

Aim: To install Ubuntu in Virtual Box.

Ubuntu: Ubuntu is a free and open source software based on Debian. Ubuntu is officially released under 3 editions: Desktop, Server, Union.

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

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

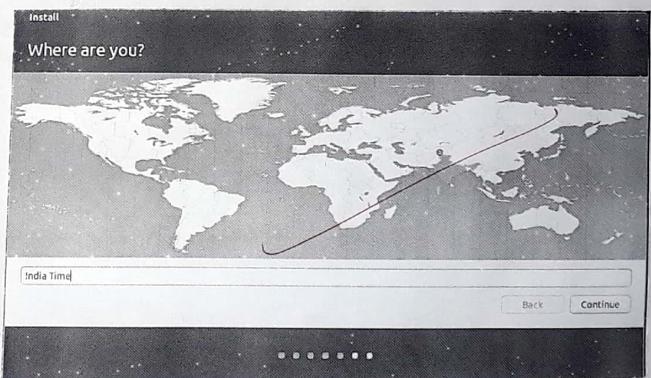
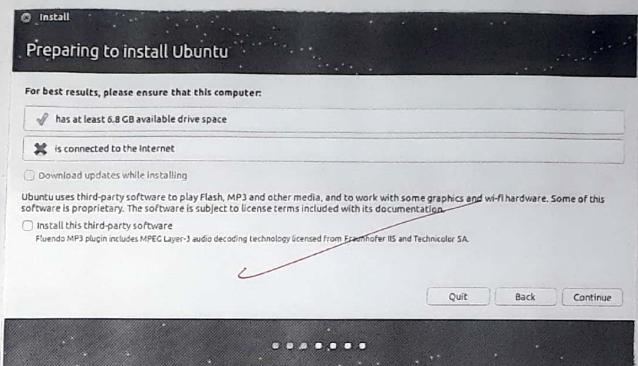
Steps for installing Ubuntu in a virtual machine:

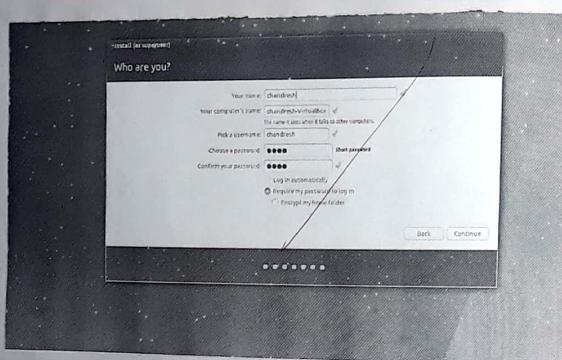
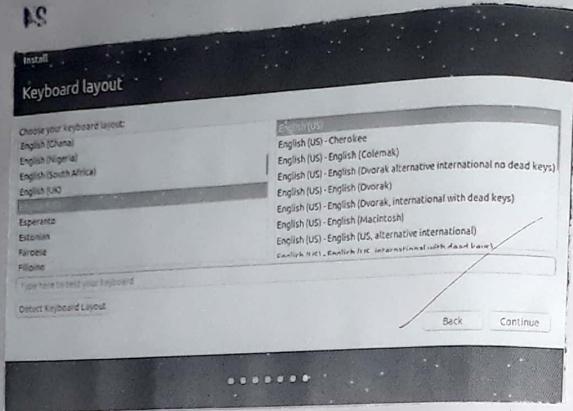
Step 2: Select a virtual optical file or a physical drive to start Ubuntu in your virtual machine. Space given to it is 1.86 GB.

Step 2: Select the language of your choice and click on 'Install Ubuntu'.

You can also 'try Ubuntu' for free on computer device from this CD.

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





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

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

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

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

Step 8: Type name of virtual disk and recommended size to be given is 2048 GB as 27B.

Therefore, now the virtualbox is ready to use.

### Accessing Appearance Setting.

To access appearance setting in Ubuntu. Let's click on User menu at the top right corner on the top menu bar and select System Settings...

A window will pop-up with all setting divided into personal, Hardware and system options icons. Let's first select the appearance icon.

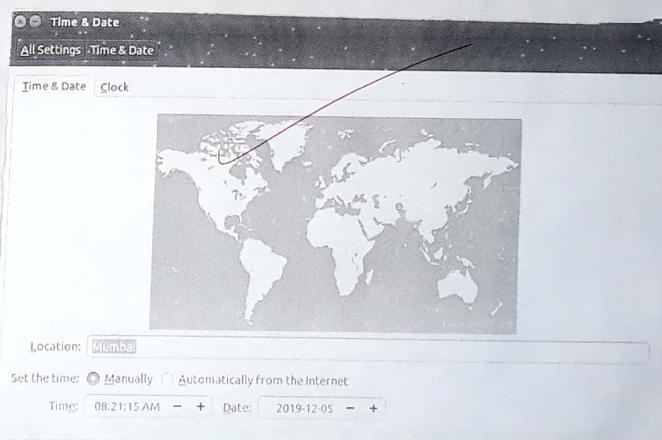
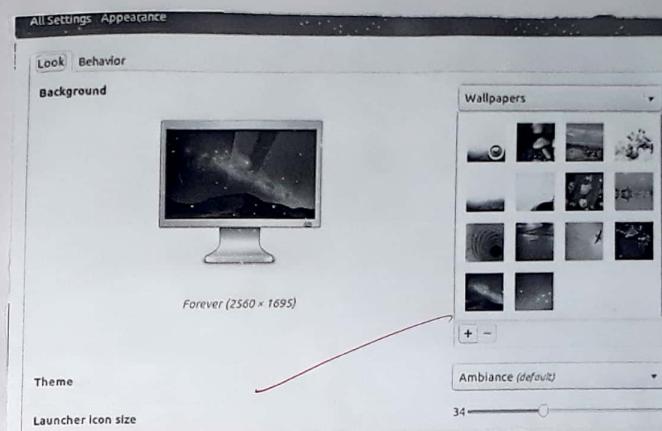
### Changing wallpaper picture:

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.

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



To add wallpaper that is in another folder, just click the plus icon below the thumbnail 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.

~~Screen Resolution:~~ Ascertain the current screen resolution for your desktop,

change the size or rotation of the screen.

You can change how big (or how detailed) 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) Open Screen Display.

3) If you have multiple displays and they are mirrored, you can have different settings on each display. Select a display in a preview area.

4) Select your desired resolution and rotation.

5) Click apply. The new setting will be applied for 30s before reverting back. That way, if you cannot see anything will the new

Time settings change the time zone of your system.

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

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

Just click on the clock on the top bar and choose Time settings. So you can change the time and date manually or otherwise choose your time from map and choose automatic.

## PRATICAL NO. 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 have already installed gcc compiler or not. If the output is blank then it means that you don't have gcc installed.

Step 2 :

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

Step 3 :

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

→ Now to 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.

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

✓  
✓  
✓

Aim : Utilization of grep, man commands .

Documentation :

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

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

We are going to find the info about the 'grep' command .

Open the terminal (ctrl + ALT + T) and type info grep

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

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

Another ~~are~~ summarized form of showing info is the 'man' command. The command is same as 'info', but required data.

b) finding man pages from the cmd line. Bring up 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'.

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

Ans:

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

Simply type 'man zip'  
man tar.

d) finding man pages by section are library functions found:

Ans:

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

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

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

command line help list the available options for the `mkdir` command. How can you do this?

~~\$ mkdir -ma = rwx directoryname.~~

~~12  
23/01~~

## PRACTICAL No.4.

### Command line Operation.

- a) Install new package on your system

`sudo apt-get install [package name]`

- b) Remove the package installed.

`sudo apt-get remove [package name]`

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

`# find / -name passwd`

- /usr/share/doc/libss-1.0.2-253/pamd/passwd

- /usr/bin/passwd

- /etc/pam.d/passwd

- /etc/passwd

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

`# find / -maxdepth 2 -name passwd`

- /etc/passwd

Find the password 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 & 4

# find - maxdepth 3 - maxdepth 5 - name passwd

- /usr/bin/passwd
- /etc/pam.d/passwd

d) Create a symbolic link to the file you found: in  
 last step.

# ln -s file1 file2.

e) Create an empty file ~~example.txt~~ & move it to  
 /tmp directory using relative pathname.

# touch ~~example.txt~~  
 # mv example.txt /tmp

f) delete the file moved to /tmp in previous step  
 by absolute method.

# rm /tmp/example.txt

28

g) find the location of ls, ps, bash commands.

# whereis ls

ls = /bin/ls /usr/share/man/man1/ls.1.g2

# whereis ps

ps = /bin/ps /usr/share/man/man1/ps.1.g2  
share/man/man1/ps.1.g2

# whereis bash

bash = /bin/bash /etc/bash.bashrc /usr/share/man/  
man1/bash.1.g2

10/10

```
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
tmpfs 7092728 3383372 3326024 51% /
/dev/sda1 512076 216 511860 1% /dev/shm
tmpfs 51208 4 5116 1% /run/lock
tmpfs 51208 0 512076 0% /sys/fs/cgroup
tmpfs 51208 102368 1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount
tmpfs 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,noexec,relatime,mode=0755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,mode=0755,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,mode=0755)
tmpfs on /run/lock type tmpfs (rw,nosuid,noexec,relatime,errors=remount-ro,data=ordered)
/dev/sda1 on / type ext4 (rw,nosuid,nodev,relatime,data=journal,errors=remount-ro)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/cha type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,mode=755)
tmpfs on /sys/fs/cgroup/systemd type tmpfs (rw,nosuid,nodev,noexec,relatime,xattr,release)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,nsroot/)
e_agents/lbagent on /sys/fs/cgroup/e_agents type cgroup (rw,nosuid,nodev,noexec,relatime)
pstore on /sys/fs/cgroup/pstore type pstore (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot)
cpu on /sys/fs/cgroup/net_cls.net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio,nsroot)
cpuset on /sys/fs/cgroup/cpuset/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsroot)
cpuacct 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)
cpu on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot)
cpu on /sys/fs/cgroup/bikio type cgroup (rw,nosuid,nodev,noexec,relatime,bikio,nsroot)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event,nsroot)
cgroup on /sys/fs/cgroup/hugepages type cgroup (rw,nosuid,nodev,noexec,relatime,hugepages,nsroot)
systemd on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,prg=1,ttimeout=0,nbsp=5,nrprot=5,ndirect)
hugepages on /dev/hugepages type hugepages (rw,relatime)
```

```
jeba@jeba-VirtualBox:~$ ls
Desktop Examples desktop 33 Pictures Public Templates Videos
Documents examples.desktop 33 Pictures Templates
jeba@jeba-VirtualBox:~/Desktop$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/Desktop$ cat >gg.txt
cat: >gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/Desktop$ cat >gg.txt
jeba@jeba-VirtualBox:~/Desktop$ touch dd.txt
jeba@jeba-VirtualBox:~/Desktop$ ls
dd gg
jeba@jeba-VirtualBox:~/Desktop$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/Desktop$ cat dd.txt
cat: dd.txt: No such file or directory
jeba@jeba-VirtualBox:~/Desktop$ cat dd.txt
jeba@jeba-VirtualBox:~/Desktop$ cat dd.txt
jeba@jeba-VirtualBox:~/Desktop$ cat ss.txt
jeba@jeba-VirtualBox:~/Desktop$ mv gg.txt ss.txt
jeba@jeba-VirtualBox:~/Desktop$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/Desktop$ cat ss.txt
jeba@jeba-VirtualBox:~/Desktop$ cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~/Desktop$
```

### PRACTICAL No. 5.

#### File Operations.

1) Explore mounted file systems on your computer.  
Ans: df -k

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

Ans: mount

#### 3) Copying text from files.

Ans: cp command, mv command.

4) Moving files.

Ans: mv command.

5) Deleting files.

Ans: rm command.

6) Creating files.

Ans: touch command.

7) Creating directories.

Ans: mkdir command.

8) Renaming files.

Ans: mv command.

9) Creating symbolic links.

Ans: ln -s command.

10) Creating hard links.

Ans: ln command.

11) Creating temporary files.

Ans: mktemp command.

12) Creating temporary directories.

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Ans: mktemp command.

4) Archiving and backup the work directory using tar, gzip and bzip2 commands.  
→ gzip filename.txt  
Bzip2 filename.txt

5) Use diff command to create diff of two files  
→ diff filename1 filename2.

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

```
jebs@jebs-VirtualBox:-/jebs$ bzip2 ss.txt  
jebs@jebs-VirtualBox:-/jebs$ ls  
dd.txt  
ss.txt.b2z  
dd  
jebs@jebs-VirtualBox:-/jebs$ cat ss.txt.b2z  
BZ#91AY&SY  
Jebs@jebs-VirtualBox:-/jebs$ gzip dd.txt  
dd.txt.gz  
ss.txt.b2z  
jebs@jebs-VirtualBox:-/jebs$ cat dd.txt.gz  
dd.txt>OeIeMeeeeeee>xjebs@jebs-VirtualBox:-
```

```
jebajeba@VirtualBox:~/jeb$ ls  
dd.txt.gz  aa.txt.bz2  
jebajeba@VirtualBox:~/jeb$ cat >aa.txt  
Hello world  
^C  
jebajeba@VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
^C  
jebajeba@VirtualBox:~/jeb$ diff aa.txt bb.txt  
1d0  
< Hello world  
< ^C  
jebajeba@VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
^C  
jebajeba@VirtualBox:~/jeb$ diff aa.txt bb.txt  
1c1  
< Hello world  
< ^C  
> this is Linux  
jebajeba@VirtualBox:~/jeb$ gzip pp.txt  
jebajeba@VirtualBox:~/jeb$ diff aa.txt.gz bb.txt.gz  
Binary files aa.txt.gz and bb.txt.gz differ
```

```
jeba@jeba-VirtualBox:~/jeba$ cat >hi.txt
hi
hi
hi
^C
jeba@jeba-VirtualBox:~/jeba$ cat >hi1.txt
hi
hi
hello
hello
^C
jeba@jeba-VirtualBox:~/jeba$ diff -u hi.txt hi1.txt >sam.patch
jeba@jeba-VirtualBox:~/jeba$ patch -s sam.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/jeba$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55.463569834 +0530
+++ hi1.txt    2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
+hi
+ht
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeba$
```

## Pactical 6.

### Use Environment

a) who command & w

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

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

Ans: cat /etc/shadow .

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

- Username, up to 8 characters. case-sensitive, usually all lowercase. A direct match to the user name in the /etc/passwd file.
- Password, 13 character encrypted. A blank entry (eg.: :) indicates a password is not required to log in (usually a bad idea), and a "\*" entry (eg.: \*:) indicates the account has been disabled.
- The number of days (since January 1, 1970) since the password was last changed.
- The 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 (ggggg indicates user can keep his or her password unchanged for many, many years)

```
jeba@jeba-VirtualBox:~$ who
jeba@jeba-VirtualBox:~$ who
jeba          2020-01-15 20:32 (:0)
jeba          2020-01-15 20:30    789 id=tty1
jeba@jeba-VirtualBox:~$ who -l
jeba          2020-01-15 20:30    789 id=tty1
jeba@jeba-VirtualBox:~$ LOGIN
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root:!:0:0:99999:7:::
daemon:!*:0:99999:7:::
bin:!*:0:99999:7:::
sys:!*:0:99999:7:::
sync:!*:0:99999:7:::
games:!*:0:99999:7:::
man:!*:0:99999:7:::
lp:!*:0:99999:7:::
mail:!*:0:99999:7:::
news:!*:0:99999:7:::
```

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:root:/root:/bin/bash
daemon:x:1:daemon:/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:/sync
games:x:5:0: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
```

P.8

- 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, up to 8 characters, case-sensitive, usually all lowercase.
  - An "x" in the password field. Passwords are stored in the "/etc/shadow" file.
  - Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following group field, to identify which files belong to the user.
  - Numeric group id. Red Hat uses group id's in a fairly unique manner for enhanced file security. Usually the gr-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. All user's personal files, web pages, mail etc will be stored here.
  - User's "shell account": often set to "/bin/bash" to provide access to the bash shell.

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

40

```
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  
9 clear  
10 cat /etc/shadow  
11 sudo cat /etc/shadow  
12 cat /etc/passwd  
13 sudo cat /etc/passwd  
14 pwd  
15 clear  
16 history  
jeba@jeba-VirtualBox:~$ !3  
who -l  
[0C1] ttty1 2020-01-15 20:30 788 id=ttty1  
jeba@jeba-VirtualBox:~$
```

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

1) Get your current working directory.  
 → pwd.

2) Explore different ways of getting command history. how to run previously executed command without typing it.  
 → history.  
 ! line numbers.

3) Create alias to most commonly used commands.  
 Alias command instructs the shell to replace one string with another string while executing the commands.  
 → alias label="command"

SD  
23/01

## PRACTICAL 7.

7. Linux editor: Vi

- a) Create, modify, search and navigate a file in editor.
  - b) Creating a file.  
To create a file on the terminal type vi followed by name.
  - c) Modifying the file.  
To modify a file on the vi editor, type 'i'.
  - d) Search in a file.  
To find a word (forwarded search) press / followed

## ii) Navigate :

Movements 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 word
v	Moves to first character of a line
\$	move to the end of line

**Syntax:** :/g/word to be replaced/s//new word.....

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

Hello  
This is my Linux example  
Welcome  
Welldone  
That's VIM Editor  
Thank you

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

```
JeBa@JeBa-VirtualBox: ~
Hello
This is my Linux example
Welcome
Welldone
This is Vt Editor
Thank you

Replace with our (~/a/a/a/~/~/~/~)
JeBa@JeBa-VirtualBox: ~
Hello
This is our Linux example
Welcome
Welldone
This is Vt Editor
thank you
```

## scrolling

key Action

$\text{ctrl} + f$	scrolls forward
$\text{ctrl} + b$	scrolls backward
$\text{ctrl} + d$	scrolls half page
$\text{ctrl} + u$	scrolls half page backward

b) learn all essential commands like search/replace, highlight, show line numbers.

i) Replace

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

ii) Highlight

Use set hlsearch

iii) show the line number

Use set nu

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

:set hlsearch
>Show the line number
Use set nu
```

## EP Practical 8 Linux Security

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

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

b) Identify operations that require sudo privilege

c) Modify expiration date for new user using password ageing

-E: Expiration Date

-m: minimum no. of days before password change

-M: No. of days password is valid

-I: Account inactive

-W: Number of days of warning before a password change is required

d) Delete Newly added user.

a) Use of sudo to change user privileges to root.

Create an user named user1

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

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

```
# Please consider adding local content in /etc/sudoers.d instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults env_reset
Defaults mail_badpass
Defaults secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/
sbin:/bin"
#
# Host alias specification
#
# User alias specification
#
# Cmnd alias specification
#
# User privilege specification
root    ALL=(ALL:ALL) ALL
user1   ALL=(ALL:ALL) ALL
```

b) Identify operations that require sudo privileges

```
jeba@jeba-VirtualBox:~$ su user1
Password:
user1@jeba-VirtualBox:~/home/jeba$ mkdir folder1
mkdir: cannot create directory 'folder1': Permission denied
user1@jeba-VirtualBox:~/home/jeba$ sudo mkdir folder1
[sudo] password for user1:
user1 is not in the sudoers file. This incident will be reported.
```

c) Modify expiration date for new user using password ageing.

```
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change : Jan 20, 2020
Password expires       : never
Password inactive     : never
Account expires        : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires: 7
```

Pra-9

## NETWORKING Management

### Practical: 9 Network Management

#### a) Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig
jeba@jeba-VirtualBox:~$ ifconfig
enp0s3  Link encap:Ethernet HWaddr 08:00:27:0e:6b:69
        inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::c0d:53a0:ds4:84be/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 frame:0
            collisions:0 txqueuelen:1000
            RX bytes:1180 (1.1 KB) TX bytes:8518 (8.5 KB)

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

#### b) Get hostname of your machine

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

d) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
;; <>> DLG 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 22:40:00 IST 2020
;; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

e) Troubleshooting network using traceroute, route 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)  0.190 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:~$ arp
Address5      Hwtype  Hwaddress      Flags Mask          Iface
10.0.2.2      ether   52:54:00:12:35:02  C          enp0s5
```

g) Use of host command

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

h) Use of netstat command and Nmap command

```
jeba@jeba-VirtualBox:~$ netstat -an
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
dnotify      [ ]      DGRAM
unix 2       [ ]      DGRAM
unix 10      [ ]      DGRAM
dev-log      [ ]      DGRAM
socket      [ ]      DGRAM
unix 3       [ ]      DGRAM
unix 3       [ ]      STREAM  CONNECTED
stdout      [ ]      STREAM  CONNECTED
stderr      [ ]      STREAM  CONNECTED
unix 3       [ ]      STREAM  CONNECTED
unix 3       [ ]      STREAM  CONNECTED
9704        /run/systemd/journal/
9804        /run/systemd/notify
44042       @/tmp/dbus-Cymtel7AGQ
43131       @/tmp/dbus-Cymtel7AGQ
42398       @/tmp/dbus-Cymtel7AGQ
42099       @/tmp/dbus-Cymtel7AGQ
13242       /run/systemd/journal/
43113       /run/systemd/journal/
43813       /run/systemd/journal/
42935       /run/systemd/journal/
```

```
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): 2404:6800:4087:811::2084
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
```

80/102

## PRACTICAL No. 10

47

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.

i) Echo \$SHELL

j) vi filename.sh

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

k) chmod 777 filename.sh

l) ./filename.sh

```
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:~$
```

Step 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 create script using cd command.
- c) Touch filename.sh [You can use your favorite editor]
- d) vi filename.sh [for making the script executable]
- e) chmod 777 filename.sh [for running the script]
- f) sh filename.sh or ./filename.sh

Program to display your name

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

```
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: ~$
```

Program to find the sum of two variables

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

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:~$
```

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

- ① Displaying partial text of a file.  
With Sed, we can view only part of a file rather than seeing whole file.
- ② Display all except some lines  
To display all content of a file except for some portion, use option 'd'
- ③ Deleting a line  
To delete a line, use line number followed by 'd'

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

```
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  
calculus  
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
calculus
computer basic

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

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:~$ 

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:~$ 

```

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

5) Replace a string on a particular line  
 To replace a string on a particular line, use line numbers 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'.

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

```
tsc@tsc-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
```

```
tsc@tsc-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
```

2) Appending lines

- To add some content before every line with  
 Sed, use \* and & as follows.

*S*  
05/03