PERFORMANCE

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Computer Journal

CERTIFICATE

SEMESTER 'I' UID No. _____

Class F.Y.B.Sc Roll No. 1803 Year 2019-2020

This is to certify that the work entered in this journal is the work of Mst. / Ms. Hemant Sahu

who has worked for the year 2019-2020 in the Computer Laboratory.

01/10/19

Teacher In-Charge

for

9/10/19

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Head of Department

Date : 27/2/2020

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PRACTICAL - 1

LINUX INSTALLATION

→ Install your choice of Linux distribution.
e.g. Ubuntu, Fedora, Debian.

→ Customize desktop environment by changing different default options like changing default background, themes, screensavers.

→ Accessing Appearance Setting :-

i) To access appearance setting in Ubuntu, let's click on User Menu at the top right corner, on the top Menu bar & select System Settings ....

ii) A window will pop-up with all settings divided into Personal, Hardware & System options/icons. Let's first select the Appearance icon.

→ Changing Wallpaper / picture.

i) On the left of background part, you can see your current wallpaper.

ii) 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.

iii) If you want to select wallpaper from your picture folder, click the drop down menu aka thumbnails & select the pictures folder.

iv) You will see all the pictures in your pictures folders as thumbnails, where you can see select them as your wallpaper

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

→ Changing Ubuntu theme :-

i) Ubuntu also has an option to change the Desktop theme, which on one click will change the entire way your Computer looks.

ii) To do that, click on the drop-down menu below the wallpaper thumbnails, & choose between Ambiance, Radiance or High Constrast

iii) Ambiance is a light theme that looks a bit more Mac-like, while Radiance is a darkeon brown theme used on Ubuntu by default.

05/02

Date 14/9/19

8

PRACTICAL-2

Aim:- Installing and removing software.

1) 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 & C++ programming language.

UNINSTALL GCC COMPILER :-

In gcc 5.1.0, although there is no top-level uninstall target, some directories don't 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 executions like gcc, g++, Cpp .... contained in that directory.

PRACTICAL-3

Aim:- Utilization of grep, man commands:-

Documentation:

a) Finding information documentation from the Command line: bring up the info page for the grep command. Bring up the wage 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) & 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.

:~ $ info

Output: This is the info main menu
(aka directory mode):
A few useful info commands:
'q' quits;
'?' lists all info commands;
'h' starts the info tutorials
'm' texting RET visits the
Zorkinfo manual, &c

:~$ Man ls

OUTPUT:- NAME:
ls - list directory contents.

SYNOPSIS:-
ls [OPTION] ... [FILE]...

DESCRIPTION:-
List information about the FILEs sort.
entries alphabetically if none of
nor -- sort is specified.

-a, --all
do not ignore entries starting with

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

--author
with -l, print the author of each file

-b, --escape
print C-style escapes for nongraphic
characters.

-c, List entries by columns.

:~$ man tar
OUTPUT:- NAME; The GNU version of the tar archiving utility.
SYNOPSIS:
tar [-]A -- Concatenate (c- --create)
d-- list --Compare --- delete (r- append).

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

5) finding man pages from the cmd line: Bring up the man page for the 'ls' command. Scroll down the example section.

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

6) finding man pages by topic what man pages are available that document file compression.

Ans) 'Tar', 'zip' are some man pages are available that document file compression:
simply type: man zip
man tar

7) Finding man pages by section from the cmdlines bring up the man page for the printf lib. function which manual page section are library function found.

Ans) The number corresponds to what section of white 8 is sysadmin stuff. The man page for man itself. explain it & list the stdlib

There are certain terms that have a different pages in different sections (eg. 'printf' as a command appears in section 1. as a 'stdlib' 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 don't want or use man -a to show entry 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 write "term" to limit it.

e) Command-Line Help list the available options for the mkdir command. How can you do this?

:~$ mkdir =m a=rwx directoryname.

:~$ ls

fyes 3

t -- list/-- test - label/u --update /x --
extract --get [option] [path name...]

Description

Tap stores & extracts file from a tap or disk

function letters

-A -- Catenate
append tar files to an archive

-c, -- Create
Create a new archive

-d ,- - diff -- Compare
find difference between archive & file system

-- delete
delete from the archive

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

:~$ man 3 printf:

NAME printf, sprintf, fprintf, dprintf, snprintf, vprintf, vfprintf, vsprintf, formatted output version.

Description:

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

PRACTICAL - 4

→ Command line operations:-

a) Install new package on your system
Sudo apt-get install [package name]

b) Remove the package installed.
Sudo apt-get remove [package name]

c) Find the passwd file in / using find command.
find / -name passwd
- /usr/share/doc/nss_ldap-253/pam.d/passwd
- /usr/bin/passwd
- /etc/pam.d/passwd
- /etc/passwd

d) find the directory passwd file under root & one level down.
find / -max depth 2 -name passwd
/etc/passwd

e) find the passwd file under root & 2 level down.
find / -max depth 3 -name passwd
- /usr/bin/passwd
- /etc/pam.d/passwd
- /etc/passwd

f) find the password file b/w sub-directories level 2 & 4
find -max depth 3 -maxdepth 5 - name passwd
./usr/bin/passwd
/etc/pam-d/passwd

g) Create a symbolic link to the file you found in last step.
ln -s file1 file2

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

i) delete the file moved to /tmp in previous step by alternate method.
rm /tmp/example.txt

j) find the location of ls, ps, bash commands.
where is ls
ls: /bin /ls /usr/share/man/man1/ls.1.gz
where is ps
ps: /bin/ps /usr/share/maps: /bin/ps/ usr/share/man/man1/ps.1.gz
where bash
bash: /bin/bash/ etc/bash.bashrc usr/share/man/man1/bash.1.gz

8/05/22

PRACTICAL-1

* Install your choice of linux distribution.
using a USB drive.

Step 1:- Most newer computers can boot from USB you should see a welcome your screenshot prompting you a choose your language & giving you the option to install ubuntu or try it from the USB.

Step 2:- If your computer doesn't automatically do you might need to press the f12 key to bring up the boot menu, but be careful not to hold it down that can cause not to burn.

Step 3:- Prepare to install ubuntu.

→ We recommend you plug your computer into a power case.

→ You should also make sure you have enough space on your computer to install ubuntu. We you to select download while installing & install this third-party software now.

Step 4:- Allocate drive space

Use the checkboxes to choose whethers you had like to install Ubuntu alongside nother Operating System, delete your existing operating System & replace it with ubuntu or it you are on advanced user chose the 'something else' Promts.

Step 5:- Begin the installation.

Depending on your previous selection & you can now verify that you have chosen the way in which you would like to install ubuntu. The installation process will begin when you click the install now button.

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

Step 6:- Select your location.

If you are connected to the internet this should be done automatically check your location is correct & click 'forward' to proceed.

If you are not correct about your timezone. Type the name of the town you are in or click on the map & we will help you find it.

Step 7:- Select your preferred keyboard layout click on the language option you need if the detection keyboard layout button for help.

Step 8:- Enter your login & password details.

Step 9:- Have more about Ubuntu while the system install s.

Step 10:- That's it.

All the left is to restart your computer & start enjoying Ubuntu.

* Screen Resolution.

→ Change the size or rotation of the screen.
→ You can change how big things appear on the screen by changing the screen resolution.
→ You can change which may up things appear by changing the resolution.
→ Step 1:- Click the icon on the very right of the select system settings.
Step 2:- Open screen display.
Step 3:- If you have multiple displays & they are not mirrored you can have different settings.
Step 4:- Select your decided resolution & rotation. Click on the apply the new settings are ready & applied now.

* Time settings:-

Step 1:- If you are already in Indian Time
Step 2:- After noting the change in time, change the time zone & back up to your local time zone.
Step 3:- Just click on the clock on the top bar & choose the time & Data settings once once change the time & date normally outside choose you time from the map & choose Automatic.

PRACTICAL- 6

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 & understand the Command importance of shadow file.
How it's different than passwd file.

Ans) Cat/etc/shadow.

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

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

→ Username upto 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 & a "*" entry (eg :*:) indicates the account has been disabled.

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

```
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: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
```

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

→ 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 or her password unchanged for many, many years)

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

→ The numbers of days since Jan 1, 1970 that an account has been disabled.

→ Username upto 8 characters. Case-sensitive, usually all lowercase.

→ An "x" in the password field. Passwords are stored in the "/etc/shadow" file.

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

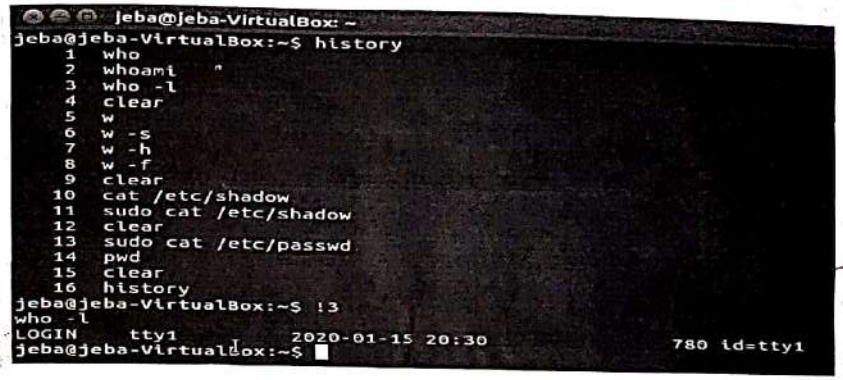
→ User "shell account". often set to "/bin/bash" to provide access to the bash shell.

a) Get your current working directory.

Ans) pwd.

b) Explore different ways of getting Command history, how to run previously executes command without typing it.

Ans) history.
! number.

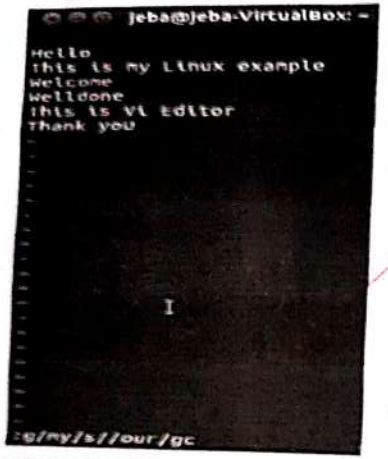


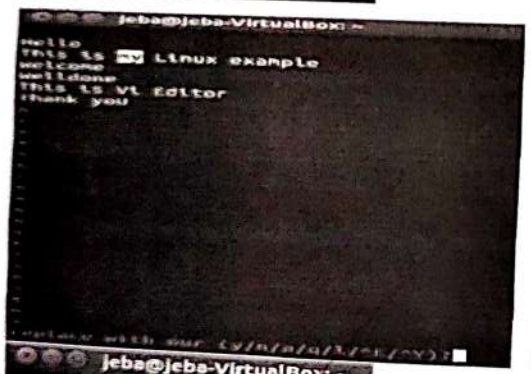
c) Create alias to most Command used Commands.

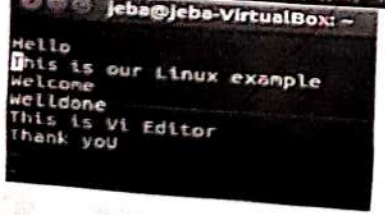
Alias Command instructs the shell to replace one string with another string while executing the Commands.

Ans) alias label = "Command".

8
10/1/20







PRACTICAL - 7

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 filename.

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

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

↳ Modifying the file:

iii) Search in a file.

Ans) To find a word press / followed by the word to search.

b) Navigate.

Moving 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 begging of word.
e	Moves forword to end of the word.
w	Moves forword to the begining of the word.
0(zero)	Move to first character of line
$	Moves to the end of line.

→ Scrolling.

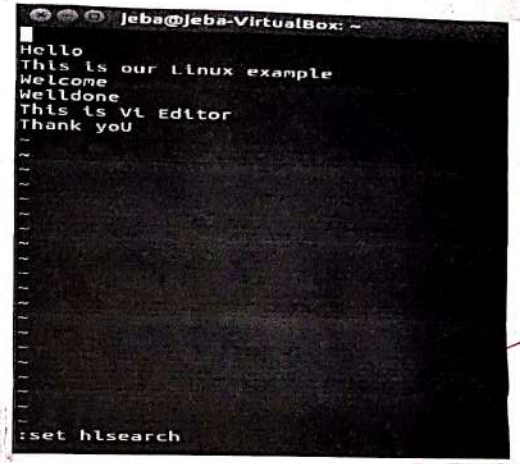
Key	Action.
Ctrl + f	Scrolls forword.
Ctrl + b	Scroll backward
Ctrl + d	Scrolls half page
Ctrl + u	Scrolls half page backward.

6) Learn all essential Commands like search/replace, highlights, 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: ~
jeba@jeba-VirtualBox:~$ sudo useradd user1
[sudo] password for jeba:
jeba@jeba-VirtualBox:~$ sudo passwd user1
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
jeba@jeba-VirtualBox:~$
```

PRACTICAL- 8

LINUX SECURITY

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

→ Create an user named user1

To give some user 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: ~
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
```

-E : Expiration Date
-m : Minimum number of days before password change
-M : Number of days password is valid
-I : Account inactive
-W : Number of days of warning before a password change is required.

d) Delete newly add user.

```
jeba@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter the new value, or press ENTER for the default

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

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

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

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

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

```
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:~$
```

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

PRACTICAL - 9

NETWORK MANAGEMENT

a) Get IP address of your machines using ifconfig.

b) Get hostname of your machine.

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

d) Use of dig Command.

e) Troubleshooting network using traceroute, route Command.

f) Use of arp Command.

g) Use of host Command.

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ dig www.google.com

; <<>> DiG 9.10.3-P4-Ubuntu <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 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:~$
```

```
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:~$
```

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s
3
```

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

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    42149    /run/user/1000/systen
d/notify
unix  2      [ ]         DGRAM                    9694     /run/systemd/journal/
syslog
unix  10     [ ]         DGRAM                    9695     /run/systemd/journal/
dev-log
unix  7      [ ]         DGRAM                    9704     /run/systemd/journal/
socket
unix  3      [ ]         STREAM     CONNECTED     9684     /run/systemd/notify
unix  3      [ ]         STREAM     CONNECTED     44042    @/tmp/dbus-CynTeI7AQG
unix  3      [ ]         STREAM     CONNECTED     43331
unix  3      [ ]         STREAM     CONNECTED     42988    @/tmp/dbus-CynTeI7AQG
unix  3      [ ]         STREAM     CONNECTED     42698    @/tmp/dbus-CMGGc6G7PS
unix  3      [ ]         STREAM     CONNECTED     13242    /run/systemd/journal/
stdout
unix  3      [ ]         STREAM     CONNECTED     43113    /run/systemd/journal/
stdout
unix  3      [ ]         STREAM     CONNECTED     43013
unix  3      [ ]         STREAM     CONNECTED     42935
```

```
jeba@jeba-VirtualBox:~$ nmap www.google.com

Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST
Nmap scan report for www.google.com (216.58.196.68)
Host is up (0.044s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net
Not shown: 998 filtered ports
PORT    STATE SERVICE
80/tcp  open  http
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
jeba@jeba-VirtualBox:~$
```

h) Use of netstat Command and Nmap command.

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PRACTICAL -5

FILE OPERATIONS

1) Explore mounted file system on your Computer.

Ans) df -k

```
jeba@jeba-VirtualBox:~$ df -k
Filesystem     1K-blocks    Used Available Use% Mounted on
udev              494436       0    494436   0% /dev
tmpfs             102416    3676     98740   4% /run
/dev/sda1        7092728 3383372   3326024  51% /
tmpfs             512076     216    511860   1% /dev/shm
tmpfs               5120       4      5116   1% /run/lock
tmpfs             512076       0    512076   0% /sys/fs/cgroup
tmpfs             102416      48    102368   1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

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

Ans) mount.

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=102416k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,releas
e_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot
=/)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net
_cls,net_prio,nsroot=/)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot=/)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsro
ot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpua
cct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsro
ot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot
=/)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/
)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_even
t,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsro
ot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minp
roto=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```

3) Copying text from files.

Ans) cp Command , mv Command

```
jeba@jeba-VirtualBox:~$ ls
Desktop    Downloads  [redacted]  Music     Public     Videos
Documents  examples.desktop  jj   Pictures  Templates
jeba@jeba-VirtualBox:~$ cd jeb
jeba@jeba-VirtualBox:~/jeb$ cat .gg.txt
cat: .gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat >gg.txt
welcome
Linux
^C
jeba@jeba-VirtualBox:~/jeb$ touch dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  gg.txt
jeba@jeba-VirtualBox:~/jeb$ cp gg.txt dd.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:~/jeb$ touch ss.txt
jeba@jeba-VirtualBox:~/jeb$ mv gg.txt ss.txt
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt
welcome
Linux
jeba@jeba-VirtualBox:~/jeb$
```

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /mnn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable: exiting now
jeba@jeba-VirtualBox:/$ sudo tar -cvf data.tar /mnn
tar: Removing leading '/' from member names
/mnn/
/mnn/hd/
jeba@jeba-VirtualBox:/$ ls
bin   data.tar  etc         lib         mnn   opt   run   srv  usr
boot  dd        home        lost+found  mnt   proc  sbin  sys  var
cdrom dev       initrd.img  media       mnt1  root  snap  tmp  vmlinuz
jeba@jeba-VirtualBox:/$ cat data.tar
mnn/hd/0000755000000000000000000000000013605376557010365 5ustar  rootrootmnn/hd/0000755000000
0000000000000000000013605376557010760 5ustar  rootrootjeba@jeba-VirtualBox:/$
```

```
jeba@jeba-VirtualBox:~/jeb$ bzip2 ss.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat ss.txt.bz2
BZh91AY&SY'◆▯▯▯◆▯▯▯
'J◆w$S◆◆▯▯1 jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
jeba@jeba-VirtualBox:~/jeb$ ▯
◆▯▯▯d.txt+O◆I◆◆M◆◆◆◆+◆◆▯◆Xzjeba@jeba-VirtualBox:~/jeb$
```

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

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


4) Archiving & backup the work directory using tar, gzip and bzip 2 command.

Ans) gzip filename.txt

Bzip2 filename.txt

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

Ans) diff filename1 filename2

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

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PRACTICAL - 10

AIM:- SHELL SCRIPTING.

Basics of shell scripting.

a) To get a shell, you need to start a terminal.
b) To see what shell you have, run: echo $ SHELL
c) In linux, the dollar sign ($) stands for shell variable.
d) The echo command just returns whatever you type in.
e) #!/bin/bash - It is called Shebang. It is written at the top of a shell script & passes the instruction to the program /bin/bash.

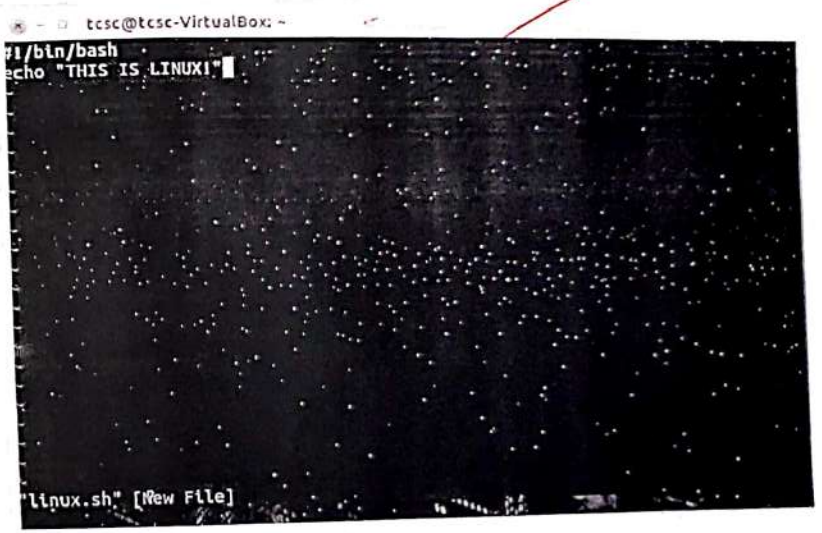
- vi filename.sh
  #! /bin /bash
  echo "This is linux!".

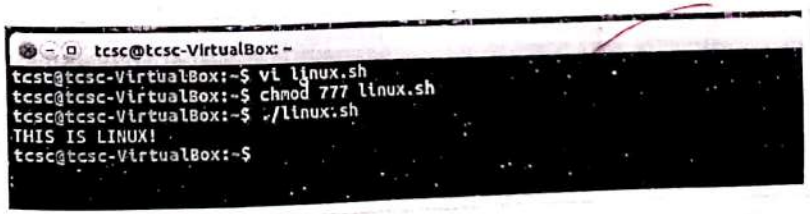
- Chmod 777 filename.sh
  ./filename.sh

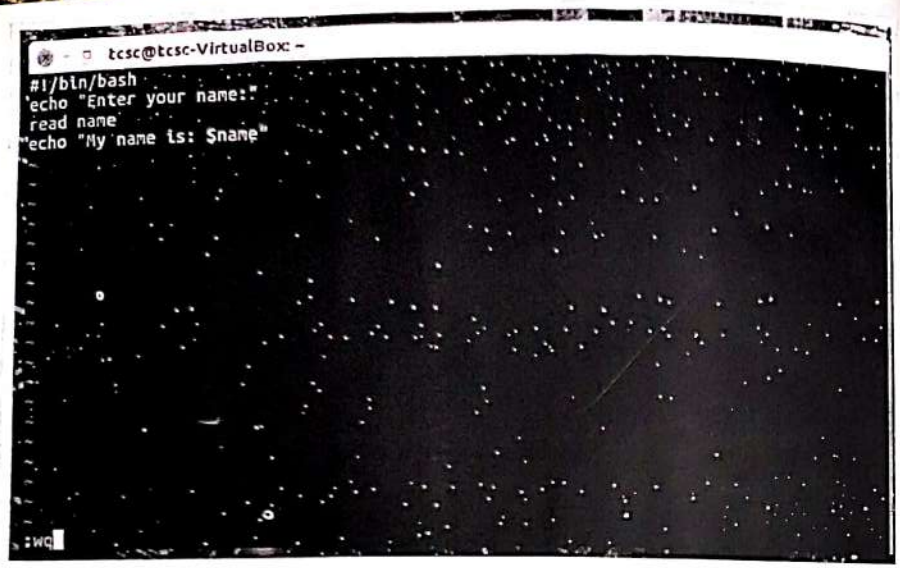
→ Step to write & execute a shell script.

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

d) Vi filename.sh

e) chmod 777 filename.sh (Making script executable)

f) 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"
```

→ 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 linux2.sh
tcsc@tcsc-VirtualBox:~$ chmod 777 linux2.sh
tcsc@tcsc-VirtualBox:~$ ./linux2.sh
Sum is:125
tcsc@tcsc-VirtualBox:~$
```

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

"lin.sh" 3 lines, 46 characters

→ 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 manipulations like insertion, deletion, search etc. With Sed, we can edit complete files without actually having to open it.

Consider the following text file.

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

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

```
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:~$
```

```
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
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

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

4) Search & 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 number with 's' option.

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

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

7) To change a whole line with modified pattern.
→ To change a whole line to a new line when a search pattern matches. Use option 'c'.

8) Appending lines.
→ To add some content before every line with $ sed, use * & as follows.

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

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

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

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

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