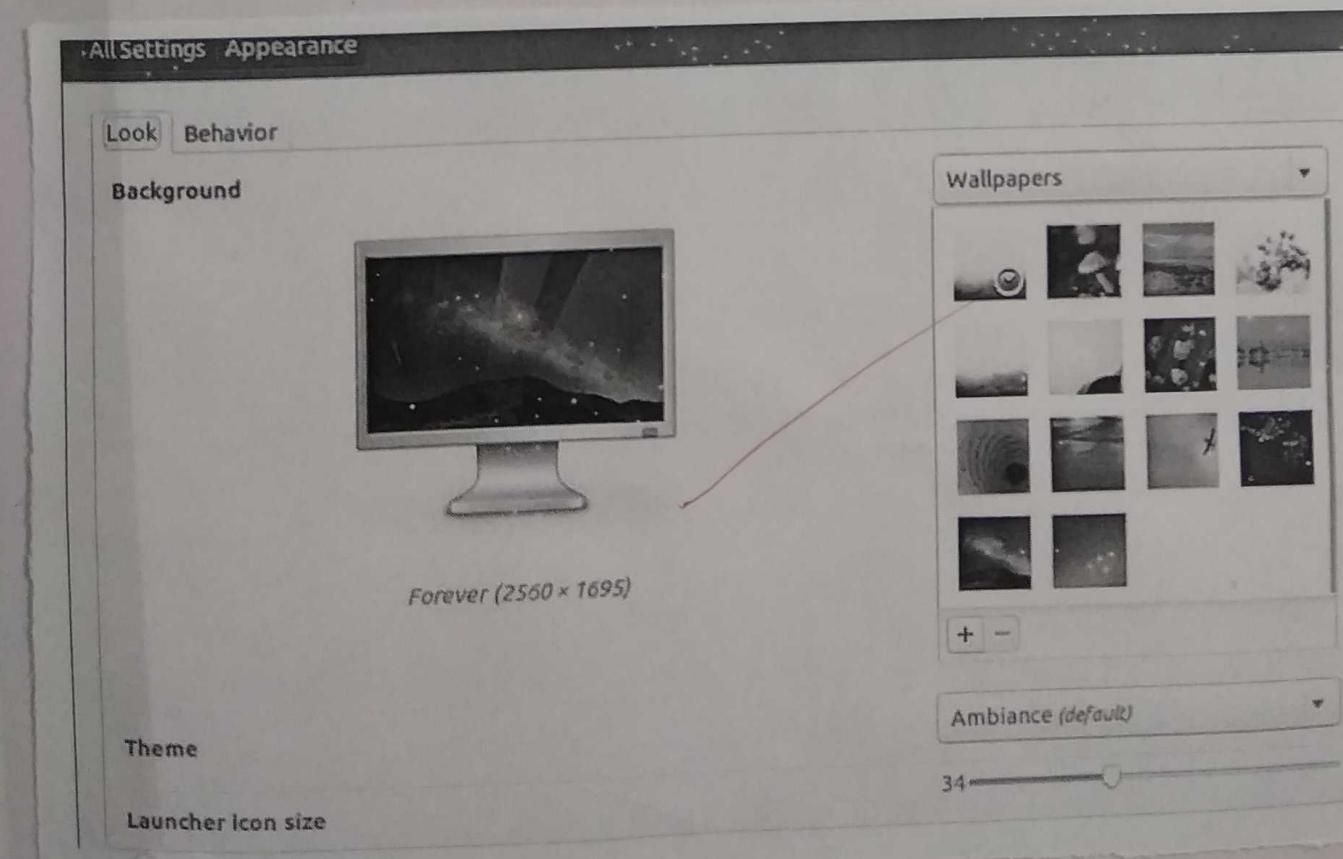
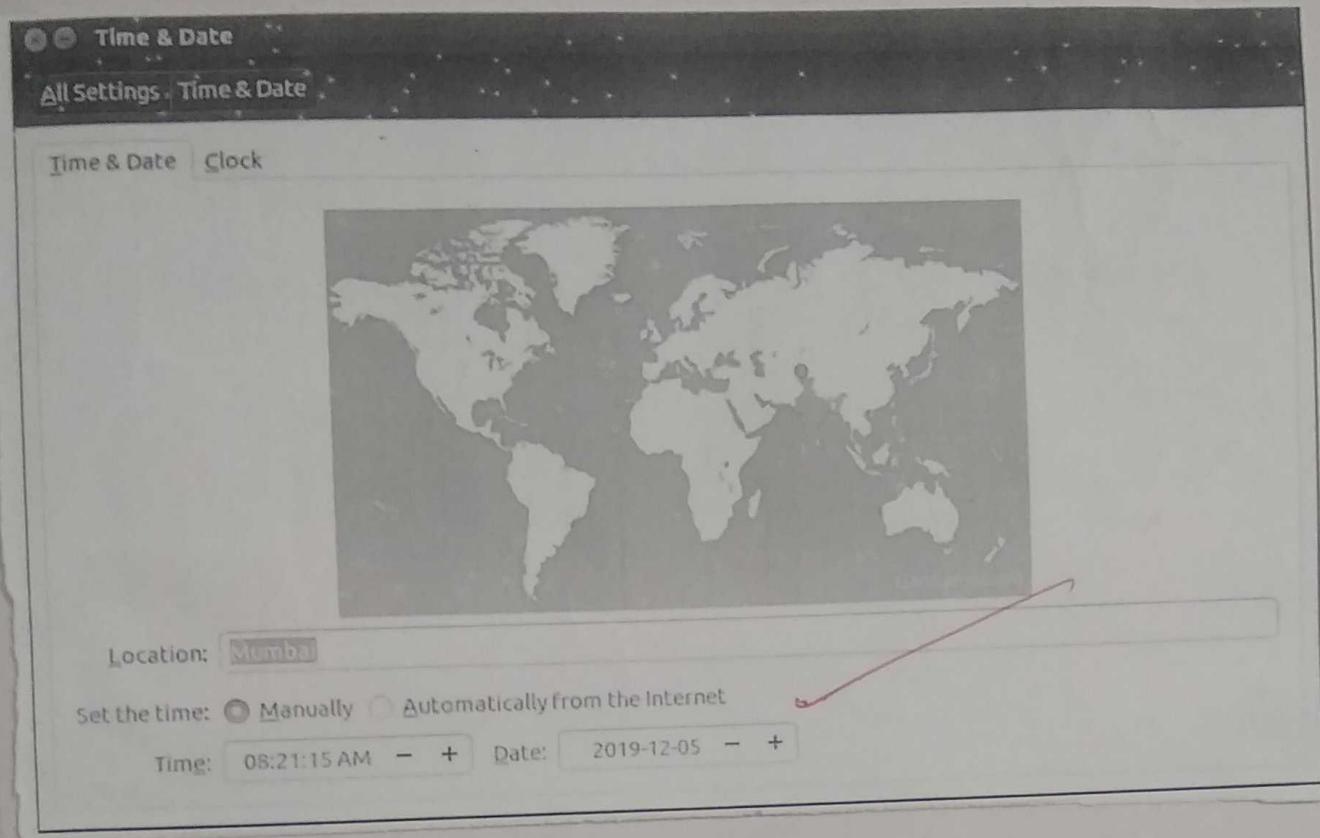


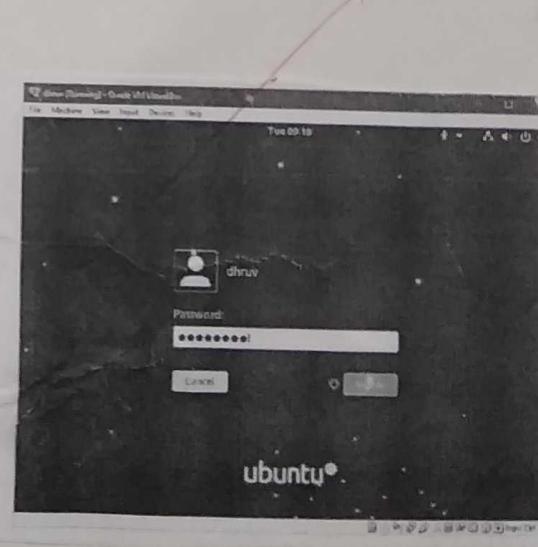
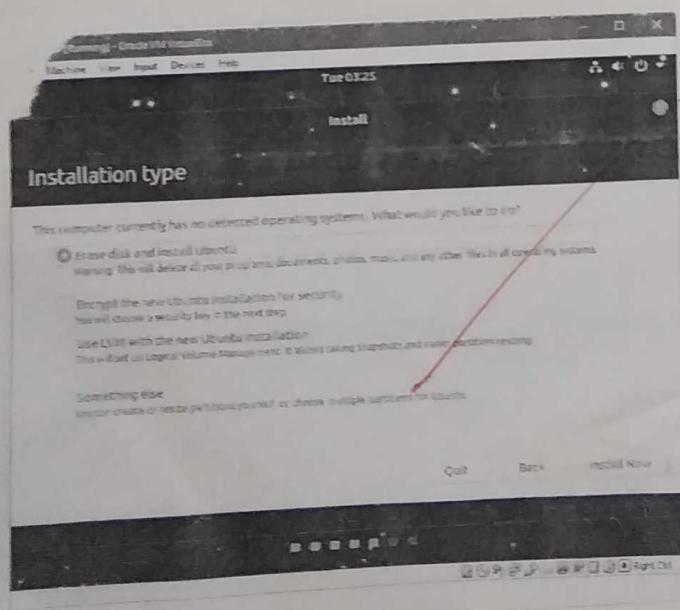
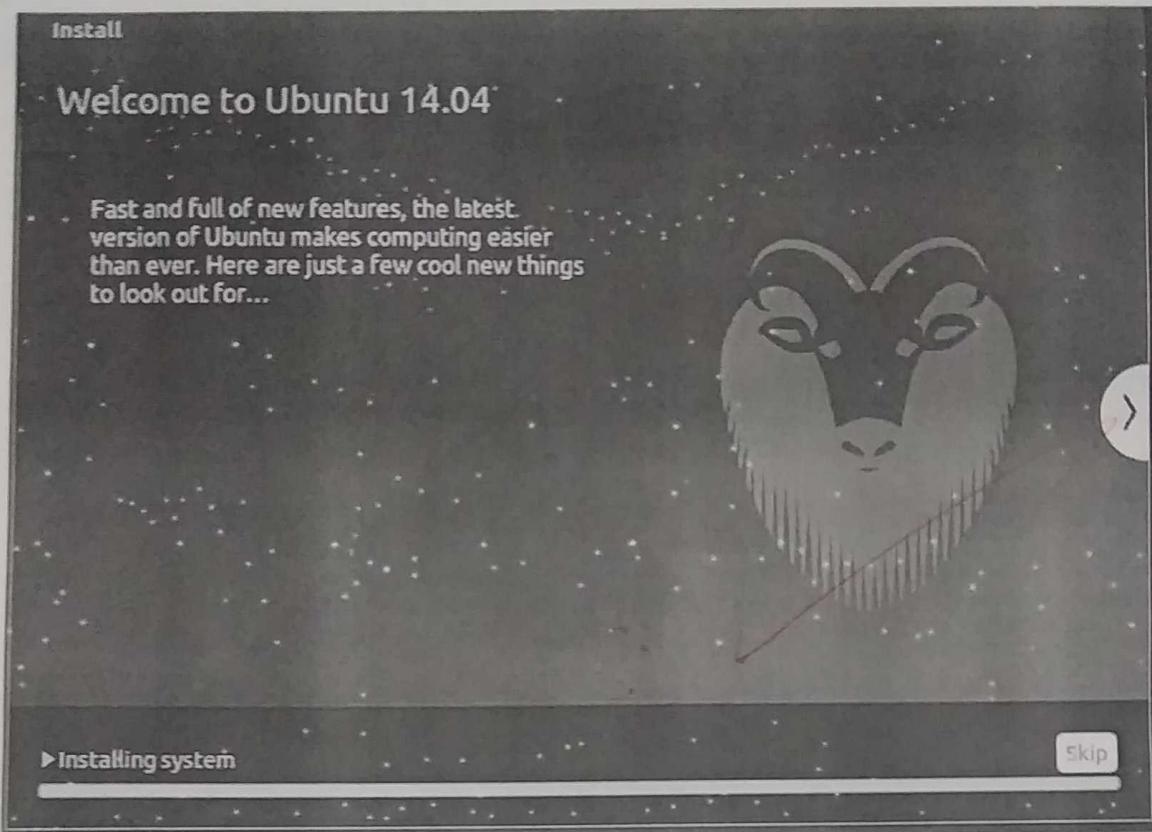
* Practical No 1 *

- Aim:-
- 1) Install your choice of linux distribution eg:- Ubuntu, Fedora
 - 2) Customize desktop environment by changing different default option like changing default background, themes, screensavers
 - 3) Screen Resolution
 - 4) Time settings.

- Q) Using a USB drive
- Most newer computers can boot from USB. You should see welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.
 - If your computer doesn't automatically do so you should see the welcome screen prompting you to choose & might need to press F12 key to bring up the boot menu.

1. Prepare to install.
- We recommend you plug your computer into a power source.
 - You should also make sure you have enough space on your PC to install the OS.





3

1

2

3

Customize desktop environment by changing different default option like changing default background, themes, screensavers

Accessing Appearance settings in Ubuntu,

1. To access appearance setting in Ubuntu, let's click on user menu at the top right corner, on the top menu bar & select system setting.
2. A window will pop-up with all settings divided into personal, hardware & system option icons. Let's first select application.

Changing wallpaper picture.

1. Now on the left side of background, you can see your current wallpaper.
2. If you want to select wallpaper from picture folder click the draw down menu above thumbnails.
3. You will see all pictures in your picture folder.

Changing Ubuntu theme.

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

Time settings Change

- 1) If you are currently in India time how does the displayed time change.
- 2) After noting the time change the time zone back to your local time zone.
- 3) Just click on the clock on the top bar & choose date & time.

8/10/1

Aim:-

Installing & removing software

- a: Install gcc package, verify that it runs then remove it.
1. First type 'gcc -v' to know if you have installed gcc compiler or not. If the output is blank then it means that you don't gcc installed
 2. Type 'sudo apt-get install gcc'. After type following command installation will take
 3. Type 'sudo apt-get install build-essential' to install all the libraries required for C++ programming language.
- b: Now to uninstall gcc compiler.

In ~~gcc 5.1.0~~ although there is no uninstall target, some directia do have it, in particular gcc, so you can do:

Type: cd build/gcc
sudo make uninstall.

rs

5 - 10/1/2019

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

Aim:-

Utilization of grep, man, comm

Documentation:-

a) Finding 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 (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 (space = up) & (backspace = down)

es

c-wi5pp

Finding Man pages from the cmd line
Bring up the man page for the 'ls'
command. Scroll down to the exam-
-ples section.

To use the 'man' command, simply
type 'man(command line)'.

Now we are going to find the
manual for 'ls' command.

Type: 'man ls'

~~Finding main pages by topic what
man pages are available that
document that document file or
compression of~~

Ans: Tar, zip are some man pages which
are type mer for.

~~Re)~~

* `man tar'

Name:

tar A - content C - create - The SUU
version Synopsis:

d - different... compordl deleted

Description

Tar stores and extracts files
from a steps 'man zip'.

Command line help list the available operation for the command. How can you do this

\$ mkdin -ma = 7wx directory name.

Practical 4

command line operation

a) Install new package of your system
 sudo apt-get install (package name)

b) Remove the package installed
 sudo apt-get remove (package name)

Find the passwd file by using find command

✓ # find -name passwd
 • /usr/share/doc/ngs-jop-263/pam-d/passwd
 • /usr/bin/passwd
 • /etc/pam.d/passwd
 • /etc/passwd

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

✓ # find / -maxdepth 2 -name passwd : /etc/passwd

Find the passwd file under root and 2 level down ✓ # find / -maxdepth 3 -name passwd

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

find the password file b/w sub directories level

```
# find - maxdepth 3 -maxdepth 5 -name pass
- /user/bin/password
- /etc/pam.d/password
```

- d) Create a symbolic link to the file you found in step.
- # ln -s file1 file2
- e) Create an empty file example.txt & move it to /tmp directory using relative path name
- ```
touch example.txt
mv example.txt /tmp
```

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

# rm /tmp/example.txt

87  
18/10/1

# Practical 5

## File operation

1. Explore mount 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 diff. ways of exploring mounted file systems of 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,release_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,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/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_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. Copying text from files  
Ans: cp command, mv command.

34

```
jeba@jeba-VirtualBox:~$ ls
Desktop Downloads 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$ █
```

4) Archiving and backup the work directory using tar, gzip & bzip2 command  
Ans: gzip filename.txt  
Bzip2 filename.txt

```
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/0000755000000000000000000000000013605376557010365 5ustar rootrootmnn/hd/0000755000000
0000000000000000000000000000000013605376557010760 5ustar rootrootjeba@jeba-VirtualBox:/$
```

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

Ans: diff filename1 filename2

```
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
```

- Q) Use patch command to patch a file. And analyze the patch command again.

```
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
^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$
```

## Use Practical 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
- 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 upto 8 character. Case-sensitive  
 Usually all lower case. A direct match to the username in the /etc/passwd file

- Password, 13 characters. Case-sensitive, usually all lowercase. A tilde blank entry (e.g.:~) indicates a password is not required to log in (usually a bad idea), and a "\*" entry (e.g.:\*) indicates a password is not required to log in (the acc. has been disabled).
- The no. 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 this or her password unchange 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 expire that account is disabled.
- The number of days since January 1, 1970 that an acc. has been disabled.

- A reserved field for possible future use

```
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:::
```

Each file in a passwd entry is separated with ":" colon character as follows:

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

- Username, up to 8 characters. Case-sensitive, usually all lowercase
- An "x" in the password field. Passwords are stored in the ``/etc/shadow'' file.
- Numeric user id. This is assigned by the ``adduser'' script. Unix uses this field, plus the following group field, to identify which files belong to the user.
- Numeric group id. Red Hat uses group id's in a fairly unique manner for enhanced file security. Usually the 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:/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:~$ pwd
/home/jeba
jeba@jeba-VirtualBox:~$
```

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

Ans:- history

```

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:~$!3
who -l
LOGIN tty1 2020-01-15 20:38
jeba@jeba-VirtualBox:~$ █
780 id=tty1

```

- e) Create alias most commonly used commands

- e) Create alias to most commonly used commands.

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

Ans: alias label="command"

```

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

```

*BR  
06/02*

18.

## Practical: 7 Linux editors: Vi

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

i) Creating 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

W Navigate:

Movement in four direction.

| Key | Action             |
|-----|--------------------|
| k   | Moves cursor up    |
| j   | Moves cursor down  |
| h   | 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 word  |
| (Zero) | Move to first char. 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 |

38

b) Learn all essential commands like search/replace, highlight, show line no.

i) Replace

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
```

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

replace with our (y/n/b/q/l/^F/^V)? █
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

```
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
```

By  
Abloz

## Practical 8

### Linux Security

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

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

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

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

- b) Identify cmd that require sudo privileges

```
jeba@jeba-VirtualBox ~$ su user1
Password: ...
user1@jeba-VirtualBox ~$ mkdir folder1
mkdir: cannot create directory 'folder1': Permission denied
user1@jeba-VirtualBox ~$ 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.

40

```
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
```

```
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:~$ 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: 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

11) Delete newly added user.

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

✓  
06/02

## Practical 9

### Network Management

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

```
r machine
jeba@jeba-VirtualBox:~$ hostname
jeba-VirtualBox
jeba@jeba-VirtualBox:~$ █
```

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

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=
97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=
82.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=
84.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=
87.1 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=
93.5 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=
86.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=
98.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=
90.9 ms
^Z
[1]+ Stopped ping www.google.com
jeba@jeba-VirtualBox:~$
```

d) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
;; <>> 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) Trouble shooting network using trace route, route command.

42

```
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

a) Use of host 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

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

Q) Use of netstat command & Nmap command

| Proto Recv-Q Send-Q Local Address         | Foreign Address | State                 |
|-------------------------------------------|-----------------|-----------------------|
| Active Internet connections (w/o servers) |                 |                       |
| Proto RefCnt Flags Type State             | I-Node          | Path                  |
| unix 2 [ ] DGRAM .                        | 42149           | /run/user/1000/system |
| d/notify                                  | 9694            | /run/systemd/journal/ |
| unix 2 [ ] DGRAM                          | 9695            | /run/systemd/journal/ |
| syslog                                    | 9704            | /run/systemd/journal/ |
| unix 16 dev-log                           | 9684            | /run/systemd/notify   |
| unix 7 [ ] socket                         | 44042           | @/tmp/dbus-CymTeI7AQG |
| unix 3 [ ]                                | 43331           |                       |
| unix 3 [ ]                                | 42988           | @/tmp/dbus-CymTeI7AQG |
| unix 3 [ ]                                | 42690           | @/tmp/dbus-CMGGc6G7PS |
| unix 3 [ ]                                | 13242           | /run/systemd/journal/ |
| stdout                                    | 43113           | /run/systemd/journal/ |
| unix 3 [ ]                                | 43013           |                       |
| stdout                                    | 42935           |                       |
| unix 3 [ ]                                |                 |                       |
| unix 3 [ ]                                |                 |                       |

jeba@jeba-VirtualBox:~\$ netstat

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:~\$

06/02

## 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 return whatever you type in.
- e) #!/bin/bash - It is called shebang. It is written at the top of a shell and it passes the instruction to the prog /bin/bash

### Echo \$shell

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

vi filename.sh

#!/bin/bash

echo "This is LINUX!"

tcsc@tcsc-VirtualBox: ~

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

"linux.sh". [New File]

chmod 777 filename.sh  
./filename.sh

tcsc@tcsc-VirtualBox: ~

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

Step to write & execute a shell scripting

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.
- 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) filename.sh or ./filename.sh [for running the script]
- Program to display your name

#!/bin/bash

Echo "Enter your name."

Read name

Echo "My name is: \$name"

tcsc@tcsc-VirtualBox: ~

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

tcsc@tcsc-VirtualBox: ~

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

Program to find the sum of two variable

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"

:wq:
```

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

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

Sed

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

Consider the following text file.

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

1) Displaying Partial text of a file.  
With sed, we can view only part of a file  
rather than seeing whole file.

```
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:~$
```

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 a line  
To delete a line, use line number  
followed by 'd'

4) Search and replacing string

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

's' option is for searching a word.

```
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
```

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
calclus
computer basic
```

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

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

To add a new line 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
calclus
computer basic
tcsc@tcsc-VirtualBox:~$
```

7) To change a whole line with matched pattern

To change a whole line to new line when a search pattern matches, use opt. 'c'

```
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
```

### 8) Appending lines

To add some content before every line with sed, use \* and 2 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
```

BR  
27/2