Practical 1

Aim: Installation of Ubuntu and background changing.

. steps to Install Ubuntu:

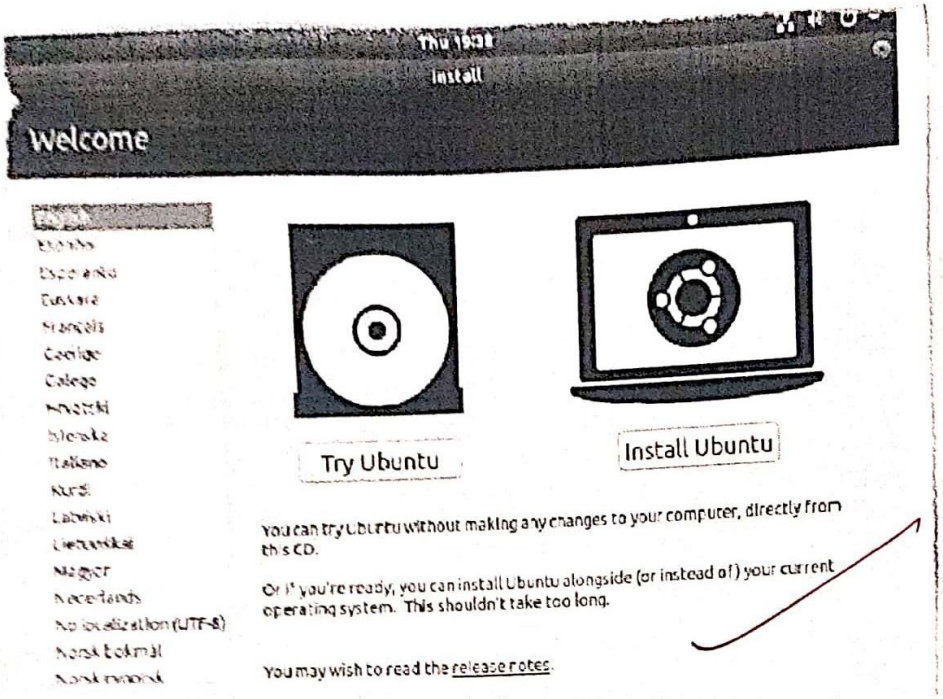
. Using a USB device:

. 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 F12 key to bring up the boot menu, but be careful not to hold it down that can cause an error message.

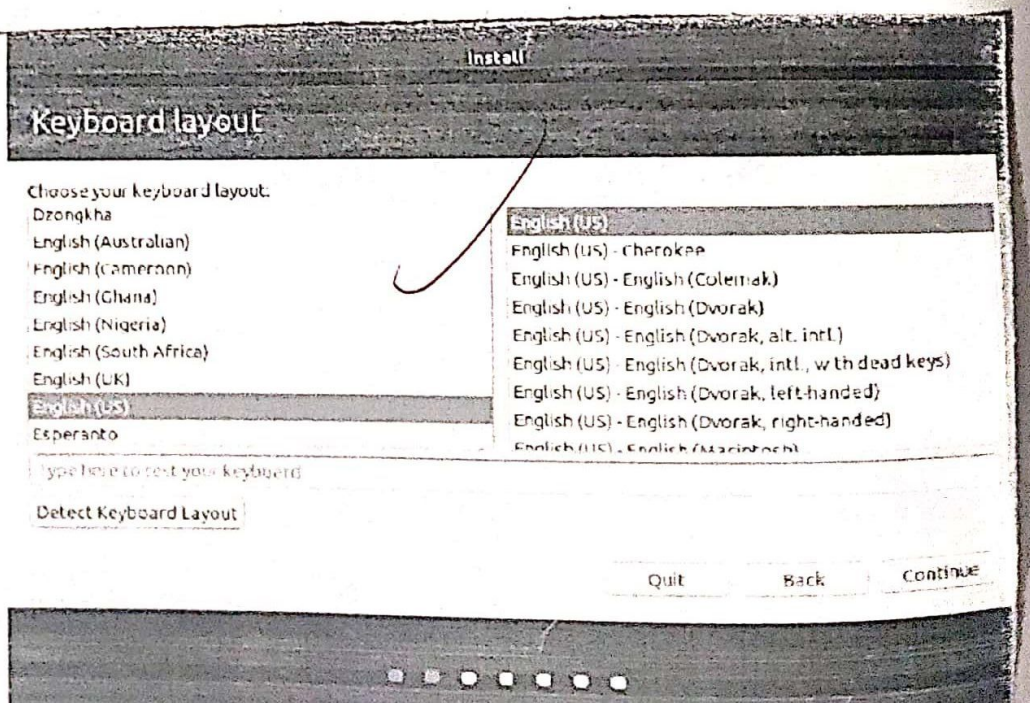
. Prepare to install Ubuntu:

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

Scanned with CamScanner



3



Scanned with CamScanner

- You should also stay connected to the Internet so you can get the latest updates while you install Ubuntu.
- If you are not connected to the internet, you will be asked to select a wireless network, if available. We advice you to connect during the installation so we can ensure your machine is upto date

- Allocate drive space:

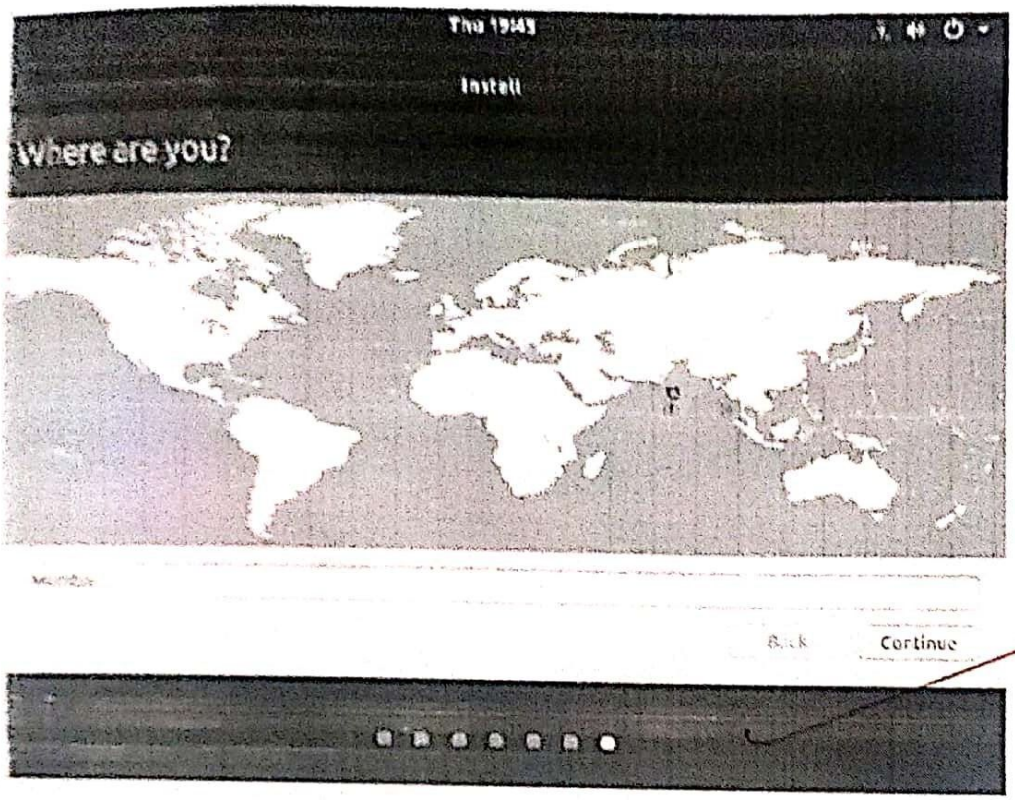
- Use the checkboxes to choose whether you had like to Install Ubuntu alongside another operating system delete your existing operating system and replace it with Ubuntu or if you are an advanced user choose the 'something else' option.

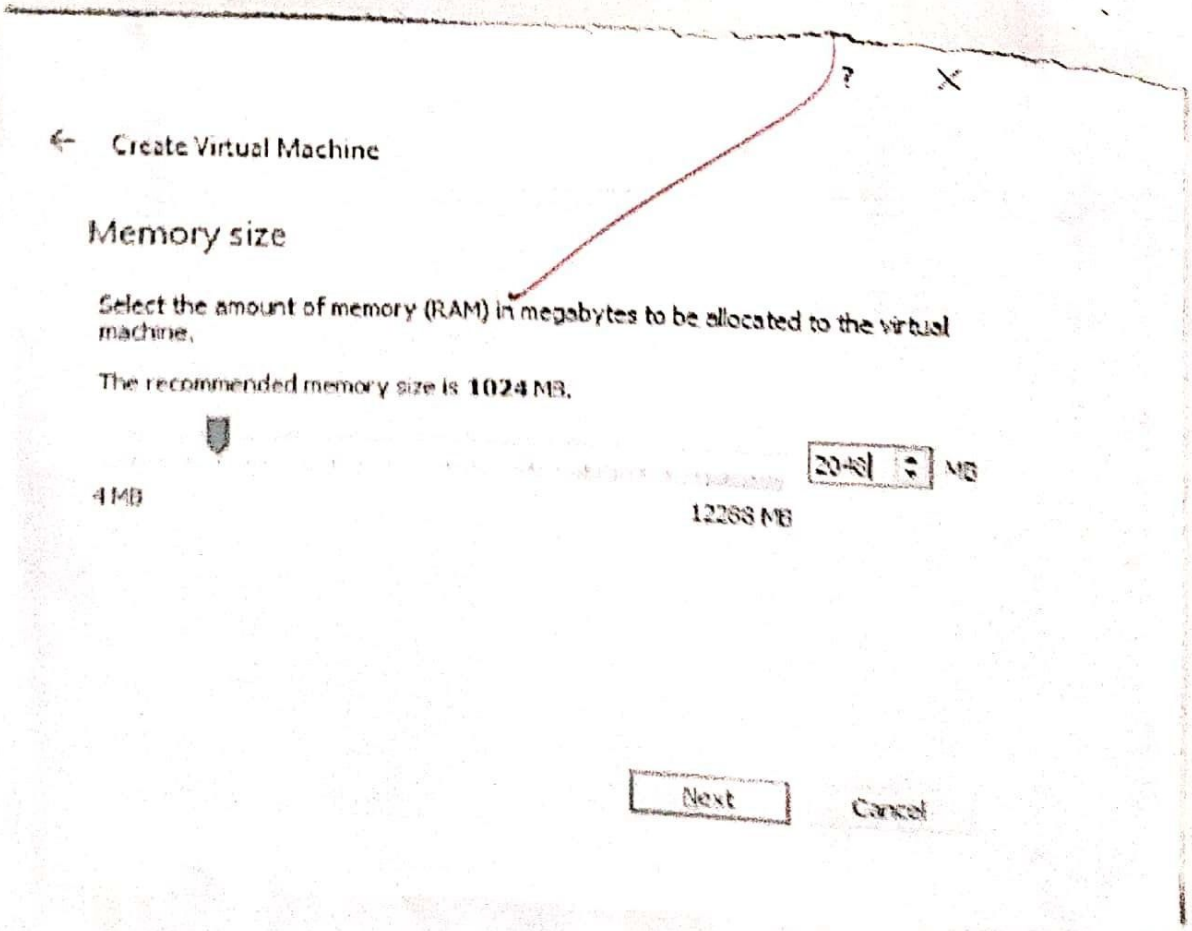
- Begin the installation:

- 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

Scanned with CamScanner

4





Scanned with CamScanner

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

- Select your location:

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

- Select your Preferred keyboard layout:

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

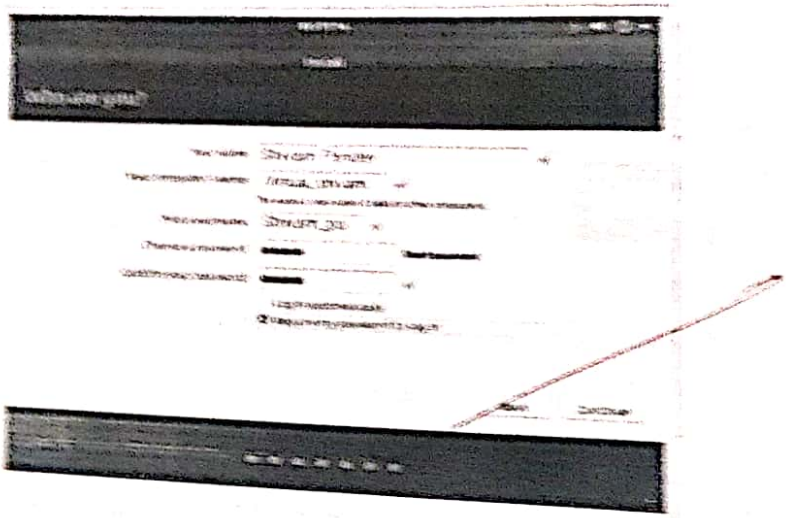
- Enter your login and Password details

- Learn more about ubuntu while the system installs.

- That's it.

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

Scanned with CamScanner



Scanned with CamScanner

- Steps to change background settings of Ubuntu:

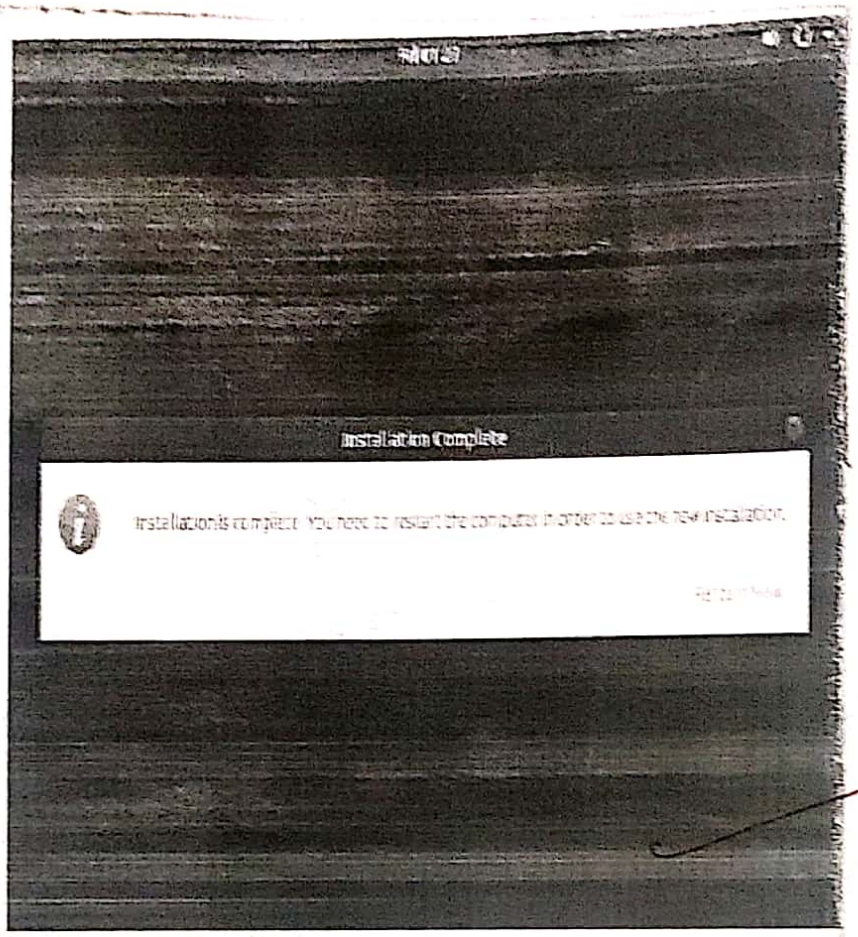
- Accessing Appearance settings:

- To access appearance settings in Ubuntu. Let's click on user menu at the top right corner, on top Menu bar and select system settings....
- A window will pop up with all set is as divided into personal Hardware and system option icons. Let's first select the appearance icon.

- 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 Ubuntu wallpapers. clicking on any thumbnail our wallpaper will be changed right away with a fading effect.
- If you want to select wallpaper from your picture folder, click the drop down menu above thumbnails and select the picture folder.

Scanned with CamScanner



Scanned with CamScanner

you will see all the pictures in your pictures folder as thumbnails, where you can select them as your wallpaper.

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

- Changing Ubuntu theme:

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

- Change the size or rotation of screen:

Scanned with CamScanner

- you can change how big things appear on the screen by changing the screen resolution.
- you can change which way up things appear by changing the rotation.

1) Click the icon on the very right of the menu bar and select system settings
2) Click Open Screen Display.
3) If you have Multiple displays and they are not mirrored, you can have different settings on each display. Select a display in the Preview area.
4) Select your desired resolution and rotation.
5) Click apply the new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with the new.

- Time settings change Time zone of your system:

- If you are currently in Indian time. Note the time change, change the time zone back to your local time zone.

1) Just Click on the clock on the top of bar, choose Time and Date settings and choose from map and choose automatic

Practical 2.

Aim: Installing and removing software.

1) Install gcc Package, verify that it runs and then remove it:

step1: First type 'gcc-v' to know if you have already installed gcc compiler or not if the output is blank then it means that you don't have gcc installed.

step 2: Type 'sudo apt-get install gcc'. After typing the following command installation will take place.

Step 3: Type 'sudo apt-get install build-essential'. This will install all the libraries required for C and C++ Programming language.

Scanned with CamScanner

b) Now to uninstall gcc compiler:

In GCC 5.1.0, although there is no top-level uninstall target, some dictionaries 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 remove major executable like gcc, g++, cpp..... contained in that directory.

02/01

Scanned with CamScanner

Practical 3

Aim: Utilization of Grep, man Commands.

a] Documentation:

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

Solution: To find info about any command 'info' command is used.
The syntax of info command is
'ns info (command name)
We are going to find the info about the 'grep' command:
Open the terminal and type
: ns info grep.
After typing this command following output will be displayed onto your screen. Another more summarized form of showing info is the 'man' command. The command is same as 'info' but required data.
You can also scroll through pages using (space = up) and (backspace = down) keys.

Scanned with CamScanner

Output:

This is the info main menu
Caka directory node:
A few useful info commands:
'q' quits;
'?' lists all info commands;
'h' starts the info tutorial;
'mTexinfo RET' visits the Texinfo manual, etc;

Scanned with CamScanner

- Finding man Pages from the Command line: Bring up the man Page for the 'ls' command Scroll down to the examples section.

Answer: To use the 'man' command simply type 'man (command name)'. Now use we are going to find the manual for 'ls' command.
Simply Type: 'man ls'

- Finding man Pages by topic. What man Pages are available that document file compression.

Answer: Tar, 'zip' are some man Pages which are available for document file compression.
Simply type: man zip
man tar.

- Finding man Pages by section from the command like being up the man Page for the Printf function which manual Page section are library function found.

Scanned with CamScanner

: N 1 man ls

Output: NAME :

ls - list directory contents

SYNOPSIS:

ls [OPTIONS].... [FILE]....

DESCRIPTION:

List information about the FILES sort enteries alphabetically if none of -cftusux nor -- sort is specified.

-a, -all
do not ignore enteries starting with.

-A, -- almost all
do not list implied. and ..

-- author
with -L, Print the author of each file

-b, -- escape
Print c - style escapes for nongraphic characters.

-c
list enteries by columns.

: N 1 man tar

Output: NAME : The GNU version of the tar archiving utility

SYNOPSIS:

tar [-] A -- Concatenate | c -- create | d -- diff -- compare | -- delete | r - append |

Scanned with CamScanner

t ± ± list -- test - label lu -- update lx --
extract -- get [option] [Pathname ....]

Description:

Tap stores and extracts file from a tap or disk achieve.

Function letters

-A -- Catenate, -- concatenate
append two files to an archieve

-c, -- create
create a new archieve

-d, -- diff, -- compare
find differences between archive and file system.

=-delete
delete from the archive

-r, -- append
append files to the end of an archive.

: NS man 3 printf:

NAME: printf, sprintf, fprintf, dprintf, snprintf, vprintf, vfprintf, vdprintf, vsnprintf formatted output version.

DESCRIPTION:

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

Answer: The number corresponds to what section of the manual page is from; 1 is user command while 8 is system admin stuff. The man page for man itself explain it and list the std one.

There are certain terms that have different page in different sections; in cases like that you can pass the section no to the main before the page name to choose which or you won't or use man -a to show every matching page in a row

you can tell which section a term falls in with "man -k". It will do substring matching too so you need to use "term" to limit it.

Simply type: man 3 printf

- Command line help list the available options for the mkdir command.

Answer: : ns mkdir = ma = rwxr
fyrs3

: ns ls

Scanned with CamScanner

Practical No: 4

Command line operations:

a) Install new package on your system.

sudo apt-get install (package name)

b) Remove the package installed.

sudo apt-get remove (package name)

c) Find the passwd file in / using find command.

find / -name passwd
-/usr/share/doc/nss-ldap-253/pam.d/passwd
-/usr/bin/passwd
-/etc/passwd.pam.d/passwd
-/etc/passwd.

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

find / -max depth 2 -name passwd
-/etc/passwd.

Scanned with CamScanner

Find the Passwd file under root and 2 level down.

find / - maxdepth 3 - name Passwd
./usr/bin/Passwd
./etc/Pam.d/Passwd.
./etc/Passwd.

Find the Password file b/w sub-directories level 2 and 4.

find - maxdepth 3 - maxdepth 5 - name pass
./user/bin/Passwd
./etc/Pam.d/Passwd.

Create a symbolic link to the file y on found in last step.

ln - s file1 file 2

Create an empty file example.txt and move it to /tmp directory using relative Path name.

touch example.txt
mv example.txt /tmp.

Scanned with CamScanner

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.

```
# where is ls
ls: /bin/ls /usr/share/man/man1/ls.1.gz

# where is 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.
```

02/01

Practical No. 5
File operations

1. Explore mounted file system on your computer.

df - k

What are the different ways of exploring file systems on Linux?
method

mount

Copying text from files

cp command, mv command.

Scanned with CamScanner

```
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:~$
```

```
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,releas
e_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,nsro
ot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpua
cct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsro
ot=/)
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_even
t,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsro
ot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minp
rotocol=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```

```
jeba@jeba-VirtualBox: $ ls
Desktop  Documents  Downloads  Music  Public  Videos
examples.desktop  Pictures  Templates
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$
jeba@jeba-VirtualBox: /jeb$ cp gg.txt dd.txt
welcome
Linux
jeba@jeba-VirtualBox: /jeb$ cat gg.txt
welcome
Linux
jeba@jeba-VirtualBox: /jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox: /jeb$
```

Scanned with CamScanner

4) Archiving and Backup the Work Directory using tar, gzip and bzip2 commands.

=> gzip filename.txt
Bzip filename.txt

Scanned with CamScanner

```
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$
```

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /mnn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable: exiting now
jeba@jeba-VirtualBox:/$ sudo tar -cvf data.tar /mnn
tar: Removing leading / from member names
/mnn/
/mnn/hd/
jeba@jeba-VirtualBox:/$ ls
jeba@jeba-VirtualBox:/$ cat data.tar
mnn/0000755000000000000000000000000013605376557010365 5ustar rootrootmnn/hd/0000755000000000
000000000000000000013605376557010760 5ustar rootrootjeba@jeba-VirtualBox:/$
```

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2
BZh91AY&SY
jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
dd.txt
jeba@jeba-VirtualBox:~/jeb$
```

Scanned with CamScanner

5) Use diff command to create diff of two files.

⇒ diff filename1 filename 2

6) Use Patch command to Patch file And analyse the Patch using Patch command again.

23/01

Scanned with CamScanner

```
jeba@jeba-VirtualBox:~/jeb$ ls

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
jeba@jeba-VirtualBox:~/jeb$
Binary files aa.txt.gz and bb.txt.gz differ
```

```
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$
```

Scanned with CamScanner

Practical No - 6

Use Environment.

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

Ans. Who command and whoami

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

Ans. cat /etc/shadow

As with the passwd files each field in the shadow file is also separated with ":" colons characters, and are as follows.

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

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

```
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
 20:35:24 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
```

```
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:::
```

Scanned with CamScanner

→ The number of days after which password must be changed (aaaaa indicates user can keep his or or her password unchanged for many, many years.

→ The number of days to warn user of an expiring password (7 for a full week).

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

→ The number of days since January 1, 1970 that an account has been disabled.

→ A reserved field for possible future use.

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

- Username upto 8 characters. Case-sensitive, usually all lower case.
- An "x" in the password field. Password are store in the "/etc/shadow" file.
- Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following groups field, to identify which files belong to the user.

Scanned with CamScanner

```
root@kedd-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
```

Scanned with CamScanner

- Numeric group i'd. Red hat uses group id's in a fairly unique manner for enhanced file security. Usually the group id will match the user id.

- Full name of user. I'm not sure what the maximum length for this field is, but try to keep it reasonable (under 30 characters).

- User's home directory. Usually /home/username (eg. /home/smithj). All user's personal files web pages, mail forwarding, etc will be stored here.

- User's "shell account". Often set to "/bin/bash" to provide access to the bash shell (my personal favorite shell).

c) Get your current working directory.

Ans. Pwd.

Scanned with CamScanner

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

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: $ history
    1  who
    2  whoami
    3  who -l
    4  clear
    5  w
    6  w -s
    7  w -h
    8  w -f
    9  clear
   10  cat /etc/shadow
   11  sudo cat /etc/shadow
   12  clear
   13  sudo cat /etc/passwd
   14  pwd
   15  clear
   16  history
jeba@jeba-VirtualBox: $ !3
who -l
LOGIN    tty1         2020-01-15 20:30              780 id=tty1
jeba@jeba-VirtualBox: $
```

Scanned with CamScanner

Explore different ways of getting command history. How to run Previously executed command without typing it.

history
! line number.

Create alias to most commonly used commands.

Alias command instructs the shell to replace one string while executing the command.
alias label = " command ".

23/01

Scanned with CamScanner

```
[illegible]-virtualbox: $ alias mc"mkdir new"
[illegible]-virtualbox: $ mc
[illegible]-virtualbox: $ ls
examples.desktop
[illegible]-virtualbox: $
```

Scanned with CamScanner

Practical No. 7

Linux Editor : Vi

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

i) Creating a file.

Ans. To create a file, on the vi editor, type 'o'. terminal type vi followed by file name.

ii) Modifying the file:

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

iii) Search in a file.

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

iv) Navigate.

Movement in four directions.

key	Action
k	Moves cursor up.
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right

Scanned with CamScanner

Word Navigation

Key	Action.
b	Moves back to beginning of word
e	Moves forward to end of word.
w	Moves forward to begining of word
0 (zero)	Moves to first character of a line
$	Moves to end of line.

Scrolling.

Key	Action.
ctrl + f	scrolls forward
ctrl + b	scrolls backward
ctrl + d	scrolls half Page
ctrl + v	scrolls half Page backward.

Learn all essential commands like search. % replace, highlight, show line numbers.

i) Replace.

syntax: :%g/word to be replaced /s// new word /gc

ii) Highlight

Use set hi search.

Scanned with CamScanner

```
jeba@jeba-VirtualBox: ~

Hello
This is my Linux example
Welcome
Welldone
This is vi Editor
Thank you

:g/my/s//our/gc
```

```
jeba@jeba-VirtualBox: ~

Hello
This is my Linux example
Welcome
Welldone
This is vi Editor
Thank you
```

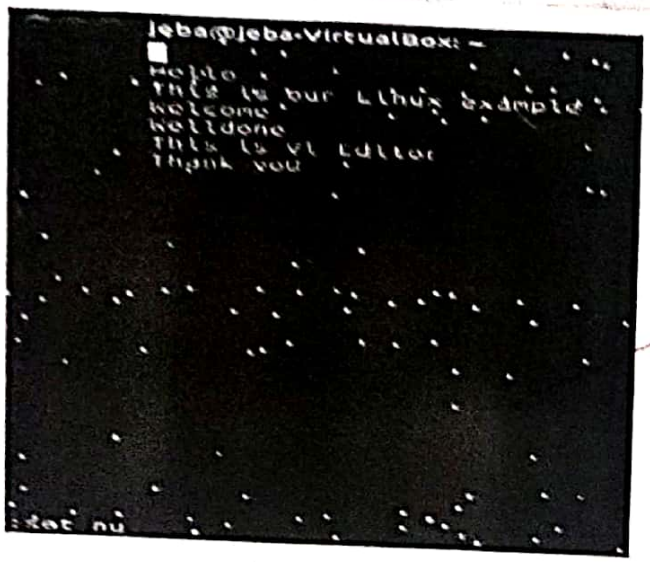
```
jeba@jeba-VirtualBox: ~

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

```
jeba@jeba-VirtualBox: ~

Hello
This is our Linux example
Welcome
Welldone
This is vi Editor
Thank you

:set hlsearch
```

Scanned with CamScanner

iii) Show the line number
use set nu.

Scanned with CamScanner



23/01

Scanned with CamScanner

Practical No: 8

Linux security.

- Use of sudo to change user privilegs to root.
  Create an username user1

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

- Identify operations that requires sudo privileges.

- Modify expiration date for new user using passwd ageing

-E : Expiration Date.
-m : Minimum number of days before password change.
-M : Number of days Password is valid

Scanned with CamScanner

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

```
# 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:/
snap/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL

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

```
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.
```

```
jeba@jeba-VirtualBox: ~
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
```

Scanned with CamScanner

-I : Account inactive
-W : Number of days of warning before a Password change is required.

& Delete newly and users.

Scanned with CamScanner

```
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: $
```

```
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: $
```

```
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: $
```

23/01

Scanned with CamScanner

Practical No: 9

Network Management.

1. Get IP address of your maching using iconfig

2. Get hotname of your machine.

3. Using Pin to Check the network Connectivity to remote machines)

Scanned with CamScanner

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

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

r machine

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

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

```
jeba@jeba-VirtualBox: $ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=
97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=
92.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=
87.5 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: $
```

Scanned with CamScanner

d) Use of dig command.

e) Trouble shooting network using traceroute, route command.

Scanned with CamScanner

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: 52008
;; 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: $
```

) Troubleshooting network using traceroute, route command

```
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                     enp0s
```

Scanned with CamScanner

i) Use of host command.

ii) Use of noststat command and Nmap command.

23/01

Scanned with CamScanner

g) Use of host command

```
$ host -V
host 9.10.3-P4-Ubuntu
$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox: $ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    42149    /run/user/1000/system
d/notify
unix  2      [ ]         DGRAM                    9694     /run/systemd/journal/
syslog
unix  10     [ ]         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     44042    @/tmp/dbus-CymTeI7AOG
unix  3      [ ]         STREAM     CONNECTED     48331
unix  3      [ ]         STREAM     CONNECTED     42988    @/tmp/dbus-CymTeI7AOG
unix  3      [ ]         STREAM     CONNECTED     42690    @/tmp/dbus-CMGGc6G7PS
unix  3      [ ]         STREAM     CONNECTED     13242    /run/systemd/journal/
stdout
unix  3      [ ]         STREAM     CONNECTED     43113    /run/systemd/journal/
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
jeba@jeba-VirtualBox: $
```

Scanned with CamScanner

Practical 10

Aim: Shell scripting

Basics of shell scripting:

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

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

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

d] The echo command just returns whatever you type in.

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

Echo $SHELL

- vi filename.sh
  #!/bin/bash
  echo "This is Linux"

- chmod 777 filename.sh

- ./filename.sh

Steps to write and execute a shell script.

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

Scanned with CamScanner

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

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
echo "THIS IS LINUX!"
"linux.sh" [New File]
```

```
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:~$
```

Scanned with CamScanner

1] open terminal.
2] Navigate to the place where you want to create script using cd command.
3] Touch filename.sh
4] vi filename.sh [You can use favourite editor, to edit the script.]
5] chmod 777 filename.sh (for making the script executable)
6] 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"
```

Scanned with CamScanner

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

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

Scanned with CamScanner

28

Program to find the sum of two variable

```
vi filename.sh
#!/bin/bash
a=100
b=25
sum= $((a + $b))
Echo " sum is : $sum",
```

Scanned with CamScanner

```
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:~$
```

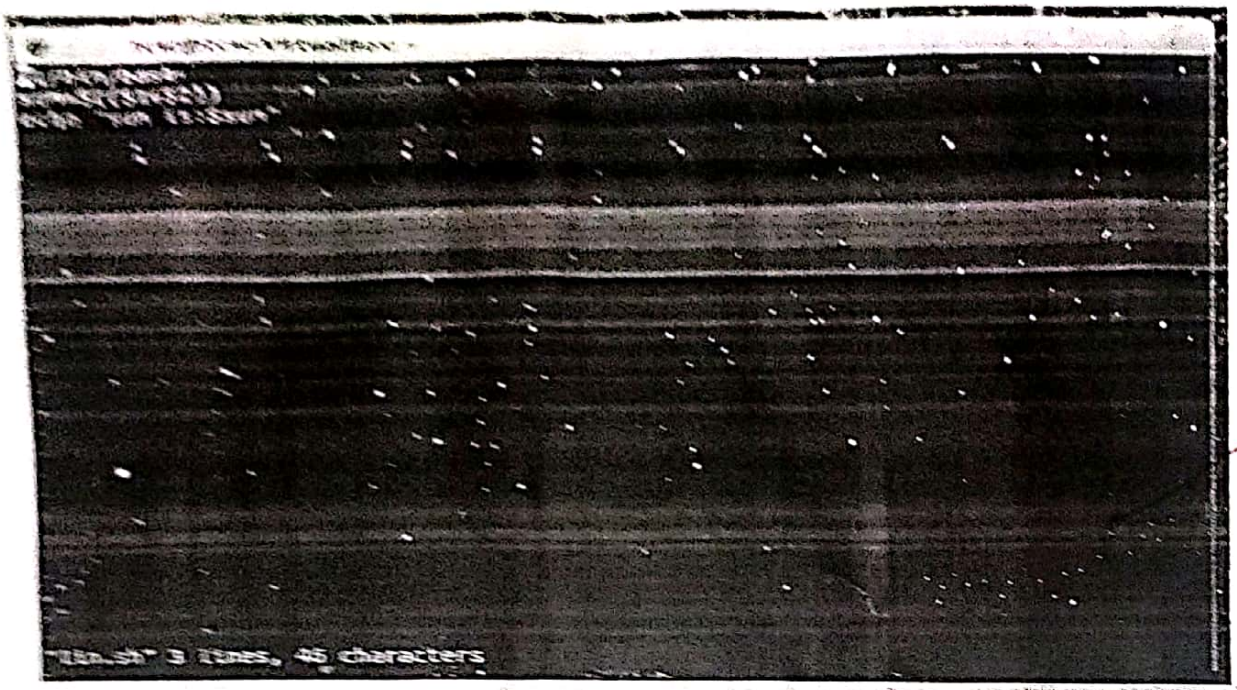
Scanned with CamScanner

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

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

Scanned with CamScanner

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




```
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:~$
```

Scanned with CamScanner

sed :

sed command or stream Editor is very Powerfy utility offered by Linux systems. It is mainly used for text substitution, find and replace but it can Perform other text manipulations like insertion, delection, search, etc. with sed, we can edit complete files without actually having to open it.

Consider the following text file.

1) Displaying the Partial text of a file.
With sed, we can view only Past of a file rather than seeing whole file.

Scanned with CamScanner

Scanned with CamScanner

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

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

4] Search and Replace a string.
's' option is for searching a word.

Scanned with CamScanner

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

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

```
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:~$
```

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

Scanned with CamScanner

5] Replace a string on a particular line

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

6] Add a line after / before the matched string.

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

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

Scanned with CamScanner

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

```
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:~$
```

```
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
alclus
mputer basic
sc@tcsc-VirtualBox:~$
```

Scanned with CamScanner

4) 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'.

3) Appending Lines
To add some content before every line used sed, use + and 1a as follows.

11/02

05.

```
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
```

```
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
```

Scanned with CamScanner