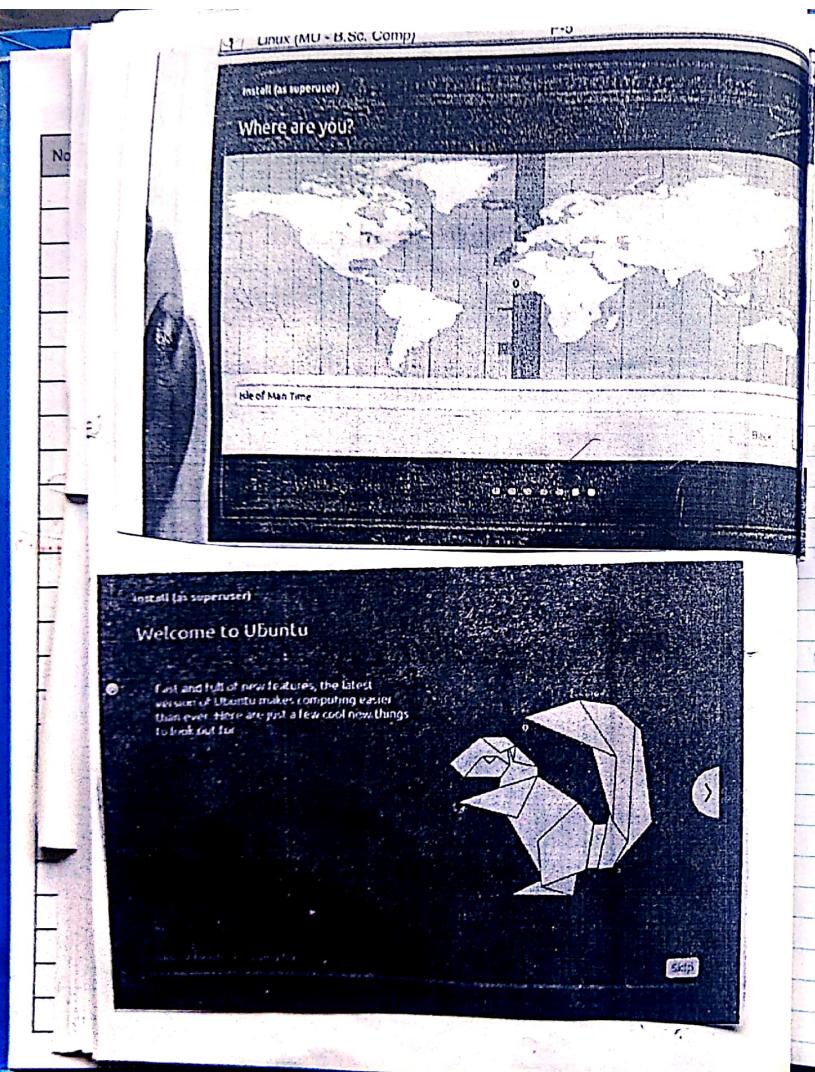
~~Ques.~~ Time Settings :-

• If you are currently in Indian time. How does the displayed time change?

• After noting the time change, bring the system time zone back to your local time zone.

• Just click on the clock on the top bar, and choose the time and date settings, once the time & date normally; otherwise choose your time zone from the map, and save after that.

QJ
01/03



PRACTICAL - 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 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'. It will install all the libraries required for C and C++ programs language.

NOW TO UNINSTALL GCC COMPILER

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`

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

89
out

FSO

PRACTICAL - 3

Ans :- Utilization of grep, man commands.

Documentation :-

a) Getting info documentation from the command line : bring up the info page for the grep command. Bring up the usage section.

Ans :- To get 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) & type: info grep.

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

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

Another more summarized form of the info is the 'man' command. The command is same as 'info', but required an additional step.

b) Finding man pages for the command : 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)' 028

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 for document file compression.

Ans:- 'tar', 'zip' are some man pages which are available for document file compression simply type : man tar zip man tar.

The screenshot shows a terminal window with the title 'The tar Manual'. The content of the window is the man page for the tar command, which is described as an archiving utility. It includes sections for SYNOPSIS, DESCRIPTION, RETURN VALUE, and EXAMPLES. The text is in a monospaced font, with some parts in bold or italicized for emphasis.

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ZIP(1)

NAME

`zip - package and compress (archive) files`

SYNOPSIS

`zip [-abccdefghijklmnoprstuvwxyz] [-longoption ...] [-b path]
[-n suffixes] [-t date] [-tt date] [-Llabel [file ...]] [-x list]`

`zipcloak (see separate man page)`

`zipnote (see separate man page)`

`zipsplit (see separate man page)`

DESCRIPTION

zip is a compression and file packaging utility for Unix, VMS, MS-DOS, OS/2, Windows 9x/ME/XP, Macintosh, Amiga, and Acorn RISC OS. It is analogous to a combination of the Unix commands tar(1) and compress(1) and is compatible with PKZIP (Phil Katz's ZIP for MS-DOS systems).

A companion program (unzip(1)) unpacks zip archives. The zip and unzip(1) programs can work with archives produced by PKZIP (supporting most PKZIP features up to PKZIP 2.04) and PKZIP and PKUNZIP can work with archives produced by zip (with some exceptions, notably zip64 archives). But recent changes in the zip file standard may facilitate better compatibility. zip version 3.0 is compatible with PKZIP 2.04 and also supports the Zip64 extensions of PKZIP 4.5 which allow archives as well as individual entries to exceed 4GB. zip 4.0 also now supports bzip2 compression if the bzip2 library is included when zip is compiled. Note that PKUNZIP 1.19 cannot extract files produced by PKZIP 2.04 or zip 3.0. You must use PKUNZIP 2.64g or unzip 2.001 (or later versions) to extract them.

See the EXAMPLES section at the bottom of this page for examples of some typical uses of zip.

Large Archives and Zip64: zip automatically uses the Zip64 extensions (man page PKZIP) when it needs to for help or A to multi.

MANUAL SECTIONS

The standard sections of the manual include:

- 1 User Commands
- 2 System Calls
- 3 C Library Functions
- 4 Devices and Special Files
- 5 File Formats and Conventions
- 6 Games et. al.
- 7 Miscellanea
- 8 System Administration tools and Daemons

Distributions customize the manual section to their specifics, which often include additional sections.

There are certain terms that have different pages in different sections (e.g.: 'printf' as a command appears in section 1 as a 'std lib' function appears in section 3), so the user before the page name to choose which one you want or you use man -a to show every matching page in a row.

\$ man 1 printf	
\$ man 3 printf	
\$ man -a printf	
\$ man -k '^printf'	
printf	(1) - format and print data
printf	(1p) - write formatted output
printf	(3) - formatted output conversion
printf	(3p) - print formatted output
printf [builtins]	(1) - bash built-in commands, see bash(1)

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

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out

PSO

PRACTICAL - 4

Command line operations:-

- a) Install new package in your system
sudo apt-get install & package name
- b) Remove the package installed.
sudo apt-get remove (& package name)
- c) Find the password file in / using find command
find / -name 'password'
 - /var/lib/share/doc/nas-1.0-253/fwd
 - /usr/lib/nas
 - /etc/nas/password
 - /etc/password

find the directory password file under root and one level down

- # find / -maxdepth 2 -name password
 - /etc/password

- find the password file under root and 2 level down
- # find / -maxdepth 3 -name password
 - /usr/lib/nas
 - /etc/nas/password
 - /etc/password

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- d) Create a symbolic link to the file you found in last step
mv -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 command.
whereis ls
ls: /bin/ls /usr/bin/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

6/03
04/03

PRACTICAL-5

File operations

1) explore mounted file system on your computer

Ans:

```
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 system or direct?

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,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/plats type cgroup (rw,nosuid,nodev,noexec,relatime,plats,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,minp=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

3) Copying text from files:

cat & command, mv command.

```
jebajeba@VirtualBox:~$ ls
Documents examples.desktop  Downloads  Music  Pictures  Public  Templates  Vtdeoc
jebajeba@VirtualBox:~$ jebS cat .gg.txt
cat: .gg.txt: No such file or directory
jebajeba@VirtualBox:~$ jebS cat gg.txt
cat: gg.txt: No such file or directory
jebajeba@VirtualBox:~$ jebS cat >gg.txt
AC
Linux
jebajeba@VirtualBox:~$ jebS touch dd.txt
jebajeba@VirtualBox:~$ jebS ls
dd.txt  gg.txt
jebajeba@VirtualBox:~$ jebS cp gg.txt dd.txt
jebajeba@VirtualBox:~$ jebS cat gg.txt
cat: gg.txt: No such file or directory
jebajeba@VirtualBox:~$ jebS cat dd.txt
Linux
jebajeba@VirtualBox:~$ jebS
jebajeba@VirtualBox:~$
```

```
jebajeba@VirtualBox:~$ jebS touch ss.txt
jebajeba@VirtualBox:~$ jebS mv gg.txt ss.txt
jebajeba@VirtualBox:~$ jebS cat gg.txt
cat: gg.txt: No such file or directory
jebajeba@VirtualBox:~$ jebS cat ss.txt
Welcome
Linux
jebajeba@VirtualBox:~$ jebS
```

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

tar -zcf file name -f/t
tar -zcf file name -f/t.

5) Use diff command to create diff of two files
Ans: Diff tolerance 1 please 2

```
jebajeba@VirtualBox:~$ jebS ls
dd.txt.gz  ss.txt.bz2
jebajeba@VirtualBox:~$ jebS cat >aa.txt
Hello world
^C
jebajeba@VirtualBox:~$ jebS cat bbb.txt
This is Linux^C
jebajeba@VirtualBox:~$ jebS diff aa.txt bb.txt
1do
> hello world
jebajeba@VirtualBox:~$ jebS cat >bb.txt
This is Linux
^C
jebajeba@VirtualBox:~$ jebS diff aa.txt bb.txt
Binary files aa.txt.gz and bb.txt.gz differ.
```

6) Use patch command to patch file and analyze the patch using patch command again.

B
cub3

```
jebajeba@VirtualBox:~$ jebS cat >ht.txt
Hello
Hello
Hello
jebajeba@VirtualBox:~$ jebS diff -u ht.txt ht.txt >sam.patch
^C
jebajeba@VirtualBox:~$ jebS patch <sam.patch
patching file ht.txt
jebajeba@VirtualBox:~$ jebS cat sam.patch
--- ht.txt      2020-01-08 22:14:55.965669834 +0530
+++ ht.txt      2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
 ht
 ht
+Hello
+Hello
+Hello
jebajeba@VirtualBox:~$ jebS
```

PRACTICAL - 6

User Environment

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

Ans: who command and whoami

```
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      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 different than passwd file.

Ans: cat /etc/shadow

As with the ~~password~~ file, each field in the shadow file was also separated with ":" colon character, and are as follows:

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

- The number of days (since January 1, 1970) since the password was last changed.
- The number of days before passwords are changed (indicates it may be changed at any time).
- The number of days to warn user of an expiring password (7 for a full week).
- The number of days after password expiry set account is disabled.
- A reserved field for possible future use.

```
jebajeba@jebajeba-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:/usr/sbin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin/sync
games:x:33:33:games:/var/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lpd: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:44:44:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

- Username, up to 8 characters. case-sensitive, usually all lowercase.
- An "x" in the password field. Passwords are stored in the "/etc/shadow" file.
- Third field user id. This is assigned by the "adduser" script. User uses this field, plus the following group field, to identify which files belong to the user.
- User's "shell account". Often set to "Bash" to provide access to the bash shell (or terminal favorite shell).

```
jebajeba@jebajeba-VirtualBox:~$ sudo cat /etc/shadow
root:$6$PQZLJ...:18240:0:99999:7:::
daemon:$169111:0:99999:7:::
bin:$169111:0:99999:7:::
sys:$169111:0:99999:7:::
sync:$169111:0:99999:7:::
games:$169111:0:99999:7:::
man:$169111:0:99999:7:::
lpd:$169111:0:99999:7:::
mail:$169111:0:99999:7:::
news:$169111:0:99999:7:::
uucp:$169111:0:99999:7:::
proxy:$169111:0:99999:7:::
www-data:$169111:0:99999:7:::
backup:$169111:0:99999:7:::
list:$169111:0:99999:7:::
```

- Get your current working directory (pwd)

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

- ⑦ explore different ways of getting command history
back to our previously executed command
without typing it:

do? History

! line number

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ history  
1 who  
2 whoami  
3 clear  
4 clear  
5 w  
6 w  
7 w  
8 w  
9 clear  
10 cat /etc/shadow  
11 sudo cat /etc/shadow  
12 clear  
13 sudo cat /etc/passwd  
14 clear  
15 clear  
16 history  
jeba@jeba-VirtualBox:~$ 13  
who  
LOGIN      ttv1          2020-01-15 20:30  
jeba@jeba-VirtualBox:~$
```

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- ⑧ Create alias to most commonly used commands

Alias command instructs the shell to replace
one string with another string while executing
the commands

do? alias label = "command"

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

Out of

TACTICAL - 7

Text Editor: Vi

- a) Create, modify, search and navigate a file editor

i) Creating a file:

To create a file, or the command `yy > vi`, followed by filename

ii) Modifying the file:

To modify a file, or the `vi` editor, type

iii) Search in a file:

To find a word (forward search) press

followed by the word to search.

iv) Navigate:

Navigation in four directions

Key	Action
k	Moves cursor up
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right

Word navigation:

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 next word
0 (zero)	Moves to first character of a line
\$	Moves to the end of a line

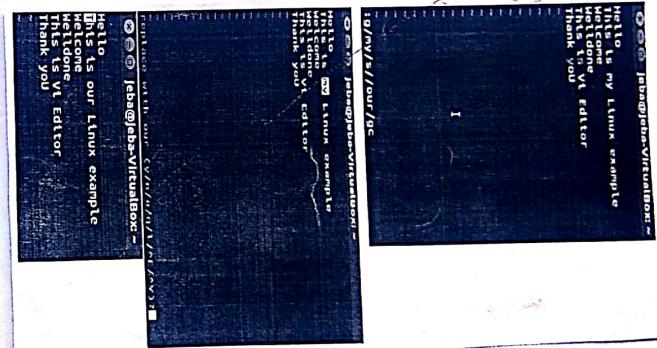
scrolling

Key	Action
Ctrl + f	scrolls forward
Ctrl + b	scrolls backward
Ctrl + d	scrolls half page
Ctrl + u	scrolls half backward

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

i) Replace

Syntax: `1g /word` to be replaced `511w new word/gc`



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iii) highlight
See set Wsearch



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

037

iii) show the line numbers
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  
7  
:set nu
```

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PRACTICAL - 8

Linux security

a) Use of sudo to change user privileges \rightarrow 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 core user root privileges \rightarrow /etc/sudoers using visudo. Enter given 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/"
# Host alias specification
# User alias specification
# Cnfn alias specification
# User privilege specification
root    ALL=(ALL:ALL) ALL
user1  ALL=(ALL:ALL) ALL
```

b) Identify operations that require sudo privilege

```
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.
```

c) Modify expiration date for new user using password aging

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

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- E : Expiration Date
- M : Maxium number of days before password changes
- N : Number of days password is valid
- I : Account inactive
- W : Number of days of warning before a password change is required

d) delete newly add 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 - 9

a) Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig  
enp0s3 Link encap:Ethernet HWaddr 0B:00:27:0e:6b:69  
inet6 addr: fe80::c0d:5a0d%enp0s3 brd fe80::ff:fe:6b:69  
inet6 addr: ::1/128 Scope:Host  
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 frame:0  
collisions:0 txqueuelen:1000  
RX bytes:1180 (1.1 KB) TX bytes:8518 (8.5 KB)  
lo Link encap:Local Loopback  
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 frame: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@jeba-VirtualBox:~$
```

c) Use ping to check the network connectivity to remote machine

```
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 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.0 ns  
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=90.9 ns  
^Z  
[1]+ Stopped ping www.google.com
```

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3) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
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 172.217.166.100
; 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:~$
```

2) Troubleshooting network using traceroute, netstat command.

```
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) 0.198 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        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:~$
```

4) Use of arp command.

```
jeba@jeba-VirtualBox:~$ arp
jeba@jeba-VirtualBox:~$ arp
Address          Hwtype  Hladdress          Flags Mask          Iface
10.0.2.2        ether   52:54:00:12:35:02  C               enp0s5
```

5) Use of host command

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

6) Use of netstat command and nmap command

```
jeba@jeba-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.1.1:53            0.0.0.0:0              LISTEN
tcp        0      0 127.0.1.1:22            0.0.0.0:0              LISTEN
tcp        0      0 127.0.1.1:80            0.0.0.0:0              LISTEN
tcp        0      0 127.0.1.1:443           0.0.0.0:0              LISTEN
tcp        0      0 10.0.2.2:22             0.0.0.0:0              LISTEN
tcp        0      0 10.0.2.2:80             0.0.0.0:0              LISTEN
tcp        0      0 10.0.2.2:443            0.0.0.0:0              LISTEN
unix  0      [ ]         DGRAM                    9694 /run/systemd/journal/
unix  0      [ ]         DGRAM                    9695 /run/systemd/journal/
unix  0      [ ]         DGRAM                    9704 /run/systemd/journal/
socket  0      [ ]         STREAM      CONNECTED  9684 /run/systemd/notify-
socket  0      [ ]         STREAM      CONNECTED  43111 0/tcp@dbus-CyteleITAGC
socket  0      [ ]         STREAM      CONNECTED  42988 0/tmp@dbus-CyteleITAGC
socket  0      [ ]         STREAM      CONNECTED  42690 0/tmp@dbus-CyteleITAGC
socket  0      [ ]         STREAM      CONNECTED  13242 /run/systemd/journal/
unix  0      [ ]         STREAM      CONNECTED  43113 /run/systemd/journal/
unix  0      [ ]         STREAM      CONNECTED  42935 /run/systemd/journal/
jeba@jeba-VirtualBox:~$
```

```
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: bon05s11-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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PRACTICAL - 10

Aim: shell Scripting

Basic 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.
- d) The echo command just returns whatever you type in.

- e) #!/bin/bash -t 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:~$ vi filename.sh  
tcsc@tcsc-VirtualBox:~$ echo $SHELL  
/bin/bash  
tcsc@tcsc-VirtualBox:~$  
  
vi filename.sh  
#!/bin/bash  
echo "This is Linux"
```

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

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

- Steps to write and execute a shell script.
- Shell script is just a simple text file with .sh extension, having executable permission.
- a) Open terminal
 - b) Navigate to the place where you want to write script using cd command.
 - c) Touch filename.sh
 - d) Vi filename.sh [you can use any editor, to edit the script]
 - e) chmod 777 filename.sh [for making the script executable]
 - f) sh filename.sh or ./filename.sh [for running the script]

\$0
 program to display your name
 #!/bin/bash
 echo "Enter your name:"
 read name
 echo "Hello \$name"
 echo "Your name is \$name"
 echo "My name is \$name"

```
tscs@tscs-VirtualBox:~
```

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

```
tscs@tscs-VirtualBox:~
```

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

~~Program to find the sum of two numbers~~

vi fileone.sh

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

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

```
tscs@tscs-VirtualBox:~
```

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

Program to find the sum of three numbers

```
tscs@tscs-VirtualBox:~
```

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

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```
tscs@tscs-VirtualBox:~$ vi lin.sh
tscs@tscs-VirtualBox:~$ chmod 777 lin.sh
tscs@tscs-VirtualBox:~$ ./lin.sh 50 70
sun ls:120
tscs@tscs-VirtualBox:~$
```

~~sed~~ command or stream editor is very powerful tool provided by Linux system. It is mainly used for substitution, find and replace but it can perform other text manipulation like insertion, delete, search, etc. With sed, we can edit multiple files without actually having to open it consider the following script file.

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

- 1) By displaying partial text of a file with sed, we can view only part of a file rather than seeing whole file.

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2) display all except some lines
To display

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

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

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

4) Search and Replacing a string
's' option is for searching a word.

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

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- 5) Replace a string on a particular line

"... a string on a particular line, use -e
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

- 6) Add a line after before ~~some content~~

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:~\$

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:~\$

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- 7) To change a whole line with matched patterns

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

- 8) Appending lines.

To add some & content before every line with sed, use `t` 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 calculus
Thanks computer basic

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