

**★ ★ INDEX ★ ★**

No.	Title	Page No.	Date	Staff Member's Signature
1.	Installation & customization of Linux in Virtual Box	34	2.12	
2.	Installing & removing software.	40	9.12	
3.	Utilization of command	42	16.12	
4.	Command line operations	45	6.1.20	
5.	File Operations	47	13.1.20	
6.	User environment	49	20.1	10/02
7.	Linux editors : vi	52	20.1	
8.	Linux security	54	27.1	27/02
9.	Network management	55	27.1	27/02
10.	Shell scripting	57	10.2	

## PRACTICAL NO.1.

29

- Aim : (i) Install your choice of Linux distribution.  
(ii) Customize desktop environment by changing different default options like changing default background themes, screensaver.  
(iii) Screen resolution.  
(iv) Time settings.

### I. Steps to install Ubuntu:

- (i) Install all virtual box.
- (ii) Open virtual box double click the virtual box app.
- (iii) Click now. Its a table box in the upper left corner of the virtual box column.
- (iv) Enter the name of your virtual machine. Type the whole variable by its name and it should be in single quotes.
- (v) Select Ubuntu as the version name. Ubuntu should be selected by default after you set type value to Linux, select on Ubuntu (64 bit) by providing
- (vi) ~~Click next at the bottom of the menu.~~
- (vii) Select an amount of RAM. Click and obey the slides left or right to decrease or increase the amount of RAM. The needed amount of RAM will be negative when you RAM.
- (viii) Then click on next at the bottom of the menu.
- (ix) Create your virtual machine that

selection of your complete hardware space which will be used to store your hardware machine program.

- Click Create
- Click Next
- Select space to be allotted
- Click Create

(x) Make sure Ubuntu is rightly installed and you can start working on it.

II. Customize desktop environment by changing different default options like changing default background, themes, screensaver.

(i) To access appearance settings in Ubuntu, click on user menu at the top right corner, on the top menu.

(ii) A window will appear with all settings and into personal, Hardware and system options icons. Select the appearance icon.

(iii) On the left side of background part, you can see your current wallpaper. On the right side, select one of Ubuntu wallpapers clicking on any thumbnail our wallpaper will be changed.

(iv) If you want to select wallpaper from your pictures folder. Click the drop down menu above thumbnail; select the wallpaper.

### III. changing Ubuntu theme:

(i) Ubuntu has an option to change the desktop theme, which in one click will change the entire way your computer looks.

(ii) Click on the drop down menu below the wallpaper thumbnails and choose between Ambiance, Radiance or High Contrast.

(iii) Ambiance is a light theme that looks a bit more Mac-like while Radiance is dark brown theme used in Ubuntu by default.

### changing screen resolution:

(i) You can change the resolution of the screen and how big things appear on the screen by changing the current resolution.

(ii) Click the icon on the very right of the menu bar and select system settings.

(iii) If you have multiple displays and they are not mirrored you can have different settings on each display. Select a display in the previous area.

(iv) Select your desired resolution and rotation. Click Apply.

### Change time setting:

(i) Change the time zone of your system.

(ii) If you are currently in Indian time.

ES.

After rotating the time change, change  
the time zone back to your local time zone.

## PRACTICAL NO. 2

33

Aim: Installing and removing software.

I. Install gcc package, verify that it runs and then remove it.

(i) Type 'gcc.x' to know if you have already installed gcc compiler or not. If the output is blank it means that you don't have gcc installed.

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

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

II. Install gcc compiler :

(i) In GCC 5.1.0 although there is no ~~cap~~-level uninstall target, some directories do have it, in particular gcc, so you can.

Type : ~~cd build/gcc~~

~~sudo make uninstall~~

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

10/102

## PRACTICAL NO. 3

Aim: Utilization of grep man commands.

### Documentation:

(i) Printing info documentation from the command line:

Bring up the info page for the grep command. Bring up the usage section.

→ To find info about any command. Info command is used.

The syntax of info command is:  
info (common name)

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

Open the terminal (~~Alt + Ctrl + T~~) and type info grep.

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

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

Another one summarized form of showing info is the main command, the command is same as 'info' but requires data.

(ii) Finding main pages from the end line: Bring up the main page is command scroll down to the example section.

→ To use the 'main' command simply type  
man (command name)

Now as we are going to find the manual for 'ls' command. Simply type:  
'man ls'

(iii) Finding pages by topic: What man pages are available that document file compression.

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

Simply type : 'man zip'  
'man tar'

(iv) Finding man pages by the section from the end lines: Bring up the man pages from the print lib function which manual page section are library function found.

→ 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 ans.

There are certain terms that have different pages in different section (e.g. 'printf' as a command appears in section 1 as a stdio function appears in section 3; in cases like that you can pass the section no to the man before the page name to choose which one you want 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 appropriate command) it will do substring matches to need to use "term. to Unit ~~the~~ it.

# PRACTICAL NO. 4

AS TITLE: Command Line Operations

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 passwd file in / using find command.

(i) find / -name passwd

- / user / share / doc / nss-ldap-253 / pamd / passwd
- / usr / bin / passwd
- / etc / pam.d / passwd
- / etc / passwd

(ii) find the directory passwd file under root and level down.

find / -maxdepth 2 -name passwd

• / etc / passwd

(iii) find the passwd file under root and 2 level down.

find / -maxdepth 3 -name passwd  
 • /usr/bin/passwd  
 • /etc/pam.d/passwd  
 • /etc/passwd

(iv) find the password file b/w sub-directories level 2 & 4

find -maxdepth 3 -maxdep -name pass  
 • /user/bin/passwd  
 • /etc/pam-d/passwd

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

> ln -s file1 file2

ii) Create an empty file example.txt & move it to /tmp directory using relative path name  
 > touch example.txt  
 > mv example.txt /tmp

ii) Delete the file moved to /tmp in previous step by absolute method.  
 rm /tmp/example.txt

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

> whereis ls

ls : /bin/ls /user/share/man1/ls.1.gz

whereis ps

ps : /bin/ps /user/share/mcops:/bin/ps /user/  
share/man/man1/ps.1.gz

whereis bash

bash : /bin/bash /etc/hash.hashrc /user/share/man/  
man1/bash.1.gz

90°  
90°

# PRACTICAL NO.5

88 TITLE: File Operations

1. Explore mounted file systems on your computer.

Ans: df -k

Practical no; 5  
Operations

1. Explore mounted file systems on your computer

Ans: df-k

Filesystem	1K Blocks	Used	Available	Mount point
udev	49152	0	49152	/dev
tmpfs	49344	1676	49772	/run
overlay	109129	348372	832602	/sys
rootfs	112675	213	112462	/
tmpfs	5120	4	5116	/var/run/lock
tmpfs	5120	6	5116	/var/lib/locate
tmpfs	102416	45	102371	/run/user/1000

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

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

### 3. Copying text from files.

**Ans : cp command, mv command**

4. Archiving and backup the work directory using the `gzip` and `bzip2` commands.

trix:  
gzip filename.txt  
Bzip2 filename.txt

4. Archiving and backup the work directory using tar, gzip and bzip2 commands.

Ans: gzip filename.txt

## Bzip2 filename.txt

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

Ans: diff filename1 filename2

```
dd.txt
jebajeba@VirtualBox:~/jebS$ cat ss.txt.gz
jebajeba@VirtualBox:~/jebS$ gzip dd.txt
jebajeba@VirtualBox:~/jebS$ ls
jebajeba@VirtualBox:~/jebS$ cat dd.txt.gz
```

5. Use diff command to create diff of two files

Ans: diff filename1 filename2

```
jebajeba@VirtualBox:~/jebS$ 
jebajeba@VirtualBox:~/jebS$ cat aa.txt
Hello world
This is Linux
jebajeba@VirtualBox:~/jebS$ diff aa.txt bb.txt
1de
+Hello world
jebajeba@VirtualBox:~/jebS$ cat >bb.txt
This is Linux
C
jebajeba@VirtualBox:~/jebS$ diff aa.txt bb.txt
+Hello world
diff: aa.txt: No such file or directory
jebajeba@VirtualBox:~/jebS$ gzip bb.txt
jebajeba@VirtualBox:~/jebS$ gzip aa.txt
jebajeba@VirtualBox:~/jebS$ diff aa.txt.gz bb.txt.gz
Binary files aa.txt.gz and bb.txt.gz differ
```

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

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

```
jebajeba@VirtualBox:~/jebS$ cat h1.txt
hi
hi
jebajeba@VirtualBox:~/jebS$ cat -n1.txt
Hello
Hello
Hello
jebajeba@VirtualBox:~/jebS$ diff -u h1.txt -n1.txt > sam.patch
jebajeba@VirtualBox:~/jebS$ patch -s sam.patch
jebajeba@VirtualBox:~/jebS$ patch -s sam.patch
patching file h1.txt
patching file -n1.txt
h1.txt
2020-01-08 22:21:10 +0530
++ h1.txt
2020-01-08 22:21:10 +0530
@@ -1,3 +1,3 @@
hi
hi
Hello
Hello
Hello
jebajeba@VirtualBox:~/jebS$
```

# PRACTICAL NO. 6

## TITLE : Use Environment

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

Ans: who command & whoami

```
jeba@jeba-VirtualBox:~$ who
jeba    tty7          2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
LOGIN   tty1          2020-01-15 20:30          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
20:35:14 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
jeba@jeba-VirtualBox:~$ w -h
jeba      tty7      :0            20:32     4:44    8.67s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -f
20:36:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER      TTY      LOGIN@     IDLE     JCPU     PCPU WHAT
jeba      tty7      20:32     5:36    9.00s  0.33s /sbin/upstart --user
```

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

Ans: cat /etc/shadow

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

- Username, up to 8 characters. case-sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.
- Password, 13 characters encrypted. A blank entry (eg. ::) indicates a password is not required to log in (usually a bad idea) and a "\*" entry (eg. :\*:\*) indicates the account has been disabled.
- The number of days (since Jan 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 (99999 indicates user can keep his/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 expiring that account is disabled.
- The number of days since Jan 1, 1970 that account has been disabled.

- A reserved field for possible future use.

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] password for jeba:
root:!$1$18240$0:99999:7:::
daemon:*$1$16911$0:99999:7:::
bin:*$1$16911$0:99999:7:::
sys:*$1$16911$0:99999:7:::
sync:*$1$16911$0:99999:7:::
games:*$1$16911$0:99999:7:::
man:*$1$16911$0:99999:7:::
lp:*$1$16911$0:99999:7:::
mail:*$1$16911$0:99999:7:::
news:*$1$16911$0:99999:7:::
```

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

- Username, upto 8 characters. Case-sensitive, usually all lowercase.
- An "x" in the password field. Password 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 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)

```
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:/usr/sbin:/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
```

c.) Get your current working directory

Ans: `pwd`

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

d.) Explore different ways of getting command history, how to run previously executed command without typing it. 42

Ans: history

!line number

```
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:~$ 13  
who -l .  
LOGIN      tty1          2020-01-15 20:30           780 id=tty1  
jeba@jeba-VirtualBox:~$
```

e.) Create alias to most commonly used commands.

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

Ans: alias label="command"

Ans: 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:~$
```

10/10/2021

# PRACTICAL NO. 7

SIDE TITLE: LINUX Editors: Vi

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

(i) Creating a file:

⇒ To create a file, on the terminal type vi, followed by file name.

(ii) Modifying the file:

⇒ To modify a file, on the vi editor, type 'o'.

(iii) Search a file:

⇒ To find a word (forward search) press / followed by the word to search.

(iv) Navigate:

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
0(zero)	Move to first character of a line
\$	Move to the end of line

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

### Scrolling

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

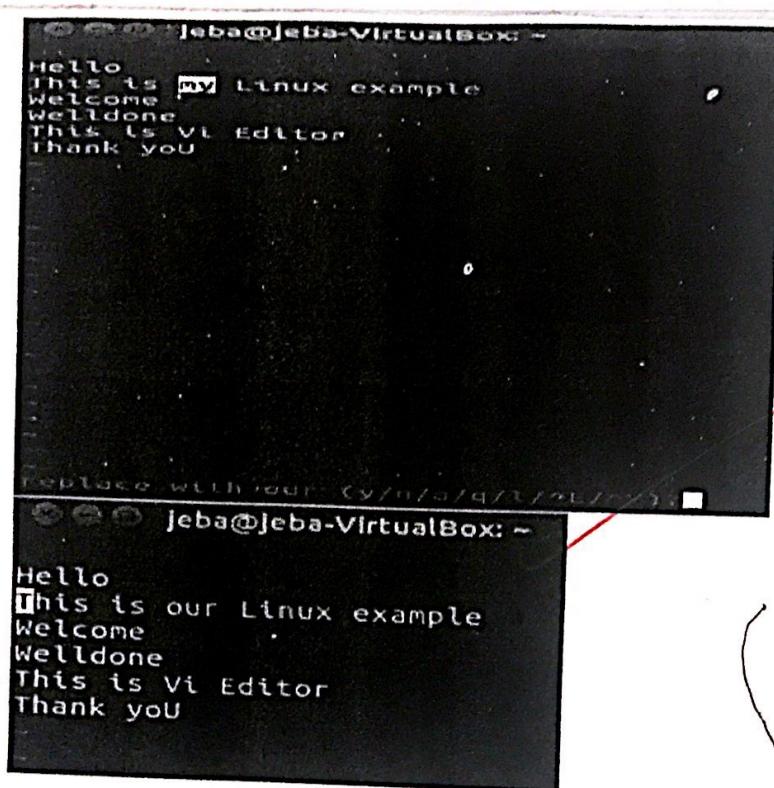
- b) Learn all essential commands like search/replace, highlight, show line numbers.
- (i) Replace : /g/word to be replaced /s//new/gc

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

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

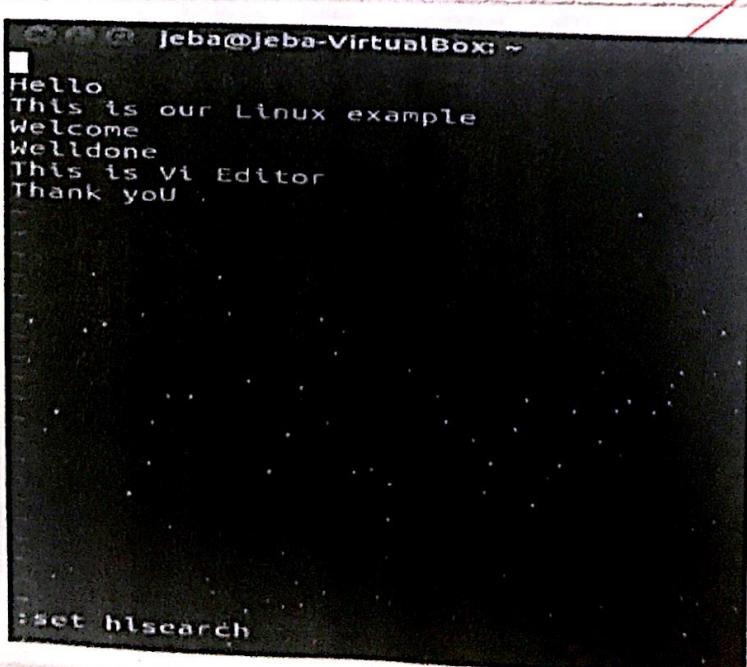
:g/my/s//our/gc
```

84.



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

ii) ~~highlight~~  
=> use set hlsearch



```
jeba@jeba-VirtualBox: ~  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
  
:set hlsearch
```

(iii) Show the Line number

use set nu

44

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 nu
```

89  
11/02

# PRACTICAL NO. 8

## TITLE : LINUX Security

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

Create an user named user1

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 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.

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 password ageing.

```
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:~$
```

- E: Expiration Date
- m: max. no. of days before password change
- M: NO. of days password is valid.
- I: Account inactive
- W: Number of days of warning before required password change.

d.) Delete newly added user.

**d) Delete newly added user**

```
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:~$
```

# PRACTICAL NO. 9

## TITLE : Network Management

46

a.) Get IP address of your machine using 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::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)
```

b.) Get hostname of your machine

b) Get hostname of your machine

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

c.) Using ping check network connectivity to remote machine.

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

a)

```
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: 52068  
; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1  
  
; OPT PSEUDOSECTION:  
; EDNS: version: 0, flags:; udp: 4096  
; QUESTION SECTION:  
www.google.com. IN A  
; ANSWER SECTION:  
www.google.com. 91 IN A 172.217.166.100  
  
; Query time: 152 msec  
; SERVER: 127.0.1.1#53(127.0.1.1)  
; WHEN: Mon Jan 20 22:40:06 IST 2020  
; MSG SIZE rcvd: 59  
  
jeba@jeba-VirtualBox:~$
```

## e.) Troubleshooting network using traceroute, route command

### e) 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

### f) Use of arp command

```
jeba@jeba-VirtualBox:~$ arp
Address          Hwtype  HWaddress      Flags Mask        Iface
10.0.2.2          ether    52:54:00:12:35:02  C            enp0s
```

### g.) Use of host command

#### 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.

10  
1102

```
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  16     [ ]        DGRAM                   9695       /run/systemd/journal/
dev-log
unix  7      [ ]        DGRAM                   9704       /run/systemd/journal/
socket
unix  3      [ ]        DGRAM                   9684       /run/systemd/notify
@/tmp/dbus-CymTeI7AQG
unix  3      [ ]        STREAM     CONNECTED    44042      @/tmp/dbus-CymTeI7AQG
unix  . 3     [ ]        STREAM     CONNECTED    43331      @/tmp/dbus-CymTeI7AQG
unix  . 3     [ ]        STREAM     CONNECTED    42988      @/tmp/dbus-CymTeI7AQG
unix  . 3     [ ]        STREAM     CONNECTED    42690      @/tmp/dbus-CMGGC6C7P5
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/
unix  3      [ ]        STREAM     CONNECTED    42935
```

## PRACTICAL NO. 10

Aim: Shell scripting

Basic of shell scripting.

- a.) To get a shell, you need to ~~select~~ start a terminal. ~~echo \$ SHELL~~
- b.) To see what -shell you have, run:  
echo \$ shell SHELL
- c.) In unix, 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.

- chmod 777 filename.sh  
- /filename.sh

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

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

Steps to write and execute a shell script.

Shell script is just a simple text file with .sh extension, having executable permission. 48

- a.) Open terminal
  - b.) Navigate to the place where you want to create script using cd command.
  - c.) Touch filename.sh
  - d.) vi filename.sh [You can use your favorite editor, to edit the script]
  - e.) chmod 777 filename.sh [for making the script executable]
  - f.) sh filename.sh or ./filename.sh [for running the script]
8. Program to display your name

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

8.b

```
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 the sum of two variables

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

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

## sed

sed command or stream editor is very powerful utility offered by Linux system. It is mainly used for text substitution, find and 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.

Consider the following text file.

```
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
```

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

1.) Displaying partial text of a file with sed, we can view only part of a file rather than swing whole file.

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

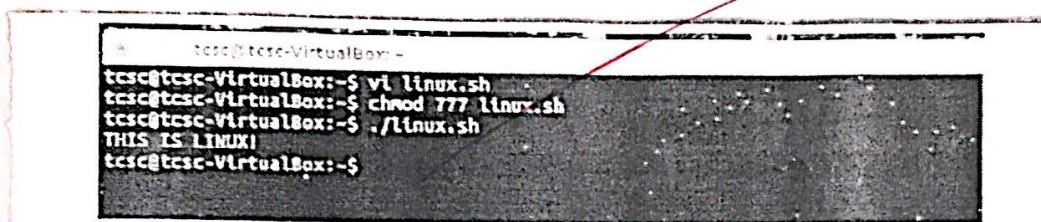
2. Display all except some lines.

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

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

### 3.) Deleting of line

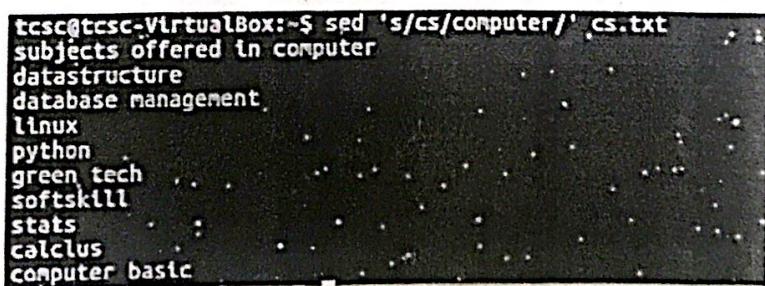
To delete a line, use line number<sup>50</sup> followed by 'd'.



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

### 4.) search and replace a string.

's' option is for searching a 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
```

5.) Replace a string on a particular line  
To replace a string on a particular line, use line number 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
```

6.) Add a line after before the matched string. Add a line after 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 a new line with some content before every pattern match, use option 'i'.

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

- 7.) To change a whole line with matched pattern. To change a whole line to a new line when a search pattern matches use option.

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

## 8. Appending lines

To add some content before every line with sed , use \* 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
```

## Q.

### Program to calculate sum of two numbers (values passed during execution).

```
tcsc@tcsc-VirtualBox:~$ vi lin.sh
#!/bin/bash
sum=$(( $1+$2 ))
echo "sum is:$sum"

lin.sh" 3 lines, 46 characters

tcsc@tcsc-VirtualBox:~$ chmod 777 lin.sh
tcsc@tcsc-VirtualBox:~$ ./lin.sh 50 70
sum is:120
tcsc@tcsc-VirtualBox:~$
```