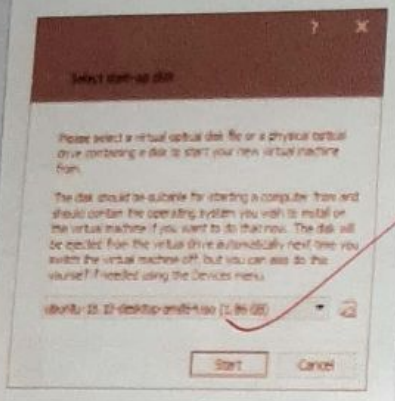
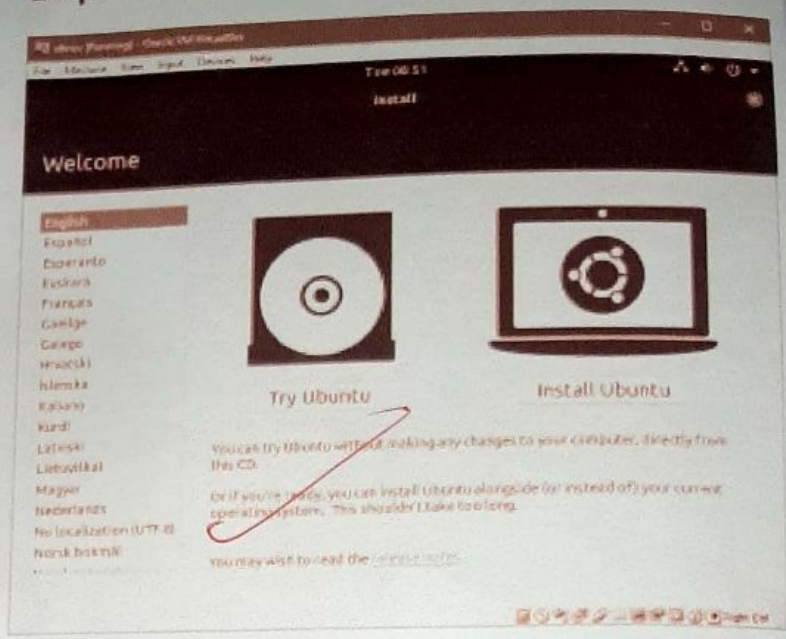
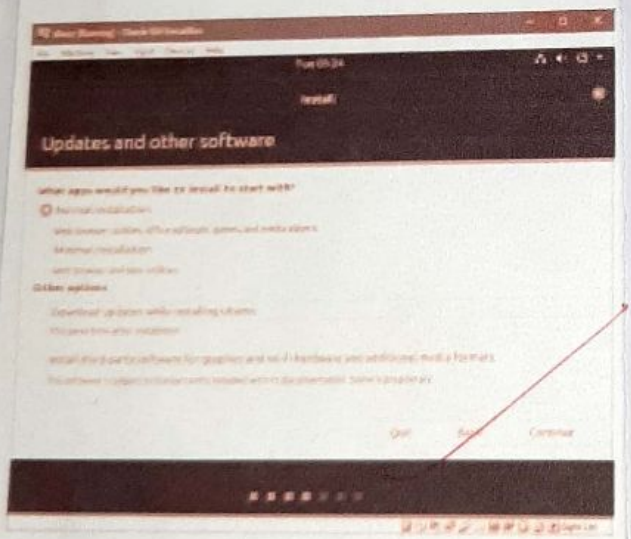
Step1



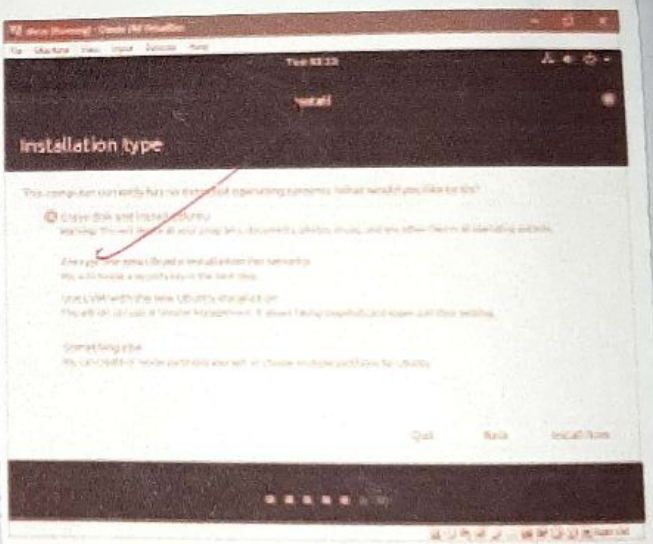
Step 2



Step3



step 4



PRACTICAL - 1

AIM: Linux Installation
a) Install your choice of Linux distribution, eg. ubuntu, Fedora, Debian.

ubuntu: ubuntu is a free and open source software based on debian. ubuntu is officially released under 3 editions. desktop, server, union.

all the editions can be runned on ctu computer alone or a virtual box machine.

It is a popular open source software for cloud computing with support of openstack.

steps for installing ubuntu in a virtual machine.

step 1: select a virtual optical file or a physical drive to start ubuntu in your virtual machine. space given to it is 1.86 GB.

step 2: select the language of your choice and click on 'Install Ubuntu'. You can also 'try ubuntu' for free on computer device from this CD.

step 3: In 'updates and add software', click on the normal installation.

step 4: while configuring installization type we need to click 'Erase disk and install ubuntu. This step would delete all types of documents, photos, etc. in all operating systems.

step 5: In this you only need to choose the location for the clock to work on ubuntu.

step 6: In this type you need to choose username and password for the login in ubuntu and then click on continue.

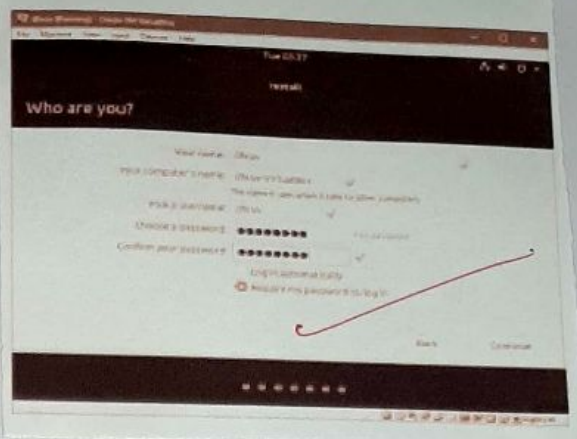
step 7: Here you simply need to type password again and it is done.

step 8: Type name of the virtual disk and recommend size to be given is 2048 GB or 2 TB.

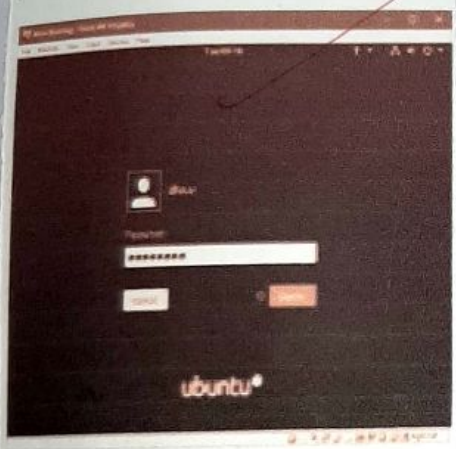
Therefore, now the virtual box is ready to use.

Step5

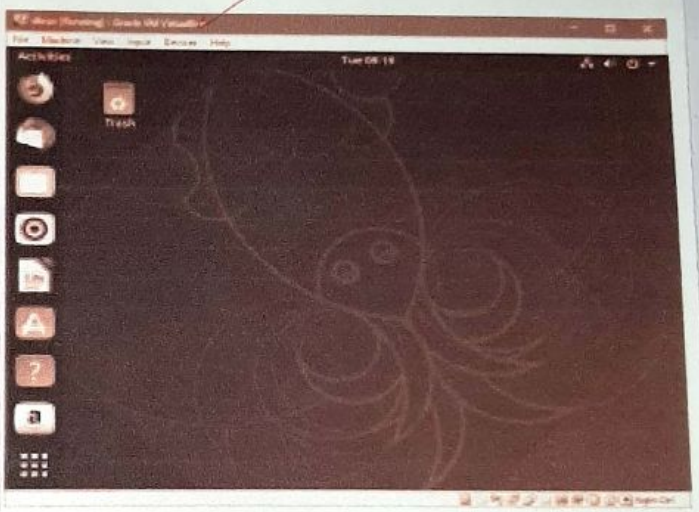
step6

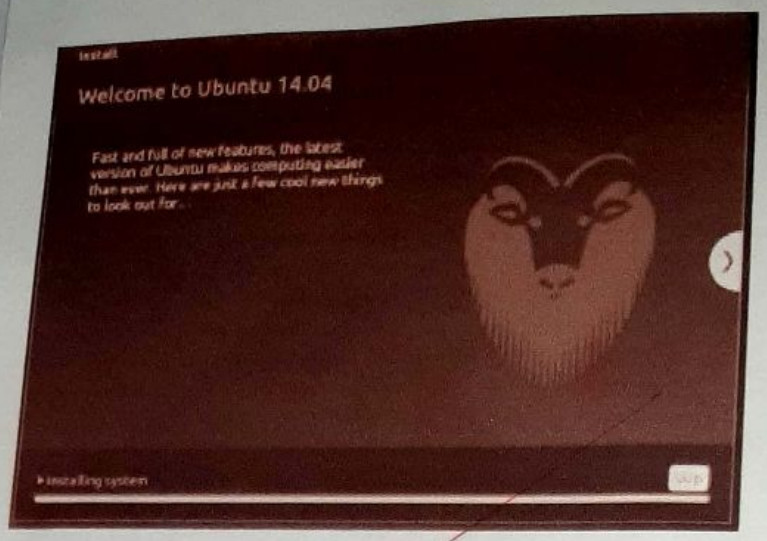


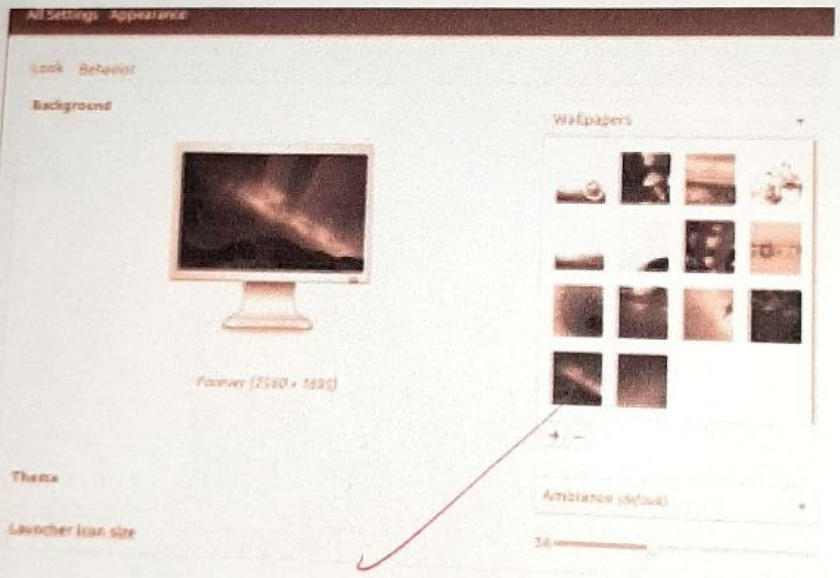
Step7



step 8




Install
Welcome to Ubuntu 14.04
Fast and full of new features, the latest version of Ubuntu makes computing easier than ever. Here are just a few cool new things to look out for...
Installing system


All Settings Appearance
Look Behavior
Background
Wallpapers
Theme
Launcher icon size

eg. Ubuntu, Fedora, Debian.

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

↳ Accessing Appearance settings

= To access Appearance settings in ubuntu, let's click on user menu at the top right corner, on the top Menu bar and select system settings

= A window will pop-up with all settings divided into Personal Hardware and system options icons. Let's first select the appearance icon.

↳ changing wallpaper picture

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

- If you want to select wallpapers from your picture folder, click the drop-down menu above thumbnail, where you can select them as your wallpaper.
- To add wallpapers that is in another folder, just click the plus icon below the thumbnails and then in pop-up window, select the path to our custom folder and choose the picture inside of it.

↳ changing ubuntu theme.

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

- To do that, click on the drop-down menu below, the wallpaper thumbnails, and choose between Ambiance, Radiance or High contrast.

- Ambiance is a light theme that looks a bit more Mac-like, while Radiance is the darker brown theme used in Ubuntu by default.

c) Screen resolution: Ascertain the current screen resolution for your desktop.

change the size or rotation of the screen.

- You can change how big (or how detailed) things appear on the screen by changing the screen resolution.

- You can change which way up things appear (for example, if you have a rotating display) by changing the rotation.

1) click the icon on the very right of the menu bar and select system settings.
2) open screen Display
3) If you have multiple displays and they are not mirrored, you can have multiple displays and they different settings on each display. select a display in the preview area
4) select your desired resolution and rotation.
5) click apply. The new setting will be applied for 30 seconds before reverting back. That way, if you cannot see anything with new

d) Time settings change the time zone of your system to (or New York time)

↳ If you are currently in Indian time. How does the displayed time change?

↳ After noting the time change, change the time zone back to your local time zone

↳ Just click on the clock on the top bar and choose Time and Date settings, once the Time & date window opens, choose Manually, so you can change the time and date ~~as~~ manually; otherwise choose your time zone from the map and choose Automatic.

04/01

PRACTICAL - 2

AIM: Installing and removing software.

a) 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 dont have GCC installed.

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

step3: Type 'sudo apt-get' install build-essential'. This will install all the libraries required for c and c++ programming language.

Now to unistall gcc compiler:

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

Type : cd build /gcc
sudo make uninstall

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

04/01

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 command is same as 'info' but required data

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.
map zip
man tar

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

ans: The number corresponds to what section of the manual page is from 1 is user command while 8 is sysadmin stuff. The man page for man itself explain it are list the std out.

There are certain terms that have 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 on you want or use man - a to show every matching page in a row.

You can tell what section a terms falls in with 'man-k' (equivalent to apropos command). It will do substring matches too. so you need to use "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 directory name.

04/01

PRACTICAL -4

AIM: 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 password
- /usr/share/doc/nss-/dap-253/pam.d/password
- /usr/bin/password
- /etc/pam.d/password
- /etc/password

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

find / max depth 2 -name password
- /etc/password

P.E.

Find the password file under root and 2 level down

find / -max depth 3 -name password
- /usr/ bin / password
- /etc/ pam.d / password
- /etc/ password

Find the password file b/w sub-directories level 2 & 4.

find -max depth 3 -maxdepth 5 -name password

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

d) create a symbolic link to the file you found in last 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/ user/ share/ man/ man1/ ls.1.gz.

where is ps
ps: /bin/ps/ user/share/ maps: /bin/ps/ user/ share/ man/ man1/ ps.1.gz.

where bash
bash: /bin/ bash/ etc/ bash. bashrc/ user/ share/ man/ man1/ bash.1.gz.

04/01

PRACTICAL-5

AIM: File operations

1) Explore mounted file system on your computer

→ df-K

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

→ mount

3) copying text from files

→ cp command, mv command

```
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:~$
```

```
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)
```

```
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
jeba@jeba-VirtualBox:~/jeb$ No such file or directory
cat: .gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat gg.txt
cat: gg.txt: No such file or directory
jeba@jeba-VirtualBox:~/jeb$ cat >gg.txt
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/0000755000000000000000000000000000000013685376557010365 5ustar  rootrootmnn/hd/0000755000000000
0000000000000000000013685376557010760 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
◆▒▒▒ ▒dd.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 22:15:10.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$
```

4) Archiving and backup work directory using tar, gzip and bzip 2 commands

→ gzip filename.txt
Bzip 2 filename.txt

5) Use diff command to create diff of two files

→ diff filename1 filename2

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

01/02

PRACTICAL-6

AIM: Use Environment

A) which account you are logged in? How do you find out?

→ who command and who ami

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

- Username, up to 8 charaters. Case-sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.

- Password, 13 charater encrypted. A blank entry (eg ::) indicates a password is not required to log in

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ who
jeba     tty7         2020-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l                                  780 id=tty1
LOGIN    tty1         2020-01-15 20:30
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   9.80s  0.33s /sbin/upstart --user
```

```
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:::
```

(usually a bad idea). and a "*" entry (eg :*:) indicates the account has been disabled.

- 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 (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 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 passwd entry is separated with ":" colon charaters, and are as follows:

- username, up to 8 charaters. 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. Im not sure what the maximum length for this field, is but try to keep it reasonable (under 30 charaters)

- User's home directory. usually /home/username (eg. /home/smithj). All user's personal files, web pages, mail forwarding, etc. will be stored here.

```
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:~$
```

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

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

- user's "shell account". Often set to "/bin/bash" to provide access to the bash shell (my personal favourite shell).

c) Get your current working directory

→ pwd

d) Explore different ways of getting command history, how run 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.

01/02

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

b) Learn all essential commands like reach/search, highlight, show line numbers i) Replace.

Movement 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 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

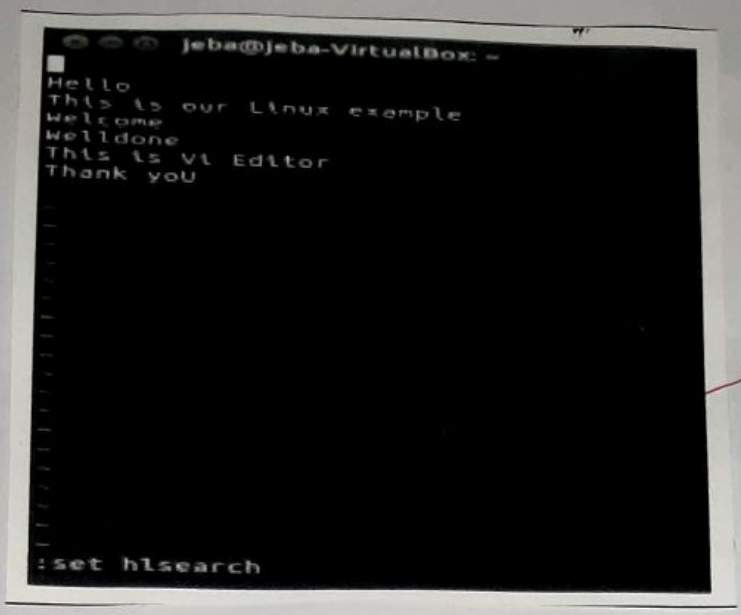
8

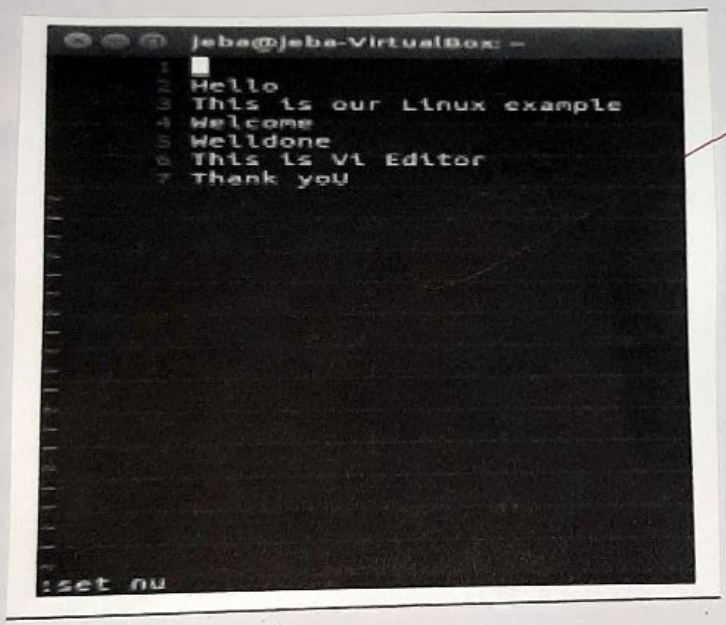
```
jeba@jeba-VirtualBox: ~

Hello
This is my Linux example
Welcome
Welldone
This is Vi Editor
Thank you
~
~
~
```

syntax : /g /word to be replaced/s// new word/ge

ii) Highlight
use set hlsearch.

iii) show the line number
use set nu.


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


jeba@jeba-VirtualBox: ~
1
2 Hello
3 This is our Linux example
4 Welcome
5 Welldone
6 This is Vi Editor
7 Thank you
:set nu

01/02

08

```
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:~$
```

```
# 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
```

PRACTICAL-8

AIM: Linux security.

a) Use of sudo to change user privileges to root.
create an user named user1

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

b) Identify operations that require sudo privileges.

c) Modify expiration date for new user using password ageing

d) Delete newly added 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:~$
```

-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

```
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:~$
```

01/02

a)

```
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)
```

b)

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

c)

```
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:~$
```

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 traceroute route command.

f) Use of arp command.

g) Use of host command

d)

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

; <<>> DiG 9.10.3-P4-Ubuntu <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52068
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.google.com.                        IN      A

;; ANSWER SECTION:
www.google.com.         91      IN      A       172.217.166.100

;; Query time: 152 msec
;; SERVER: 127.0.1.1#53(127.0.1.1)
;; WHEN: Mon Jan 20 22:40:06 IST 2020
;; MSG SIZE  rcvd: 59

jeba@jeba-VirtualBox:~$
```

e)

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ traceroute www.google.com
traceroute to www.google.com (172.217.166.100), 30 hops max, 60 byte packets
 1  10.0.2.2 (10.0.2.2)  0.190 ms  0.143 ms  0.151 ms
 2  * * *
 3  10.0.2.2 (10.0.2.2)  68.568 ms  68.486 ms  68.405 ms
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        *               255.255.255.0   U     100    0        0 enp0s3
link-local      *               255.255.0.0     U     1000   0        0 enp0s3
jeba@jeba-VirtualBox:~$
```

f)

```
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
```

g)

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

h)

```
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
unix  3      [ ]         STREAM     CONNECTED     42988    @/tmp/dbus-CymTeI7AQG
unix  3      [ ]         STREAM     CONNECTED     42690    @/tmp/dbus-CMGGc6G7P5
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
```

h)

```
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 & Nmap command.

01/02

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

Echo $SHELL

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

- chmod 777 filename.sh
  ./filename.sh

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

```
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 & 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 [You can use your favourite 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
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 (Value passed during execution)

tcsc@tcsc-VirtualBox: ~

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

tcsc@tcsc-VirtualBox: ~

```
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:~$
```

```
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:~$
```

sed

sed command or stream Editor is very powerful utility offered by Linux systems. It is mainly used for text substitutions 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) 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

```
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:~$
```

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

02

```
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 '/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 '/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
```

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 matched 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 * and & as follows.

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

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