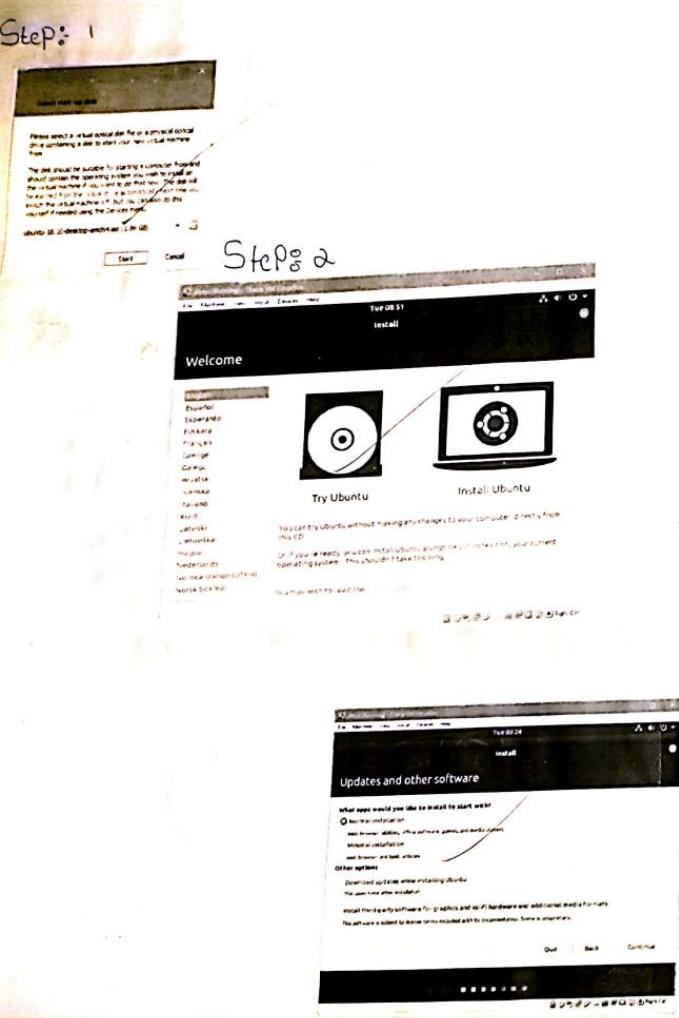


Practical No. 1

- Aim: To choice install a linux distribution of your
eg: Ubuntu
- Ubuntu:
It is free and open source linux distribution based on debain. Ubuntu was officially released on three editions are desktop, server & core machine. The latest version of Ubuntu was released on 19 April 2019 which is Ubuntu 19.04.

Installation process on virtual machine

- Step-1:- As few entered in virtual machine click on new & select startup disk. As we are working on up Ubuntu so select Ubuntu as startup disk & click on start
- Step-2: Now select the language as you are comfortable & click on install Ubuntu
- Step-3: Now they will ask you do you want the updates or any other software in Ubuntu. So select the normal installation & continue the installation process



- Step 4: Now select the installation type. And, select the Erase disk & install Ubuntu as you are working on Virtual Box if will. Don't harm your PC & click on install now.
- Step 5: Select the country in which you live, accepting the Ubuntu & continue the process.
- Step 6: Now enter your name, your Computer name & username which you like & Now enter the password which you don't forget because of you can't forget change password & you want to go in reinstallation process.
- Step 7: Confirm your ID & password which you entered & click on Sign-in.
- Now you are ready to use Ubuntu in Virtual Box.





b) Customize desktop environment by changing different default option like changing default background, themes & screensaver.

Accessing appearance setting :-

i) accessing a appearance setting in ubuntu, let's click on user menu on top right corner on top menu bar and select system settings.

2) A window will pop-up with all setting divided into personal, hardware & system option icon. Let's first select the appearance icons.

* changing wallpaper Pictures:

1 on the left side of Background part, you can see your wallpaper.

2 On right side is a part where you can select one ubuntu wallpaper. Clicking on a thumbnail your wallpaper will be changed right away with fading effect

3 If you want to select a wallpaper from picture folder, click the dropdown menu above thumbnails & select Pictures folder

- you will see all pictures in pictures folder as a thumbnails where you can select them as your wallpaper

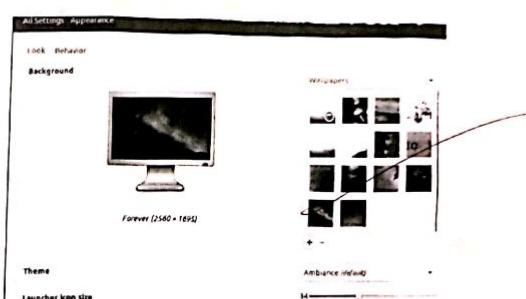
To add wallpaper that is in another folder, just click the plus icon below the thumbnails & then pop-up the window. Select the path to your custom folder & choose the picture inside of it.

* 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 drop-down menu below the wallpaper thumbnails and choose between Ambiance, Radiance or High Contrast.

Ambiance is 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 screen
- You can change how big thing appear on screen by changing screen resolution
- You can change which way up think appear by change the rotation
 - a) Click the icons on very right of the menu bar and Select system setting
 - b) Open Screen display
 - c) If you have a multiple display & they are not mirrored you have different setting on each display, Select the display in preview area
 - d) Select desired resolution and rotation
 - e) Click apply. The new setting will be applied for 30 second before reverting back. That way, if you cannot see anything with new

7. ~~Free~~

- time setting change the time zone of your system
- if you are currently in Indian time . How does displayed time change
- After noting the time changed the time zone back to your local time zone
- Just click on clock on top bar and choose the time & date setting . once time & date window opens , choose manually , so you can change Time & date manually ; otherwise choose your time zone from map and choose automatic

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1601

Practical No. 2

Aim: Installing and removing software.

- i) Install gcc package, verify that it runs and 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 you don't have gcc compiled.

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

* How to uninstall GCC compiler

In GCC 5.1.0, although there is no top-level uninstall target, some directions do have it in particular gcc; so you

- Type: cd build/gcc
sudo make essential

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

Practical NO.3

Aims & utilization of grep, man commands.

Documentation:-

a) finding info about any command line : Bring up the info page for grep command. Bring up the usage section

Ans: To find info about any command 'info' is used the syntax of info command is "info" (command name) we are going to find the info about 'grep' command.

open the terminal (ctrl + alt + t) and type \$ info grep

After typing this command following output will displayed onto your screen

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

Another more summarized form of showing info is the 'man commands'. the command is same as 'info' but require a data

b) Finding man Pages from Command line : Bring up the man page for 'ls' command. scroll down the example 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 page which are available for document file compression simply type : 'man zip'

Tar

name

tar - an archiving utility

Synopsis :

Traditional usage

tar { A | c | d | l | r | t | u } [FILE] [OPTION]

unix Style usage :

tar A - [OPTIONS] ARCHIVE

tar C [-t ARCHIVE] [OPTIONS] [FILE]

tar D [-t ARCHIVE] [OPTIONS] [FILE]

tar L [-t ARCHIVE] [OPTIONS] [FILE]

tar R [-t ARCHIVE] [OPTIONS] [FILE]

tar U [-t ARCHIVE] [OPTIONS] [FILE]

tar X [-t ARCHIVE] [OPTIONS] [FILE]

GNU Style usage :

tar { --catenate --concatenate [OPTION] [ARCHIVE]

tar --create [-f file archive] [OPTION] [FILE]

name
zip - Package & compress (archive) files

Synopsis
zip abc def ghi jkl mn opq rstuvwxyz [oq]

ziplook (See separate man pages)

zip note (See separate man page)

zip lft (See separate man page)

Note : Command Line Processing in ZIP has been changed to support long option and handle all option and argument more consistently. Some old command line that depend on command line may no longer work.

d) Find the man Pages by section from the command line :
Bring up the man Pages from the printf lib. function which manual Pages section are library function

Ans) the number command to correspond to what sec of manual Pages is form ; 1 is user command while 3 is sysadmin stuff. The man Pages man -t Self explains. \$ man -t std one

* manual Sections

The Standard Section of manual include :

- 1 User command
- 2 System call
- 3 C library function
- 4 Devices & special file
- 5 File format & convention
- 6 Games, etc. etc.
- 7 Miscellaneous

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3. System administrator tool and Daemons

Distribution customize the manual section to their specifics which often include additional section

There are certain terms that have different pages in different sections (e.g., 'printf' as a command appears in section one as 'stdlib' junction appears in section 3; in cases like that you can pass section no. to the man before the page name to choose on you want or use man-a to show every matching page in row

* \$ man 1 printf
\$ man 2 printf
\$ man -a printf
\$ man -k '^ printf'
~~printf (1) - format and print data~~
~~printf (1P) - write a formatted output~~
~~printf (3) - formatted output conversion~~
~~printf (3P) - print formatted output~~
~~printf [buildings] (1) - bash built-in command, see bash()~~

• You can tell what section a term fall in with 'man-k' (equivalent to a Procd command) it will do substring matches too. So you need to use "term" to a limit in

Ques.

e)

Command-line Help list the available option for
mk dir Commands , how you can do this ?

* \$ mk.dir - m x=rwx directory name



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Practical No. 4

Command Line operation

i) Install new package on your system

→ sudo apt-get install [Package name]

ii) Remove the Package installed.

→ sudo apt-get remove [Package name]

iii) Find the Password file in / using find command

→ # find / -name Password

- /usr/share/doc/nss-1day-253/Pamd/Password

- /usr/bin/Password

- /etc/Pam.d/Password

- /etc/Password

Find the directory Password file under root and one level down.

find / -maxdepth 2 -name Password

- /etc/Password

Find the Password file under root and 2 level down

find / -maxdepth 3 -name Password

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

* Find the passwd file between subdirs of level 2 \$ h

find -maxdepth 3 -maxdepth 5 -name passwd

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

iv] Create a symbolic link to file you found in 3rd step

→ # ln -s file1 file2

v Create an empty file example.txt & move it to temp directory using relative pathname

→ # touch example.txt

→ # mv example.txt

vi Create delete the file moved to temp in previous step by absolute method

→ # rm /tmp/example.txt

- q. Find the location of ls, ps, bash command
- # where is ls
ls : /bin /ls /usr /share /man/man1 /ls.1.g2
 - # where is ps
ps : /bin /ps /usr /share /maps : /bin /ps /usr /share /man/man1 /ps.1.g2
 - # where is bash
bash : /bin /bash /etc /bash.bashrc /usr /share /man /man1 / bash.1.g2

~~16/01.~~

Practical No. 5

8im: file operation

Q1 Explore the mounted file system on your Computer

$$\rightarrow df - k$$

```
df -k
Filesystem      1K-blocks   Used  Available Use% Mounted on
udev             494436       0  494436  0% /dev
tmpfs            102416   3676  98740  4% /run
tmpfs            7092728  338372  3326024  5% /
/dev/sda1        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
root@ebagiba-VirtualBox:~$
```

2. what are different ways of exploring mounted file system

→ mount

3. Copying text from file

→ cp command, mv command

```
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  Music  Pictures  Public  Videos
Documents  examples.desktop  Pictures  Templates

jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: .00..txt: No such file or directory
cat: .00..txt: No such file or directory
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
cat: gg..txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat dd..txt
cat: dd..txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ touch dd..txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd..txt  gg..txt
jeba@jeba-VirtualBox:~/jeb$ cp gg..txt dd..txt
jeba@jeba-VirtualBox:~/jeb$ cat dd..txt
cat: dd..txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ rm dd..txt
jeba@jeba-VirtualBox:~/jeb$ ls
jeba@jeba-VirtualBox:~/jeb$ cat dd..txt
cat: dd..txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ rm dd..txt
jeba@jeba-VirtualBox:~/jeb$ rm gg..txt
jeba@jeba-VirtualBox:~/jeb$ ls
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
jeba@jeba-VirtualBox:~/jeb$ welcome
jeba@jeba-VirtualBox:~/jeb$
```

Q. Archiving and back up the work directory using tar, gzip and bzip2 commands.

→ gzip filename.txt , Bzip2 file name.txt

5] use diff command to Create, diff of two file
→ diff filename1 filename2

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

6. use Patch command to Patch file . and analyze the patch using Patch Command again

```
jebajeba@VirtualBox:~/jeb$ cat >hi.txt
hi
hi
^C
jebajeba@VirtualBox:~/jeb$ cat >hlt.txt
hello
hello
hello
^C
jebajeba@VirtualBox:~/jeb$ diff -u hi.txt hlt.txt >sam.patch
2c2
jebajeba@VirtualBox:~/jeb$ patch < sam.patch
patching file hi.txt
jebajeba@VirtualBox:~/jeb$ cat sam.patch
--- hi.txt      2020-01-08 22:14:55 +063009834 +0530
+++ hlt.txt    2020-01-08 22:15:18.259898738 +0530
@@ -1,3 +1,3 @@
hi
hi
hello
hello
hello
jebajeba@VirtualBox:~/jeb$
```

Practical NO.6

Q which account you are Logged in? How do you find out
+ who command & whoami

```
jebajeba@VirtualBox: ~
jebajeba@VirtualBox: ~ who
jeba    tty7          2020-01-15 20:32 (:0)
jebajeba@VirtualBox: ~ whoami
jeba
jebajeba@VirtualBox: ~ who -l
jebajeba@VirtualBox: ~ who -l
jeba    tty1          2020-01-15 20:30
LOGIN   tty1          780 id=tty1

jebajeba@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 -
Jebajeba@VirtualBox: ~ w -s
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37
USER   TTY   FROM           IDLE WHAT
jeba   tty7   :0            4:38   /sbin/upstart --user
Jebajeba@VirtualBox: ~ w -h
jeba   tty7   :0            20:32  4:44  8.67s  0.33s /sbin/upstart -
jebajeba@VirtualBox: ~ w -f
20:36:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER   TTY   LOGIN@ IDLE  JCPU PCPU WHAT
jeba   tty7   20:32  5:36  9.00s  0.33s /sbin/upstart --user
```

b) Display /etc/shadow file using Cat Command and understand the importance of shadow file. how it's different than password file.

→ cat /etc / shadow

• As with passwd file, each field in a shadow file is also separated with ":" colon character and are as follow:

• A reserved field for possible future use.

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo]: password for jeba:
root::10240:0:99999:7:::
daemon::16911:0:99999:7:::
bin::16911:0:99999:7:::
sys::16911:0:99999:7:::
sync::16911:0:99999:7:::
games::16911:0:99999:7:::
man::16911:0:99999:7:::
lp::16911:0:99999:7:::
mail::16911:0:99999:7:::
news::16911:0:99999:7:::
```

- Each field in Password entry is separated with ":" character, and are as follows:
 - Username, upto 8 character, case sensitive, usually all lower case. A direct match to username in the /etc/passwd file
 - Password, 13 character encrypted. A blank entry (eg.:) indicate a password is not required to log in (usually a bad idea), and a "*" entry (eg.:*) indicate account has been disabled.
 - The number of days after (since 1 January 1970) since the password was last changed
 - The number of days before password may be changed (to indicate it may be changed at any time)
 - The number of days after which password must be changed (99999 indicate user can keep this or her password unchanged for many years)
 - The number of days to warn user of an expiring (7 for full week)
 - The number of days after password expire that account is disabled
 - The no. of days since January 1, 1970 that account has disabled
- User home directory, usually /home/username (eg /home/smith). All user's personal files, web pages, mail forwarding etc.
- User's "shell account". often set to "/bin/bash" to provide access to bash shell (my personal favourite shell)

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:60:games:/usr/games:/usr/sbin/nologin
man:x:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:lp: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:Mailng List Manager:/var/list:/usr/sbin/nologin
```

Practical No. 7

Topic : Linux Editor: vi

- * Create, modify, search and navigate file in editor.
- i creating a file
→ To create a file, on the terminal type 'vi' followed by filename
- ii modifying the file
→ To modify the file name on vi editor, type 'o'
- iii search in file
→ To find a word (forward search) Press / followed by word to search
- iv Navigate
• movement in four direction

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

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Q) get your current working directory
→ Pwd

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

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

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

Q) Create alias to mostly commonly used command
→ Alias command instruct the shell to replace one command while executing the command
→ alias label = "command"

```
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:~$
```

b) Learn all essential Command Line Search/Replace/Highlight,
Show line number

i) Replace :

Syntax : `:g/oldword to be replaced/s//newword/gc`

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

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

```
jeba@jeba-VirtualBox: ~
Hello
This is our Linux example
Wellcome
Welldone
This is Vt Editor
Thank you
```

ii) Highlight

→ use set hlsearch

```
jeba@jeba-VirtualBox: ~
Hello
This is our Linux example
Wellcome
Welldone
This is Vt Editor
Thank you

:set hlsearch
```

• word navigate

Key	Action
b	Move back to beginning of word
*	Move forward to end of word
e	Move forward to beginning of word
w	Move forward to first character of line
o(zero)	Move to first character of line
\$	Move to end of line

• Scrolling

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

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- iii show the line number
- use `set nu`

```
jebajeba@VirtualBox: ~
$ set nu
jebajeba@VirtualBox: ~
$ cat /etc/lsb-release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=12.04 LTS
DISTRIB_CODENAME=precise
DISTRIB_DESCRIPTION="Ubuntu 12.04 LTS"
jebajeba@VirtualBox: ~
$
```

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Practical No. 8

Topic: Linux security

- a use of sudo to change user privileges to root
- Create an user named user1

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

- To give some user root privileges edit /etc/sudoers using vi editor Enter new line in 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/sbin:/usr/bin/"
Defaults !/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 operation 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 new user using password

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

```
jeba@jeba-VirtualBox:~$ sudo chage user1  
Changing the aging information for user1  
Enter the new value, or press ENTER for the default  
Minimum Password Age [0]: 100  
Maximum Password Age [99999]: 200  
Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21  
Password Expiration Warning [7]: 5  
Password Inactive [-1]:  
Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31  
jeba@jeba-VirtualBox:~$ sudo chage -l user1  
Last password change : Jan 21, 2020  
Last password change : Aug 08, 2020  
Password expires : never  
Account expires : Jan 31, 2028  
Minimum number of days between password change : 100  
Maximum number of days between password change : 200  
Number of days of warning before password expires : 5
```

```
jeba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 98 -I 30 -W 30 user1  
jeba@jeba-VirtualBox:~$ sudo chage -l user1  
Last password change : Jan 21, 2020  
Last password change : Apr 20, 2020  
Password expires : May 20, 2020  
Account expires : Jan 01, 2022  
Minimum number of days between password change : 10  
Maximum number of days between password change : 90  
Number of days of warning before password expires : 30
```

-E: Expiration date

-m: minimum number of days before Password change

-M: Maximum of the number of days Password is valid

-I: Account Inactive

-W: no. of days of warning before password change required

d) Delete newly added user

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

Practical No. 9

Topic: Network management

Q] Get IP address of your machine using ifconfig

```
jeba@jeba-VirtualBox:~$ ifconfig
eth0      Link encap:Ethernet HWaddr 00:0c:27:0e:6b:69
          BROADCAST MTU:1500 Metric:1
          RX packets:12 errors:0 dropped:0 overruns:0 frame:0
          TX packets:12 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
          BROADCAST MTU:1500 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)
```

Q] Get the host name of your machine

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

Q] Use Ping to check the network connectivity to remote machine

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.8 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.8 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.8 ms
64 bytes from naa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=90.9 ms
^Z
```

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d) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
;; <> DiG 9.10.3-P4-Ubuntu <> www.google.com
; global options: +cmd
; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 52068
;; Flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
; OPT PSEUDOSECTION:
; EDNS: version: 0, flags: udp: 4096
; QUESTION SECTION:
; www.google.com. IN A
; ANSWER SECTION:
www.google.com. 91 IN A 172.217.166.100
; Query time: 152 msec
; SERVER: 127.0.1.1#53(127.0.1.1)
; WHEN: Mon Jan 26 22:48:06 IST 2020
; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

e) Troubleshooting network using trace route

```
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:~$
```

```
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  68.485 ms
jeba@jeba-VirtualBox:~$
```

f) Use of arp Command

```
jeba@jeba-VirtualBox:-
jeba@jeba-VirtualBox:~$ arp
Address           Htype  HWaddress           Flags Mask           Iface
10.0.2.2          ether   52:54:00:12:35:02  C      enp0s3
```

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g) Use of host Command

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

h) Use of netstat Command & Nmap Command

```
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  
d/notify  
unix 2      [ ]    DGRAM  
syslog  
unix 16     [ ]    DGRAM  
dev-log  
unix 7      [ ]    DGRAM  
socket  
unix 3      [ ]    DGRAM  
unix 3      [ ]    STREAM   CONNECTED  44642  /run/systemd/notify  
unix 3      [ ]    STREAM   CONNECTED  43331  @/tmp/dbus-CyNTeI7AQG  
unix 3      [ ]    STREAM   CONNECTED  42988  @/tmp/dbus-CMCCc6G7P5  
unix 3      [ ]    STREAM   CONNECTED  42690  /run/systemd/journal/  
unix 3      [ ]    STREAM   CONNECTED  13242  /run/systemd/journal/  
stdout  
unix 3      [ ]    STREAM   CONNECTED  43113  /run/systemd/journal/  
stdout  
unix 3      [ ]    STREAM   CONNECTED  43013  /run/systemd/journal/  
tx 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): 2484:6800:4007:811::2004  
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net  
Not shown: 998 filtered ports  
PORT      STATE SERVICE  
80/tcp      open  http  
443/tcp     open  https  
  
Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
```

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Practical No. 10

Aim: Shell Scripting

- * Basics of shell Scripting
- i To get a shell, you need to start a terminal
- ii To see what shell you have, run: echo \$SHELL.
- iii In Linux, the dollar sign (\$) stand for shell variable
- iv The echo command just return whatever you type in
- v ~~#!/bin/bash - it is called shebang. It written at the top of shell script and it passes the instruction to program /bin/bash~~
- Echo \$SHELL

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

• Vi file_name.sh
~~#!/bin/bash~~
 Echo "This is Linux"

```

eg tcsc@tcsc-VirtualBox ~
#!/bin/bash
echo "THIS IS LINUX!"

linux.sh [New File]

```

- chmod 777 file-name.sh
./filename.sh

```

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

```

- * Step to write & execute shell scripting
 - Shell script is just a simple text file with .sh extension, having executable permission
 - i open terminal
 - ii Navigate to place where you want to script using cd command
 - iii Touch filename.sh
 - iv vi file-name.sh (you can use your favourite editor to edit script)

j) chmod 777 filename.sh (for making script Executable)
vi) Sh filename.sh or ./filename.sh (for running script)

* 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"

```

```

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 sum of two numbers

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

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

* Program to find sum of two number (value Pass during Execution)

```
#!/bin/bash
Sum=$(( $1 + $2 ))
echo "Sum is : $Sum"
```

chmod 777 file Name. Sh
./file Name. Sh 50 70

```
tcsc@tcsc-VirtualBox ~
$ chmod 777 lln.sh
$ ./lln.sh 50 70
```

```
"lln.sh" 3 lines, 46 characters
tcsc@tcsc-VirtualBox:~$ vi lln.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 lln.sh
tcsc@tcsc-VirtualBox:~$ ./lln.sh 50 70
sum is:120
tcsc@tcsc-VirtualBox:~$
```

* Sed

Sed command or stream editor is powerful utility offered by linux system. It is mainly use for text substitution, find & replace but it can perform other text manipulation like insertion, deletion, search etc with Sed we can edit complete file without actually having to open it

- Consider following text file

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

- i) Displaying Partial text of file
 - with Sed, we can view only part of file rather than seeing whole file

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

- ii) To display all except Some line
 - To display all content of a file Except for Some portion use, 'd' option

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

iii) Deleting a line

- To delete a line, use line number follow by 'd'

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

iv) Search & replace a string

- 's' option is searching word

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

v) Replace a string on particular line

- To replace a string on particular line
 Use line with 's' option

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

vii To add line before or after the matched string

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

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

To add new line with some content after every pattern match use option 'i'

```
tcsc@tcsc-VirtualBox:~$ sed '/cs/i "this is linux"' cs.txt
>this is linux"
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

viii To change a whole line with matched pattern

- To change a whole line to new line when search matches use option 'c'

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

vii Appending line

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

```
tcsc@tcsc-VirtualBox:~$ sed -e 's/.*/Thanks &/' cs.txt
Thanks subjects offered in cs
Thanks datastructure
Thanks database Management
Thanks linux
Thanks python
Thanks green tech
Thanks softskill
Thanks stats
Thanks calculus
Thanks computer basic
```

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