

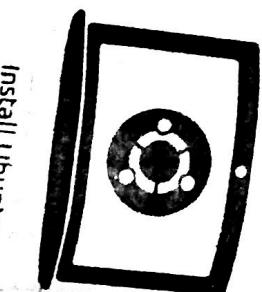
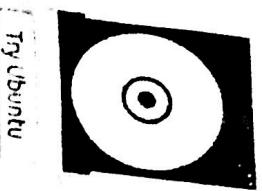
Linux Installation

43

Welcome

Special
Experience

Essera
Frances
Gadje
Genco
Harish
Ishika
Rajino
Kunif
Lavishi
Ubuntu
Mayer
Nederlands
Norwegian
Portuguese
Spanish
Swedish
Turkish
Ukrainian
Welsh
Yiddish



Install Ubuntu

Try Ubuntu

You can try Ubuntu without making any changes to your computer, directly from this CD.
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This
should take about 15 minutes.

You may wish to read the [Ubuntu documentation](#).

→ Representa Testall Ubuntu:

- We recommend you plug your computer into a power source.

- You should also make sure you have enough space on your computer to install Ubuntu.

- We advise you to select Download updates while installing and Install this third-party software now.

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

a) Install Your choice of Linux Distribution e.g. Ubuntu, Fedora, Debian.

→ Using a USB drive?

- Most newer computers can boot from USB. You should see a welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.

- If your computer doesn't automatically do so, you might need to press the F12 key to bring up the boot menu, but be careful not to hold it down that can cause an error message.

QUIT BACK CONTINUE

If you are not connected to the internet, you will be asked to select a wireless network. If you have been connected to the internet during the installation, we advise you to connect during the installation. So we can ensure your machine is up to date.

2. Allocate drive space:-

- Use the checkboxes to choose whether you had like to install Ubuntu alongside another operating system or delete your existing operating system and replace it with Ubuntu. If you are an advanced user choose the 'Something else' option.

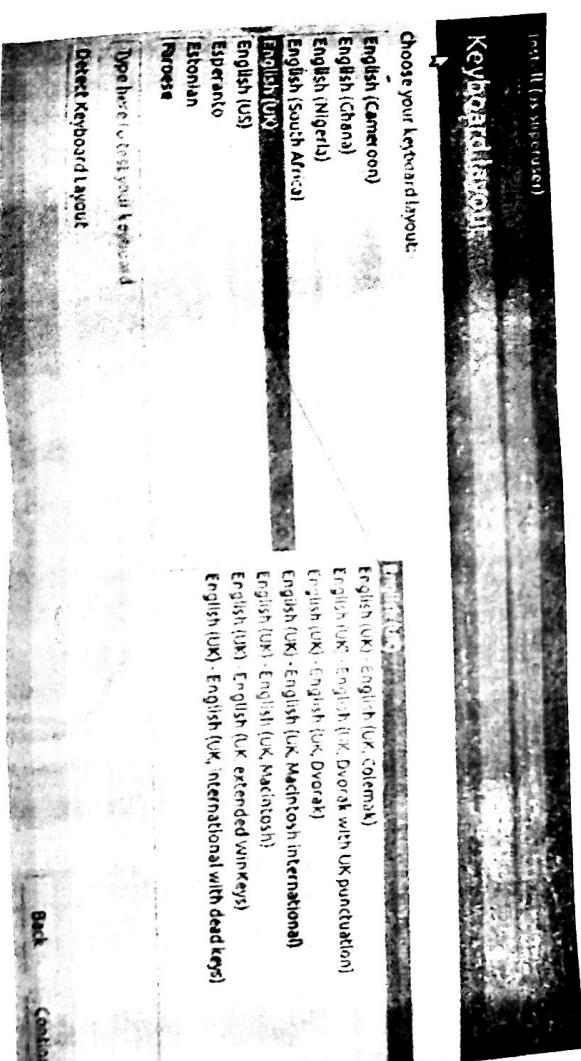
3. Begin the Installation:-

Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu.

The installation process will begin when you click the 'Install Now' button.

Ubuntu needs about 4.5 GB to install so add a few extra GBs to allow for your files.

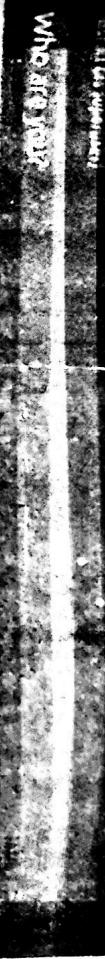
4) Select your Location:-



6) Take login & password details

Practical Q2

45



Q2 During Installation and removing a software

a) To 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 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 languages

Now to install 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

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

i) Installation is complete. You need to restart the computer in order to use the new installation.

Ques: Utilization of grep, man commands

Documentation:-

- Getting 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' is used for syntax of info command) is:

info (command name)

We can 'grep' to find the info about the 'grep' command.

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

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

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

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

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

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

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

Simply type: 'man ls'

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

Simply type: 'man tar'
 or
 'man zip'

There are certain items that have different pages in different sections (eg printf) as a command appears in section 3; in cases like that you can pass the section no. to the man before the page name to choose which one you want to use 'man -a' to show every matching page in a row.

~~finding man pages by section from the commandline~~
 bring up the man page for the printf lib function, while which manual page section are library functions

Ans: You can tell what section a term falls in with 'man -k' (equivalent to a proper command). It will do substring matches too, so you need to use 'term' to limit it.

Page 3 from, 1 is user command, while 8 is system stuff. The man page for man itself explain it and list the standard options

2) Command Line Operations:

Install new package on your system

Sudo apt-get install (package name)

2) Remove the package installed:

Sudo apt-get remove (package name)

3) Find the Password file in using find command.

find / -name passwd

- /usr/share/doc/nss-/dbs-253/pamd/passwd

- /etc/pam.d/passwd

- /etc/passwd

4) Find the directory passwd file under root and one level down:

find / -maxdepth 1 -name passwd

/etc/passwd

find / -maxdepth 2 -name passwd

/etc/passwd

find / -maxdepth 3 -name passwd

/usr/bin/passwd

/etc/pam.d/passwd

5) Find the password file both sub-directories from 2nd.

find . -maxdepth 3 -maxdepth 5 -name passwd

/usr/share/doc /usr/share /usr /usr /bin /passwd

/usr/share/completion/completions /passwd

/usr/bin /passwd

/etc/cron.daily /passwd

/etc/pam.d /passwd

/etc/pam.d /passwd

~~last step~~

ln -s file1 file2

6) Create an empty file example.txt & move it to

~~tmp directory using relative path~~

touch example.txt

mv example.txt /tmp

7) Delete the file moved to /tmp in previous step by

~~absolute method~~

rm /tmp/example.txt

10) Find the location of ls, ps, bash commands.

where is ls

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

where is ps

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

where is bash

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

1) Explore mounted file systems on your computer.

Ans: df -k

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
udev	494436	0	494435	0%	/dev
tmpfs	102416	3676	98749	4%	/run
/dev/sda1	7092178	3583372	3326974	51%	/
tmpfs	512076	216	511860	1%	/dev/shm
tmpfs	5120	4	511516	1%	/run/lock
tmpfs	512076	512076	0%	0%	/sys/fs/cgroup
tmpfs	102416	48	102368	1%	/run/user/1000

2) What are the different ways of exploring mounted file system on Linux?

Ans: mount

jebab@jebab-VirtualBox:~\$ mount
/dev/sda1 on /proc type proc (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,relatime)
tmpfs on /tmp type tmpfs (rw,relatime)
none on /dev/pts type devpts (rw,relatime)
tmpfs on /run type tmpfs (rw,relatime)
none on /dev/shm type tmpfs (rw,relatime)
none on /run/lock type tmpfs (rw,noexec,nosuid,relatime)
none on /sys type sysfs (rw,relatime)
none on /run/user/1000 type tmpfs (rw,nosuid,nodev,noexec,relatime)
none on /run/user/1000/gvfs type gvfs-fuse (rw,nosuid,nodev,noexec,relatime)
none on /dev/hugepages type hugetlbfs (rw,relatime)

File Operations

3) Copying text from files
Ans: cp command, mv command

```
jeba@jeba-VirtualBox:~$ cp ss.txt Desktop
jeba@jeba-VirtualBox:~$ cp ss.txt Desktop/ss.txt
jeba@jeba-VirtualBox:~$ cat ss.txt
cat: ss.txt: No such file or directory
jeba@jeba-VirtualBox:~$ ls
Desktop ss.txt
jeba@jeba-VirtualBox:~$ cd Desktop
jeba@jeba-Desktop:~$ ls
ss.txt
jeba@jeba-Desktop:~$ cat ss.txt
cat: ss.txt: No such file or directory
jeba@jeba-Desktop:~$
```

4) Archiving and backup the work directory using tar, gzip, bzip2 commands
Ans: tar, gzip, bzip2, tarore.txt

```
jeba@jeba-VirtualBox:~$ tar -czvf tarore.txt .
tar: data: Cannot open file: Permission denied
tar: Error is not recoverable; exiting now.
tar: Removing temporary archive file: tarore.txt
tar: Removing temporary archive file: tarore.txt
jeba@jeba-VirtualBox:~$ ls
tarore.txt
jeba@jeba-VirtualBox:~$ rm tarore.txt
rm: cannot remove 'tarore.txt': No such file or directory
jeba@jeba-VirtualBox:~$ ls
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ bztp2 -k .
bztp2: warning: file '.' is empty
boot
cdrom
jeba@jeba-VirtualBox:~$ ls
tarore.bz2
jeba@jeba-VirtualBox:~$ rm tarore.bz2
rm: cannot remove 'tarore.bz2': No such file or directory
jeba@jeba-VirtualBox:~$ ls
jeba@jeba-VirtualBox:~$
```

5. Use diff command to create two different files
Ans: diff filename1 filename2

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

Use Environment

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

Ans: who command & whoami

```
jeba@jeba-VirtualBox:~$ who
jeba    pts/0        2020-01-15 20:30(?) (jeba)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ whoami
LOGIN   pts/1        2020-01-15 20:30                jeba@jeba-VirtualBox:~$ 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          since
jeba    pts/0        2020-01-15 20:30(?) (jeba)
jeba@jeba-VirtualBox:~$ w
20:35:14 up 4 min, 1 user, load average: 0.63, 0.71, 0.32
USER   TTY          since
jeba    pts/0        2020-01-15 20:30(?) (jeba)
jeba@jeba-VirtualBox:~$ w
20:36:12 up 15 min, 11 users, load average: 0.41, 0.69, 0.37
USER   TTY          LOGGED IN   JCPU   PCPU WHAT
jeba    pts/7        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 is it different from passwd file.

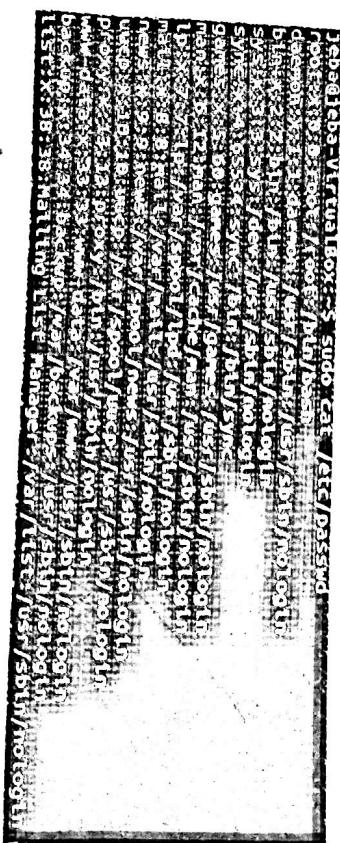
Ans: cat /etc/shadow

As with the passwd file, each field in the shadow file is also separated with ":" colons characters, and one is follows

```

jebelleba-VirtualBox:~$ sudo cat /etc/shadow
root:$6$HgkLJ...:1823015363$...:0:99999:7:::
bin:$6$HgkLJ...:1823015363$...:0:99999:7:::
sys:$6$HgkLJ...:1823015363$...:0:99999:7:::
www-data:$6$HgkLJ...:1823015363$...:0:99999:7:::
www:$6$HgkLJ...:1823015363$...:0:99999:7:::
mail:$6$HgkLJ...:1823015363$...:0:99999:7:::
news:$6$HgkLJ...:1823015363$...:0:99999:7:::

```



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

~~password~~ Password 13 characters encrypted. A blank entry (eg. "") indicates a password is not required to log in (usually a bad idea), and a "*" entry (eg. "*") indicate the account has been disabled.

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

The ~~password~~ number of days before password may be changed (0 indicates it may be changed at any time). The number of days after which password must be changed (9999 indicates it may be changed for user may keep his password unchanged for many years).

The number of days after password expires that account is disabled.

A reserved field for possible future use.

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

→ Username, upto 8 characters, case-sensitive

→ Usually all lowercase

→ For ":", in password field are stored

in the /etc/shadow file.

→ Numeric user Id. This is assigned by adduser "script". Unix uses this field

- Plus the following group field, to identify files which belongs to the user.
- User's home directory, usually /home/jeba
 - In user's personal files, web pages, mail forwarding, etc will be stored here.
 - User's shell account, often to /bin/bash, to provide access to the bash shell

c) Get your current working directory
Ans: /home/jeba

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

- e) Create alias to most commonly used commands
- Aliases command instructs the shell to replace one string with another string while executing the command
- Ans: alias kubectl = "command"

Jebalov

```
jeba@jeba-VirtualBox:~$ alias m="mkdir -m"
jeba@jeba-VirtualBox:~$ ls
jeba@jeba-VirtualBox:~$ ls -l
total 0
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Desktop
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Documents
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Downloads
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Pictures
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Public
drwxr-xr-x 2 jeba jeba 4096 Jan 13 20:30 Videos
jeba@jeba-VirtualBox:~$
```

- d) Explore different ways of getting command history, how to run previously recorded command without typing it.
- Ans:
! & .史

Jebalov

```
jeba@jeba-VirtualBox:~$ !history
jeba@jeba-VirtualBox:~$ history
No. Date          Command
 1  2016-01-13 20:30 whoami
jeba@jeba-VirtualBox:~$ .史
jeba@jeba-VirtualBox:~$ !history
jeba@jeba-VirtualBox:~$ history
No. Date          Command
 1  2016-01-13 20:30 whoami
 2  2016-01-13 20:30 .史
jeba@jeba-VirtualBox:~$ !1
jeba@jeba-VirtualBox:~$ whoami
LOGIN      ttv1
jeba@jeba-VirtualBox:~$
```

Practical - 7

a) Create modify, search and navigate a file

i) Create file :-
in editor:

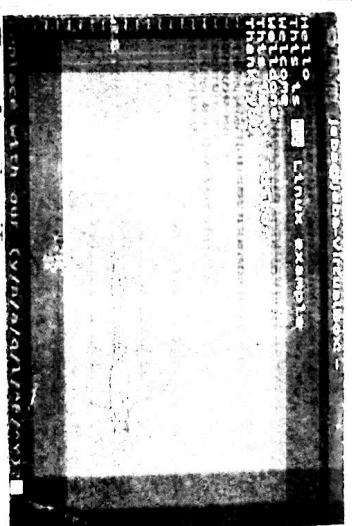
- ii) Creating file :-
To create a file on terminal type 'vi'
followed by filename.

- iii) Modify the file:
To modify a file, on the vi editor, type 'o'

- iv) Navigate:-
Movement in 4 directions.

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

v) Highlight
see set in search



b) Scrolling:-

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

- vi) Learn all essential commands:
Search, replace, highlighted, show line number

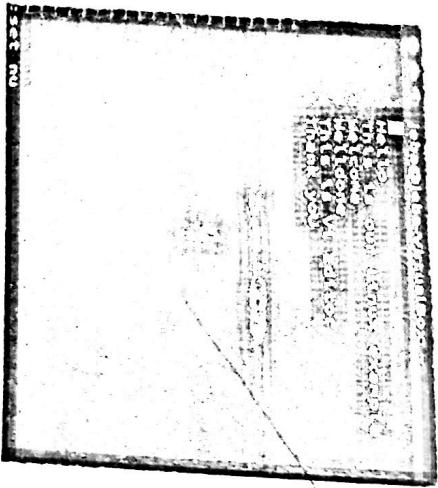
- vii) replace:

Action	Key
Scrolls forward	Ctrl + f
Scrolls backward	Ctrl + b

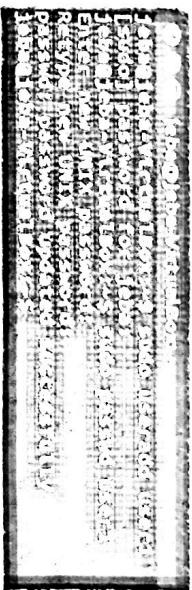
Linux Security Practical 8

58

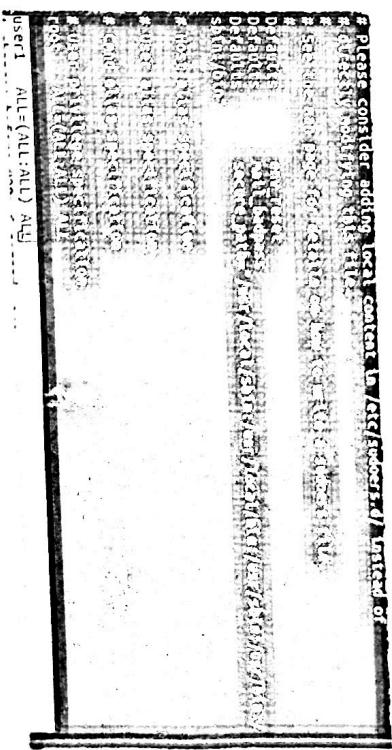
iii) Show the file number
Use set no.



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



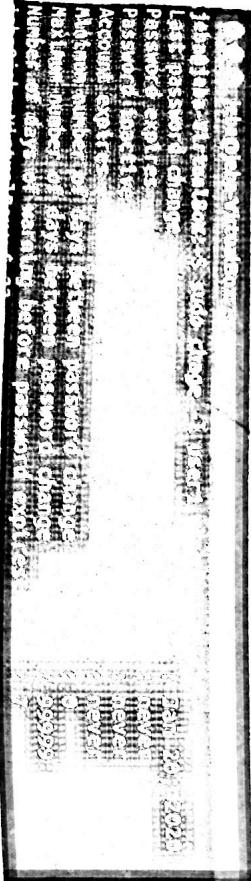
⇒ To give some user root privilege edit
etc sudoers using visudo. Enter new lines as
highlighted below



b) Identify operations that require sudo privilege



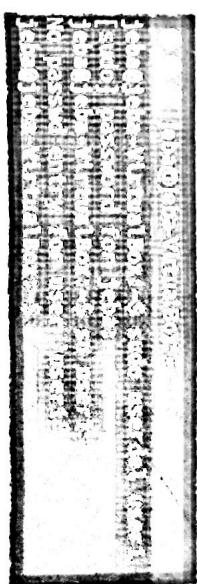
c) Modify expiration date for new user 'wining'
Password aging:



10/2



- \rightarrow E : Expiration Date
 \rightarrow M : Min. No. of days before Password change
 \rightarrow N : No. of days password is valid
 \rightarrow I : Account inactive
 \rightarrow W : No. of days of warning before a Password change is required.
 \rightarrow ~~The newly added user~~



Network Management

6

a) Getting IP address of your machine using
NetBIOS.

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

a) Use of sign command:-

16
Link encap:Local Loopback
inet addr: 127.0.0.1
Scope ID: 1
Link layer type: UNSPECIFIED
MTU: 1500
RX bytes: 4225072 (4.2 MB) TX bytes: 4225072 (4.2 MB)

VirtualBoy **VirtualBoy** **VirtualBoy**

b) Get best part of your machine

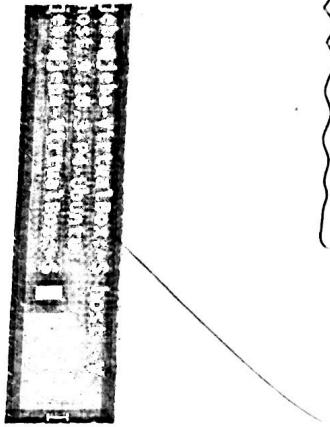
This image shows a severely damaged document page. The paper is off-white with dark, irregular stains and holes, particularly along the right edge. Faint, illegible horizontal lines are visible across the page, suggesting the presence of text that is too faded to be read. The overall quality is very poor, resembling a scan of a damaged piece of paper.

e) Troubleshooting network using traceroute, route command:

Troubleshooting network using traceroute, route command

```
traceroute to www.google.com
traceroute to www.google.com
traceroute to www.google.com
```

```
traceroute to www.google.com
traceroute to www.google.com
traceroute to www.google.com
```



g) Use of 'host' command:-

b) Use of netstat command and Nmap command

```
netstat -an
netstat -an
netstat -an
```

```
host www.google.com
host www.google.com
host www.google.com
```

10.2

Part - Shell Scripting

Basis 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

```
tcs@tcs-VirtualBox:~
```

```
#!/bin/bash
```

```
echo "This is Linux!"
```

• chmod +x filename.sh
 • ./filename.sh

```
tcs@tcs-VirtualBox:~
```

```
vi linux.sh
```

```
chmod 777 linux.sh
```

```
THIS IS A SHELL SCRIPT
```

```
tcs@tcs-VirtualBox:~
```

```
tcs@tcs-VirtualBox:~
```

```
#!/bin/bash
```

```
echo "This is Linux!"
```

- vi filename.sh
 #!/bin/bash
 echo "This is Linux!"
- Steps for writing and executing 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
 - vi filename.sh [You can use your favorite editor, to edit script]
 - chmod 777 filename.sh (for making the script executable)
 - sh filename.sh 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"

```
tsc@tsc-VirtualBox: ~
```

```
#!/bin/bash
echo "Enter your name!"

```

Read name

Echo "My name is: \$name"

```
tsc@tsc-VirtualBox: ~
```

```
#!/bin/bash
echo "Enter your name!"

```

→ Program to find sum of two variables

vi file.bash

#!/bin/bash

a=100

b=25

Sum=\$((a+b))

Echo "Sum is: \$sum"

```
tsc@tsc-VirtualBox: ~
```

```
#!/bin/bash
echo "Enter your name!"

```

→ Program to find the sum of two numbers!

vi file.bash

#!/bin/bash

a=100

b=25

Sum=\$((a+b))

Echo "Sum is: \$sum"

```
tsc@tsc-VirtualBox: ~
```

```
#!/bin/bash
echo "Enter your name!"

```

→ Program to find the sum of two numbers!

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

```

→ Program to find the sum of two numbers!

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

```

```
tsc@tsc-VirtualBox: ~
```

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

```

→ Program to find the sum of two numbers!

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

```

→ Program to find the sum of two numbers!

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

```

```
tcscc@tcscc-VirtualBox:~$ vi ltn.sh
tcscc@tcscc-VirtualBox:~$ chmod 777 ltn.sh
tcscc@tcscc-VirtualBox:~$ ./ltn.sh
sum ls:120
tcscc@tcscc-VirtualBox:~$
```

→ 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 complex files without opening it. Consider the following text file.

```
subjects offered in cs
database
linux
python
green
softskill
stats
calculus
computer
```

2) Display all except some lines
To display all content of a file, except for some portion, use option 'd'.

```
tcscc@tcscc-VirtualBox:~$ sed 3,5d cs.txt
subjects offered in cs
database
green
softskill
stats
calculus
computer
```

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

```
tcscc@tcscc-VirtualBox:~$ vi ltn.sh
tcscc@tcscc-VirtualBox:~$ chmod 777 ltn.sh
tcscc@tcscc-VirtualBox:~$ ./ltn.sh
THIS IS A TEST FILE FOR SED COMMANDS
tcscc@tcscc-VirtualBox:~$
```

4) Search & Replacing a string ('s'):

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

5) Replace or change on a particular line

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

```
tesc@tesc-VirtualBox:~$ sed '1s/this is link/this is link2/' test.txt
```

```
tesc@tesc-VirtualBox:~$ sed '1s/this is link/this is link2/' test.txt
```

6) Add a line after / before the matched string

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

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/a line is linked to this is link/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

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

```
tesc@tesc-VirtualBox:~$ sed 'i/this is link/this is link2/' test.txt
```

this is link

subjects offered

datastructure

databases

python

green tea

softskill

stats

calculus

computer basic

8)

A) Appending Lines

- To add some content before every line with sed, use * and & as follows:

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Python/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Green Tea/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Softskill/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Stats/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Calculus/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

```
tesc@tesc-VirtualBox:~$ sed 's/this is link/& Thanks Computer Basic/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```

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

```
tesc@tesc-VirtualBox:~$ sed '1c/this is link2/' test.txt
```

```
tesc@tesc-VirtualBox:~$
```