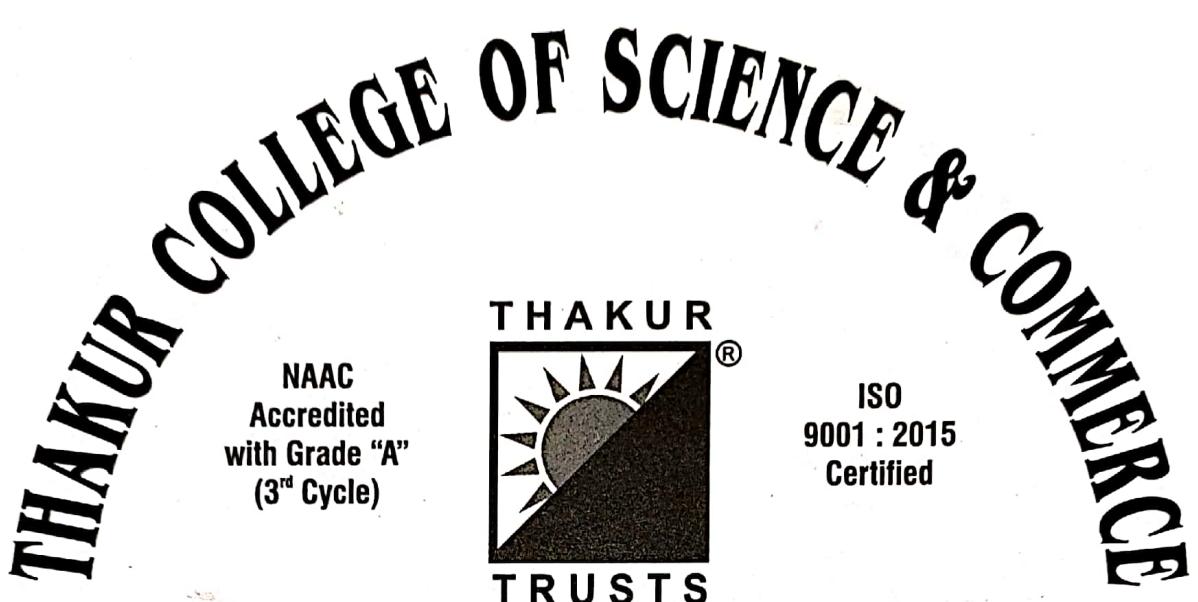


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Degree College
Computer Journal
CERTIFICATE

SEMESTER II UID No. _____

Class FY BSC CS Roll No. 1730 Year 2019 - 20

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who has worked for the year 2019 - 20 in the Computer
Laboratory.

Teacher In-Charge

Date : _____

Head of Department

Examiner



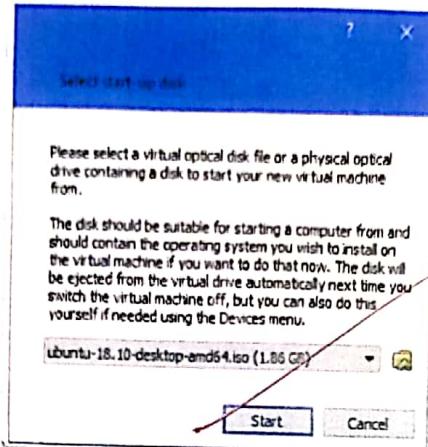
INDEX



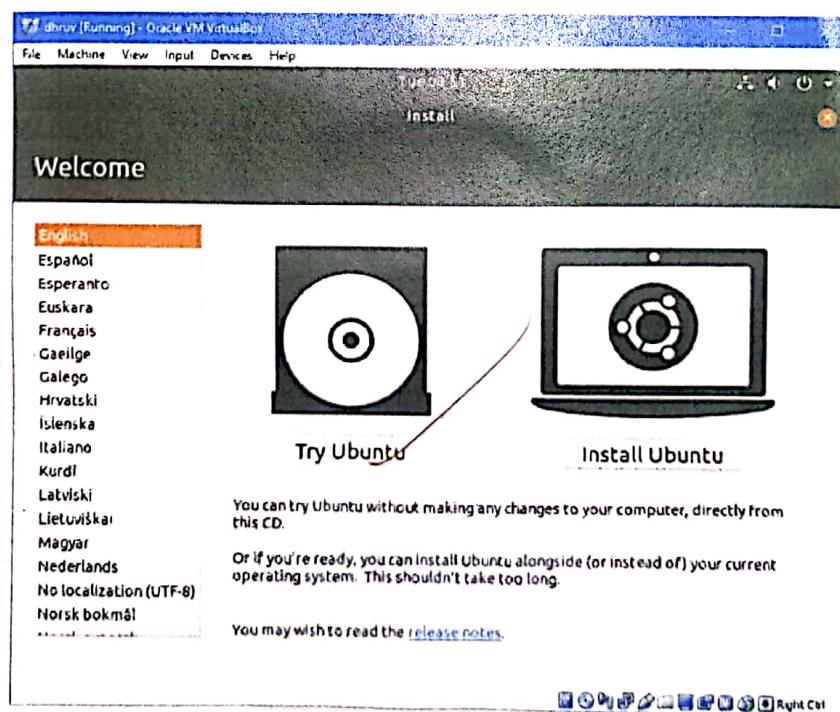
No.	Title	Page No.	Date	Staff Member's Signature
1.	PRACTICAL-1 LINUX INSTALLATION	29	30-11-19	✓
2.	PRACTICAL-2 INSTALLING & REMOVING SOFTWARE	32	21-12-19	✓
3.	PRACTICAL-3 UTILIZATION OF GRP, MAN, S COMMAND	34	21-12-19	✓/10
4.	PRACTICAL-4 FILE OPERATIONS COMMANDLINE	37	4-1-20	✓
5.	PRACTICAL-5 FILE OPERATIONS	40	4-1-20	✓
6.	PRACTICAL-6 USE ENVIRONMENT	42	11-1-20	✓/80
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INDEX

STEP1



Step 2



Practical-1

Aim: Linux Installation

a. Install your choice of Linux distribution

Eg: Ubuntu, Fedora, Debian

1. Prepare to install Ubuntu

2. Allocate drive space

• Use the check boxes to choose whether you would like to install Ubuntu alongside another operating system, delete your existing operating system and replace it with Ubuntu or if you are an advanced user choose the 'something else' option.

3. Begin the installation

• Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu.

• The installation process will begin when you click the Install Now button.

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

4. Select Your location:-

• If you are connected to the internet, this should be done automatically. Check your location is correct and click 'Forward' to proceed. If you are unsure of your time zone, type the

name of the town you are in or click on the map and we will help you find it.

5. Select your preferred keyboard layout
Click on the language option you need. If you are not sure, click the 'Delete keyboard layout' button for help.

6. Enter your login and password details

7. Learn more about Ubuntu while the system installs.

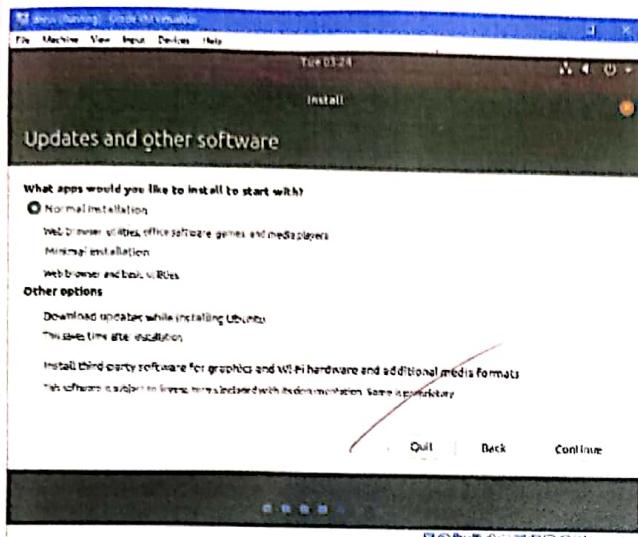
8. That's it

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

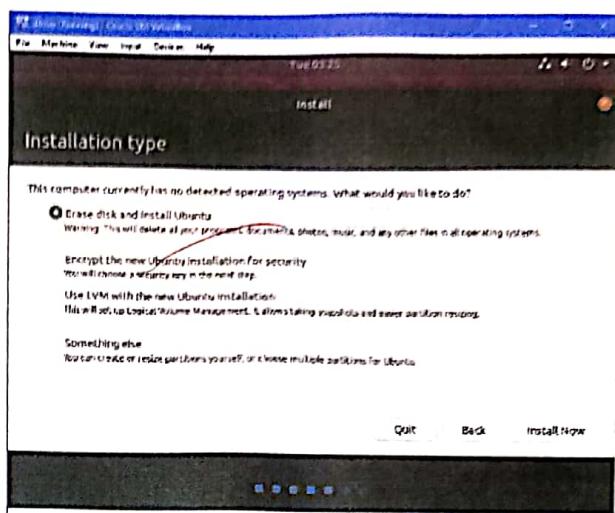
(b) Customize desktop environment by changing different default options like changing default background, themes, screensavers.

(c) Screen resolution: Assertion, the current screen resolution for your desktop.
Change the size or rotation of the screen

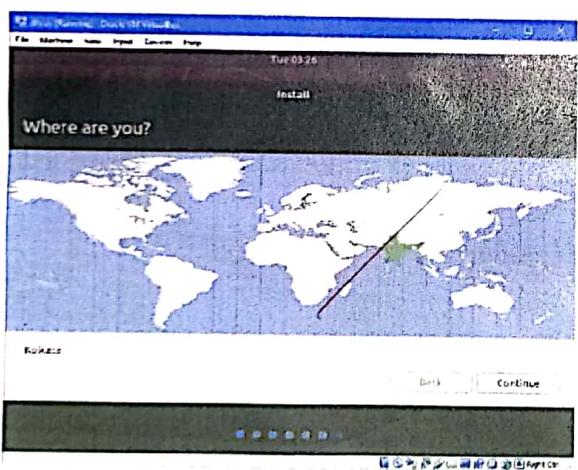
Step3



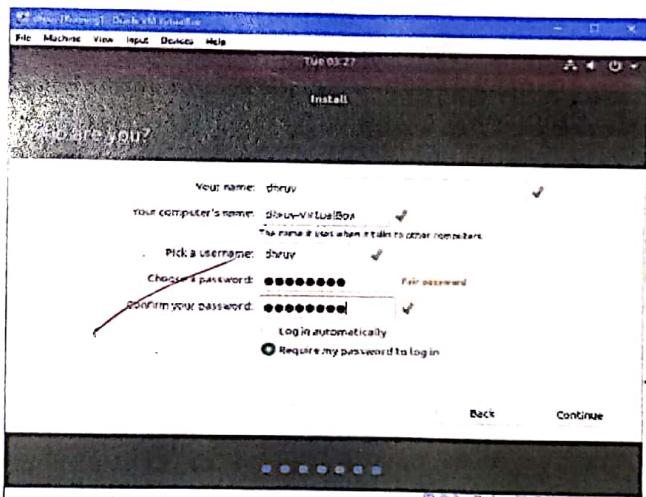
step 4



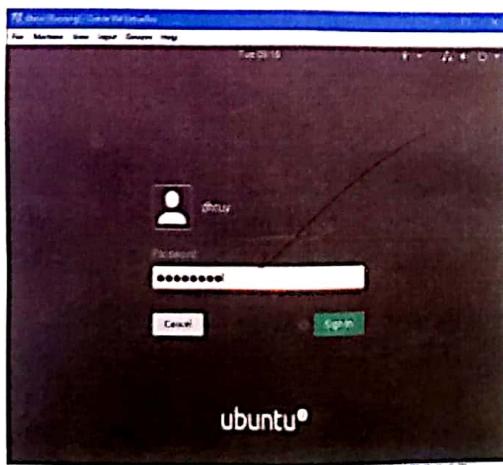
Step5



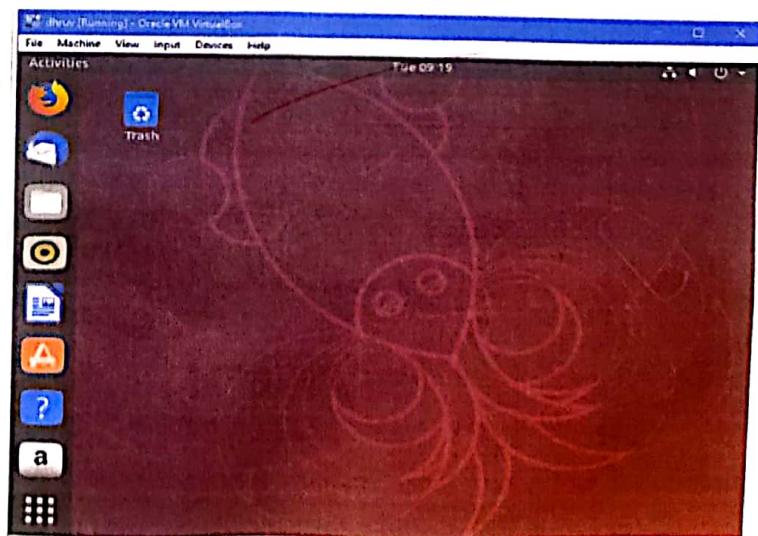
step6



Step7



step 8



- You can change how big or detailed things appear on the screen by changing the screen resolution.
 - You can change which way up things appear by changing the rotation.
- (d) Time settings change the time zone of your system.

Practical - 2

Aim: Installing and Removing software

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

Step 1: First type 'gcc -v' to know if you have already installed gcc compiler or not. If the output is blank then it means that you don't have gcc installed.

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

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

Now to install gcc compiler:-

In acc 8.1.0 although there is no top-level uninstall target, some directories do have it in particular gcc, so you can do:

Type: cd build | g++ . /a.out
sudo make uninstall

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

8
11/01

Practical - 3

Aim: Utilization of grep, man commands

Documentation:

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

ans: To find info about any command 'info' command is used. The syntax of info command is 'info (command name)'
We are going to find the info about the 'grep' command.

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

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

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

Another, more summarized form of showing info is the 'man' command.

The compound is same as 'info' but required data.

UbuntuServer [Running] - Oracle VM VirtualBox
File Machine View Help

Terminal File Edit View Search Terminal Help

TAR(1) BSD General Commands Manual 853 AM TAR(1)

NAME
tar - The GNU version of the tar archiving utility

SYNOPSIS
tar [-c] A --catenate --concatenate | c --create | d --diff --compare | --delete | r --append | t --list | --test-label | u --update | x
--extract --get [options] [pathname ...]

DESCRIPTION
Tar stores and extracts files from a tape or disk archive.

The first argument to tar should be a function; either one of the letters Acdrtux, or one of the long function names. A function letter need not be prefixed with '--', and may be combined with other single-letter options. A long function name must be prefixed with '--'. Some options take a parameter; with the single-letter form these must be given as separate arguments. With the long form, they may be given by appending =value to the option.

FUNCTION LETTERS
Main operation mode:

- A, --catenate, --concatenate append tar files to an archive
- c, --create create a new archive
- d, --diff, --compare find differences between archive and file system
- delete delete from the archive (not on mag tapes!)
- r, --append append files to the end of an archive
- t, --list list the contents of an archive
- test-label test the archive volume label and exit
- u, --update only append files newer than copy in archive

Manual page tar(1) line 1 (press h for help or q to quit)

File Machine View Help

girish@UbuntuServer:~

File: dlr, Node: Top, This is the top of the INFO tree.

This is the Info main menu (aka directory node).
A few useful Info commands:

- 'q' quits;
- '?' lists all Info commands;
- 'b' starts the Info tutorial;
- 'texinfo RET' visits the Texinfo manual, etc.

* Menu:

- Basics
 - * Common options: (coreutils)Common options,
 - * Coreutils: (coreutils), Core GNU (file, text, shell) utilities.
 - * Date input formats: (coreutils)Date input formats.
 - * Ed: (ed), The GNU line editor
 - * File permissions: (coreutils)File permissions.
 - * Finding files: (find), Access modes, Operating on files matching certain criteria.
- C++ libraries
 - * autospprintf: (autospprintf), Support for printf format strings in C++.
- Compression
 - * Gzip: (gzip), General (de)compression of files (lzw).
- Development
 - * SSIP: (ssip), Speech Synthesis Interface Protocol.
 - * Speech Dispatcher: (speech-dispatcher), Speech Dispatcher.
- DOS
 - * Mtools: (mtools), Mtools: utilities to access DOS disks in Unix.
- Editors
 - * nano: (nano), Small and friendly text editor.
- GNU Gettext Utilities
 - * autopoint: (gettext)autopoint Invocation, Copy gettext infrastructure.
 - * envsubst: (gettext)envsubst Invocation, Expand environment variables.

....Info: (dir)Top, 254 lines ..Top..

Welcome to Info version 6.1. Type H for help, h for tutorial.

File Machine View Help

UbuntuServer [Running] - Oracle VM VirtualBox
File Machine View Help

Terminal File Edit View Search Terminal Help

girish@UbuntuServer:~

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....Info: (dir)Top, 254 lines ..Top..

Welcome to Info version 6.1. Type H for help, h for tutorial.

File Machine View Help

UbuntuServer(Running) - Oracle VM VirtualBox

File Machine View Help

Terminal File Edit View Search Terminal Help

User Commands

LS(1)

NAME
ls - list directory contents

SYNOPSIS
ls [OPTION]... [FILE]...

DESCRIPTION
List information about the FILES (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.

-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

--block-size=SIZE
scale sizes by SIZE before printing them; e.g., '--block-size=M' prints sizes in units of 1,048,576 bytes; see SIZE format below

-B, --ignore-backups
do not list implied entries ending with ~

-c
with -lt: sort by, and show, ctime (time of last modification of file status information); with -l: show ctime and sort by name; otherwise: sort by ctime, newest first

-c
list entries by columns

--color[=WHEN]
colorize the output; WHEN can be 'always' (default if omitted), 'auto', or 'never'; more info below

-d, --directory
list directories themselves, not their contents

-D, --dired

Manual page ls(1) line 1 (press h for help or q to quit).

8:53 AM LS(1)

ENG 853 AM IN 12/16/2019

b. Finding man pages from the cmd line: Bring up the man page for the 'ls' command. Scroll down to the examples section.

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

c. Finding man pages by topic | what man pages are available that document file compression

ans: 'tar' 'zip' are some man pages which are available for document file compression
 simply type man zip, man tar.

d. Finding man pages by section from the cmd lines bring up the man page for the print lib function which manual page section are library function found.

ans: The number corresponds to what section of the manual page is from is user command while 8 is sysadmin stuff. The man page for man itself explain if are list the std out.

- There are certain terms that have different pages in different pages in different sections, 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 -o to show every matching page in your system.
- You can tell what section a terms fall in which man -k (equivalent to a propos command). It will do substring matches too. So you need to use !TERM! to limit it.
- Command line help list the available option to the mkdir command. How can you do this?

\$ mkdir -ma=rwx directory name

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4/01

Practical-4

Aim :- Command line operations

- Install new package on your system -
⇒ sudo apt-get install (package name).
- Remove the package installed
⇒ sudo apt-get remove (package name).
- Find the passwd file in/using find command
⇒ #find / -name passwd
 - /usr/share/doc/nss-1/dap-253/pamd/passwd
 - /usr/bin/password
 - /etc/pam.d/passwd
 - /etc/passwd.

~~find the password file under root and one level down.~~

```
# find / -max_depth 2 -name passwd
◦ /etc/passwd.
```

~~find the passwd file under root and 2 level down.~~

find - maxdepth 3 - name passwd.

- /usr/bin/passwd

- /etc/pam.d/passwd

- /etc/passwd

find the passwd file b/w sub-directories

Level 2 + 4

#find - maxdepth 3 -maxdepth 5-name passwd

- /usr/bin/passwd

- /etc/pam.d/passwd

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

⇒ # ln -s file1 file2

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

⇒ # touch example.txt

mv example.txt /tmp

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

⇒ # rm /tmp/example.txt

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

⇒ # where is ls

ls : /bin /ls /usr/share/man /man1 /ls.1.gz

where is ps

ps: /bin /ps /usr/share/maps /bin /ps /usr /share /man1 /man1 /ps.1.gz

where bash

bash: /bin /bash /etc /bash.bashrc /usr /share /man1 /man1 /bash / bash.gz

~~18101~~

Practical-5

Aim :- File Operations

- 1) Explore mounted file systems on your computer.
⇒ df -k
- 2) What are the different ways of exploring mounted file system on Linux?
⇒ mount
- 3) Copying text from files
⇒ cp command , mv command
- 4) Archiving and backup the work directory using tar, gzip, and bzip2 commands.
⇒ gzip filename.txt
Bzip2 filename.txt
- 5) Use different command to create different of two files
⇒ diff filename1 filename2

1) 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) jeba@jeba-VirtualBox:~\$ mount

```
svfs 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,relative,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relative,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,relative,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,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
fstab 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,nsroot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot=/)
cgroup on /sys/fs/cgroup/bikio type cgroup (rw,nosuid,nodev,noexec,relatime,bikio,nsroot=/)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsroot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

3) jeba@jeba-VirtualBox:~\$ ls

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

4) 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 vmlinuz
jeba@jeba-VirtualBox:/\$ cat data.tar
mnn/0000755000000000000000000000000013605376557010365 Sustar rootrootmnn/hd/0000755000000
00000000000000000000000013605376557010760 Sustar 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
BZh9AY&SY *
'JewSS*
jeba@jeba-VirtualBox:~/jeb\$ gZip dd.txt
jeba@jeba-VirtualBox:~/jeb\$ ls
dd.txt ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb\$ cat dd.txt.gz
*
jeba@jeba-VirtualBox:~/jeb\$ cat dd.txt.gz
*Xzjeba@jeba-VirtualBox:~/jeb\$ █

5) 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 █

6) 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\$ █

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

~~Q8~~
~~(8/10)~~

The purpose of life is to make it not longer, but
shorter for us to accomplish our dreams
and to fulfil the full life value of
life learning.

It is a good idea to have a
good education and a good job
and a good family and a good life.

It should be taken in account of, how much
time we spend on a particular task or what
kind of time can we use to complete a task
and the time will be used to complete a task.

Practical - 6

Aim :- Use Environment

- a) Which account you are logged in? How do you find out?
⇒ who command & whoami
- b) Display /etc/shadow file using cat command and understand the importance of shadow file. How it's different than passwd file.
⇒ cat /etc/shadow

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

- * Username, up to 8 characters. Case-sensitive, usually all lowercase. A direct match to the user name in the /etc/passwd file.
- * Password, 13 characters encrypted. A blank entry (e.g. "") indicates a password is not required to login (usually a bad idea), and a "*" entry (e.g.: *;) indicates the account has been disabled.

a)

```
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
jeba@jeba-VirtualBox:~$ █
```

780 id=tty1

```
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          LOGIN@     IDLE     JCPU     PCPU 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)

```
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:::
```

b)

```
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
```

- * The number of days (since January 1, 1970) since the password was last changed.
- * The number of days before password may be changed (0 indicates it may be changed at any time).
- * The number of days after which password must be changed (999999 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 number of days after password expires that account is disabled.
- * The number of days since January 1, 1970 that an account has been disabled.
- * A reserved field for possible future use.

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

- * Username ; up to 8 characters. Case-sensitive, usually all lowercase.

File

- * An "x" in the password field. Passwords are stored in the "etc/shadow" file.
- * Numeric user id. This is assigned by "adduser" script. Unix uses this field, plus the following group fields, 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 char).
- * User's home directory. Usually /home/username (e.g. /home/smitij). All user's personal files, web pages, mail forwarding, etc. will be stored here.
- * User's "shell account". Often set to "/bin/bash" to provide access to the bash shell (my personal favorite shell).

c) Get your current working directory.

=> pwd

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c)

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

d)

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

e)

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

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

⇒ history
! line number.

e) Create alias to most commonly used commands.

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

⇒ alias label = "command"

~~18/01~~

Practical - 7

Aim :- Linux Editors: Vi

a) Create, modify, search and navigate a 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 a file, on the vi editor, type 'o'.

iii) Search in a file:-

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

iv) Navigate:-

Movement in four directions.

Word Navigate

Scrolling

Movements

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

Word Navigation

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

b) i)

The screenshot shows a terminal window with the following text:

```
Jeba@Jeba-VirtualBox ~
Hello
This is my Linux example
Welcome
Welldone
This is Vi Editor
Thank you

I

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

A red arrow points from the bottom right of the terminal window towards the bottom right corner of the page.

b) i)

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

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

ii)

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

iii)

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

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

i) Replace:

Syntax - :%g!word to be replaced !s !!new word/gc

ii) Highlight

Use set hlsearch

iii) Show the line number.

use set nu

~~BS
1810~~

PRACTICAL - 8

Aim:- Linux Security

- a) Use of sudo to change user privileges to root.
 - o Create an user named user1.
 - o To give some user root privileges edit /etc/sudoers using visudo. Enter new line as highlighted below.
- b) Identify operations that requires sudo privileges.
- c) Modify expiration date for new user/ using password ageing.
 - 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 added user.

```
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: ~$
```

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```
# 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
```

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

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

8P

```
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: ~$
```

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Practical - 9

Aim:- Network Management.

- a) Get IP address of your machine 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 tracert, route command.
- f) Use arp command.
- g) Use of host command.
- h) Use of netstat command and Nmap command.

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

```
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: ~$ 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.
; 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/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  
unix 3 [ ] STREAM CONNECTED 44042 @/tmp/dbus-CymTeI7AQG  
unix 3 [ ] STREAM CONNECTED 43331 @/tmp/dbus-CymTeI7AQG  
unix 3 [ ] STREAM CONNECTED 42988 @/tmp/dbus-CMGGc6G7PS  
unix 3 [ ] STREAM CONNECTED 42690 @/tmp/dbus-CMGGc6G7PS  
stdout  
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: $
```

Practical 10

Aim :- Shell Scripting

Basics of shell scripting

- To get a shell, you need to start the terminal.
- To see what shell you have, run:
echo \$SHELL
- To, In linux, the dollar (\$) sign stands for shell variable.
- The echo command just returns whatever at the top of a shell script and it passes the instruction to the program /bin/bash.

→ Echo \$ SHELL

→ vi filename.sh

#!/bin/bash

echo "THIS IS LINUX!"

→ Chmod 777 filename.sh
./filename.sh

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

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

"linux.sh" [New File]

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

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

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

Steps to write and execute a shell script -

Shell script is just a simple text file with .sh extension, having executable permissions -

- 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)

Program to display your name -

~~#!/bin/bash~~

Echo "Enter your name."

Read name

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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)

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 computer files without actually having to open it.

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

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

```
tcsc@tcsc-VirtualBox: ~
#!/bin/bash
sum=$($1+$2)
echo "sum is:$sum"
.
.
.
"lin.sh" 3 lines, 46 characters
```

```
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:~$
```

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

```
:wq
```

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

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

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

Consider the following text file -

- 1) Displaying partial text of a file -
→ with sed, we can view only part of a file rather than seeing whole file.
- 2) Display all except some lines.-
→ To display all content of a file except for some portion , use option 'd' .
- 3) Deleting a line -
→ To delete a line , use line number followed by 'd' .
- 4) Search and Replacing a string -
→ 's' option is for searching a word.
- 5) Replace a string on a particular line.-
→ To replace a string on a particular line , use line 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 matched, use option 'i'.

- 7) To change a whole line with matched pattern. -
- To change a whole line to a new line when a searched pattern matches; use option 'c'.
- 8) Appending lines -
- To add some content before every line with sed, use * and & 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  
calculus  
computer basic
```

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

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

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

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

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