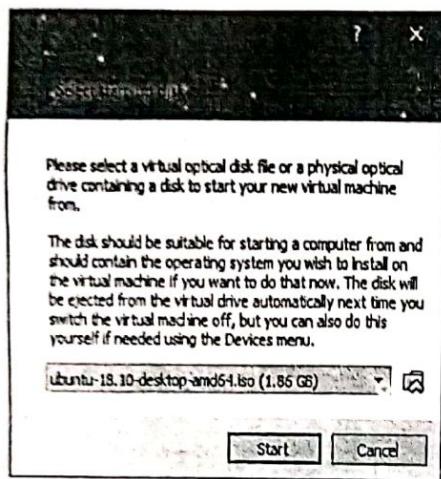
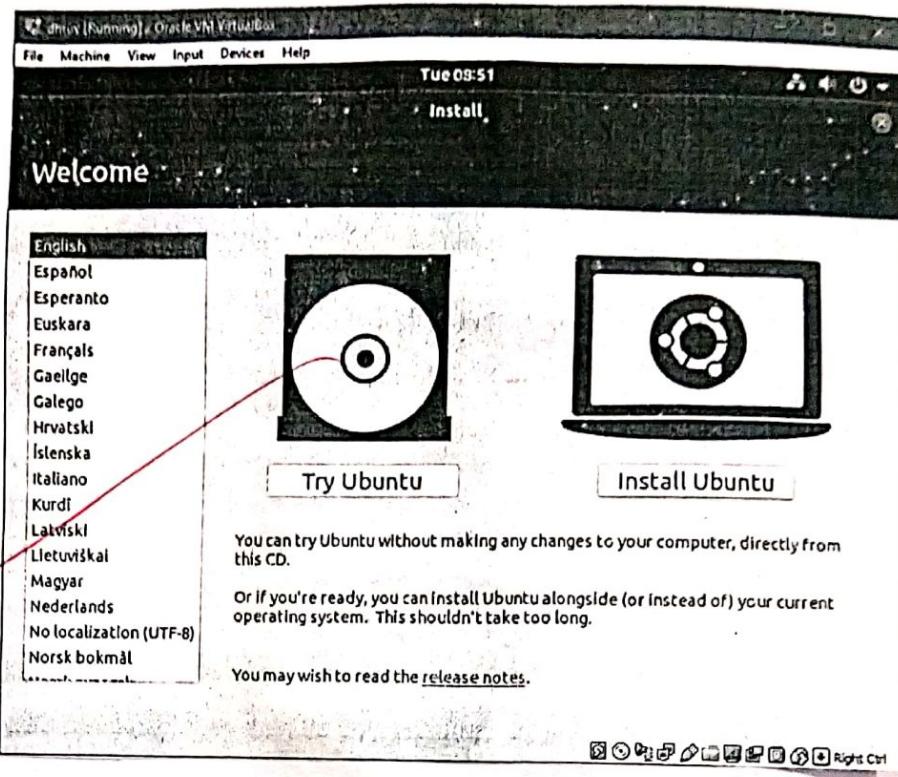


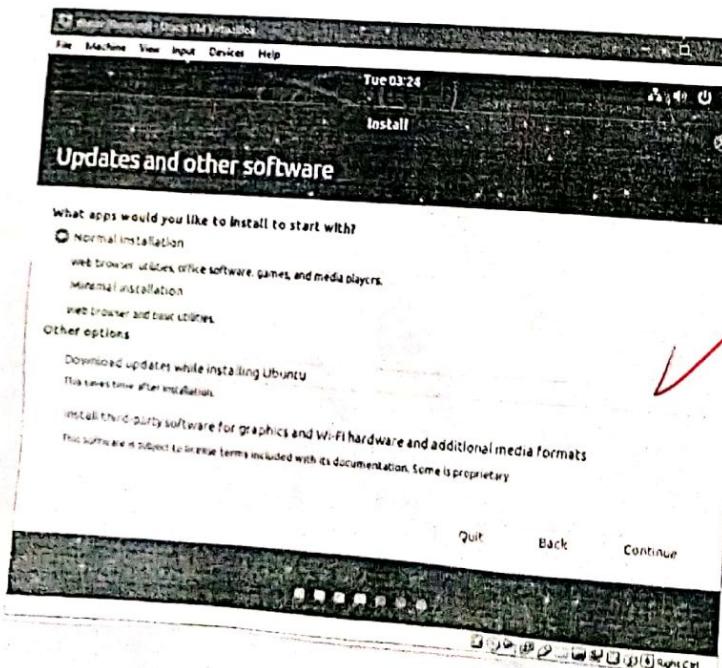
Step1



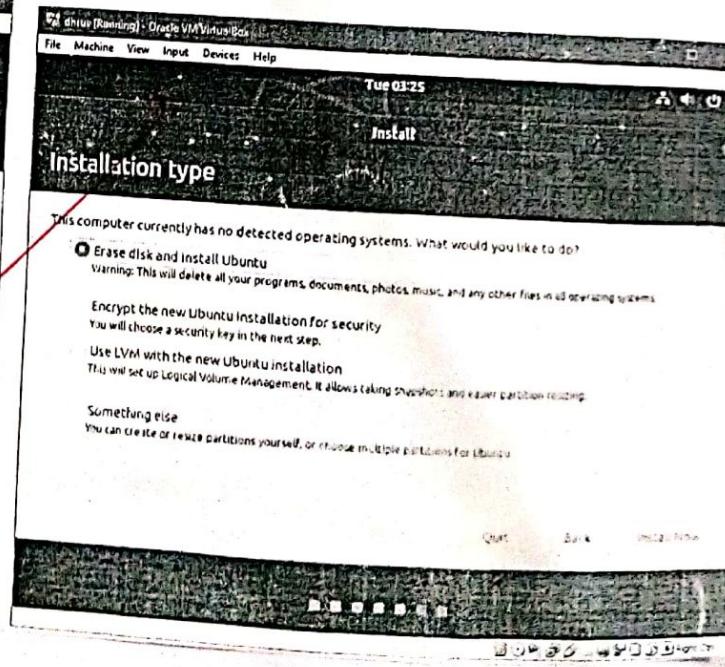
Step 2



Step3



step 4



Practical - 1

Aim: Installing your choice of Linux Distribution (Ubuntu).

Ubuntu is a free and open source software based on ~~linex~~ kernel, released under 2 editions Desktop and Server having LTS vs long term release and a standard release. It is a popular software among coders cloud computer with support for open stock.

steps to install Ubuntu Virtual box:

- ① Open Virtual box, click on New, and set up to create the virtual machine by adding saving location, memory size and virtual hard disk
- ② Click on start, add location of Ubuntu Disk image and start, later as Ubuntu is initialized click on Install Ubuntu (safe graphics)
- ③ Click next and go through all the default ops finally coming to install now let the system install Ubuntu

Finally add your desired username and password, let the system setup your Ubuntu installation.

③ Ubuntu distribution is installed on your virtual machine, its restart

④ Customize desktop environment by changing different default options like changing default background, themes, screen savers.

⑤ click on the show application select settings, click on background

⑥ If you would like to change the resolution in setting click on display - change to your desired resolution

Screen Resolution :-

⑦ Click on the icon on the very right of the menu bar and select system settings.

⑧ open screen display

⑨ If you have multiple displays and they are not mirrored you can have different settings on each display - select a display in the preview area

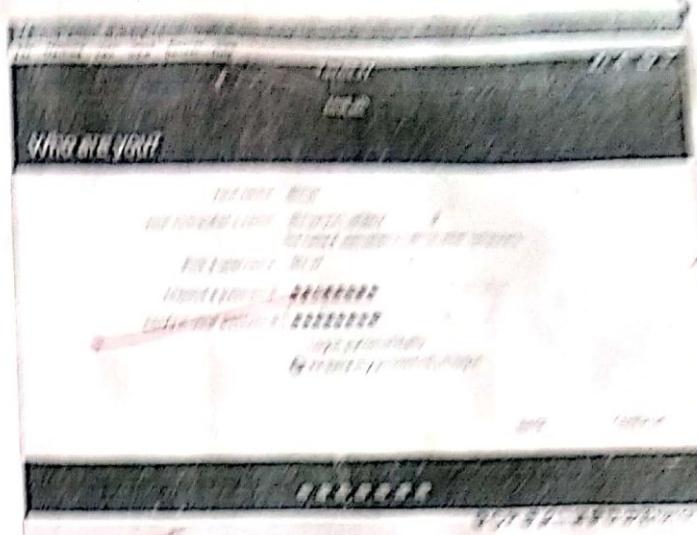
⑩ Select your desired resolution and rotation.

⑪ Click apply. The new settings will be applied for 30 seconds before reverting back.

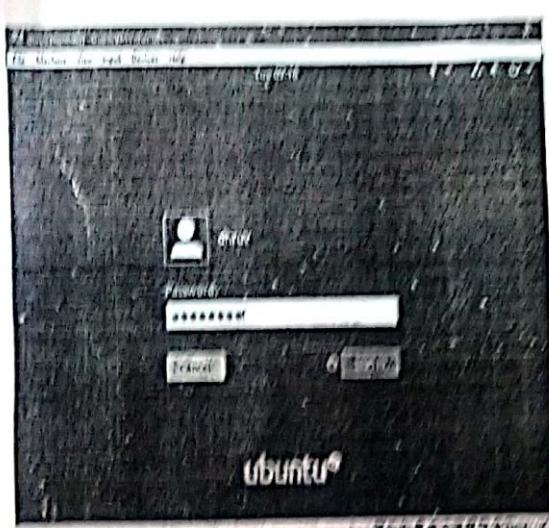
step5



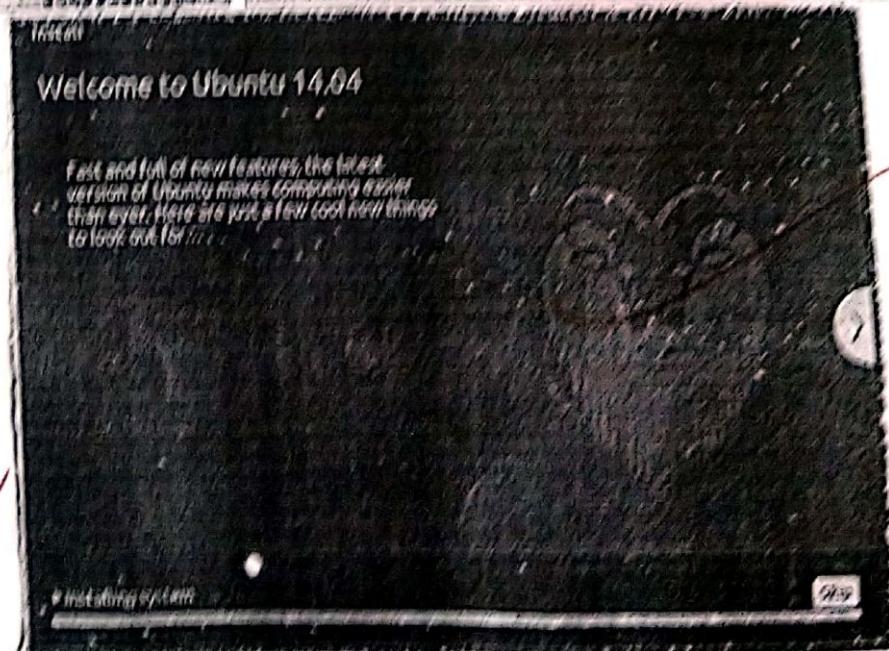
Simpler



Step7



step 8



Practical No-2

Aim: Installing and removing software and using some terminal commands.

- a) Installing 'gcc' package, verify that it runs and then remove it

Step 1: Type 'gcc -v' to know if you have already installed gcc compiler or not. If the output is blank then gcc isn't installed.

Step 2: Type 'sudo apt-get install gcc'. This command is used to install gcc compiler.

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

How to uninstall GCC compiler

In GCC 5.1.0, although there is no uninstall target, some directories do have it.

~~/usr/lib/build/gcc~~

~~/usr/bin/make/uninstall~~

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

Practical No - 3

Aim: Utilization of grep, man commands

Documentation:

1) man ls

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 -cfn=vsux-nov-sort.

-a, --all

do not ignore entries starting with

-A, --almost-all

do not list implied

2) man tar

tar - the GNU version of the tar archiving with functions letters

-A, --catenate, --concatenate

append tar files to an archive

-C, --Create

Create a new archive

3) `mkdir`

→ Create the directory if they do not exist
 → mandatory arguments to long options are mandatory for short options too.

-m, --mode = MODE - set file mode.

-P, --parents

no errors if existing, make parent directories as needed.

-v, --verbose

print a message for each created directory

4) `mv 3 printf`

The functions `printf()` and `vprintf()` write output to `stdout`, the standard output stream; `fprintf()` writes output to the given output stream

5) `info`

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

'q' quits;

'?' lists all info commands;

'h' starts the info tutorial;

'T...& O...' with the Terminal manual etc.

e) Zip - package and compress archivey file

- zip is a compression and file packaging utility for UNIX, VMS, MSDOS, OS/2;
- it's analogous to a combination of the UNIX commands tar and compress:
 - add - update existing entries and new files
 - update - update existing entries if newer on the file system
 - delete - select entries in an existing archive and delete them

18
18

Practical - A

Aim: Command line operations

① find 1 - none passed

/etc / cron.daily / passwd

/etc / pam.d / passwd

/etc / passwd

/usr / share / doc / passwd

/root /etc / cron.daily / passwd

② find 1 - maxdepth 2 - none passed

/etc / passwd

③ find 1 - maxdepth 2 - maxdepth 3 - none passed

/etc / cron.daily / passwd

/etc / pam.d / passwd

/etc / passwd

/user / bin / passwd

/root /etc / passwd

④ find - maxdepth 3 - maxdepth 5 - none passed

/user / bin / passwd

/user / share / bash-completion / passwd

/user / share / doc / passwd

⑤ whereis ls

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

⑥ whereis ps

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

⑦ whereis bash

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

⑧ ln -s fibname.txt fibname2.txt

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```
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      7093728 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=123689,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,node=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,node=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=/)
cgrpup 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)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```

3) copying text from files
→ cp command, mv command

```
jeba@jeba-VirtualBox:~$ ls
Desktop    Downloads    Music    Public    Videos
Documents  examples.desktop  33  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$ ■
```


- Q) Archiving and backup the work directory using tar, gzip and bzip2 commands
→ gzip filename.txt
Bzip2 filename.txt
- Q) Use different command to create difference of two files
→ diff filename1 filename2

⑤ Use patch command to patch a fib and apply
the patch using command again.

→ cat > fibname.txt

cat > fibname.txt

diff -u fibname.txt fibname.txt > san.patch

Patch: san.patch

patch < san.patch

```
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz aa.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 >hi1.txt
hello
hello
hello
^C
jeba@jeba-VirtualBox:~/jeb$ diff -e hi.txt hi1.txt >san.patch
jeba@jeba-VirtualBox:~/jeb$ patch ,san.patch
^C
jeba@jeba-VirtualBox:~/jeb$ patch <san.patch
patching file hi.txt
jeba@jeba-VirtualBox:~/jeb$ cat san.patch
--- hi.txt      2020-01-08 22:14:55.463569834 +0530
+++ hi1.txt     2020-01-08 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
+hi
+hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$
```

*b7
11/02*

```
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      FROM      LOGIN@     IDLE     JCPU   PCPU WHAT
jeba   tty7      :0      20:32    5:36   9.00s  0.33s /sbin/upstart --user
```

Aim :- Use Environment

- 1) Which account you are logged in? How do you find.
→ who command & whoami.

- 2) Display /etc/shadow file using cat command and understand the importance of shadow file. How it is different than passwd file
→ cat /etc/shadow

Its with the passwd file each field in shadow file is also separated with ":" column characters and are as follows:-

- Username, upto 8 characters case sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.
- Password: 13 character encrypted. A blank entry (eg::) indicates a password is not required to log in (usually a bad idea), and a "*" entry (eg: *) indicates the account has been disabled.
- The number of days (since 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 years)

- 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 a colon character, case-sensitive, usually all lowercase.

- Username, upto 8 characters, case-sensitive, usually all lowercase
- An "x" is the password field. Passwords are stored in the "/etc/shadow" file.
- Numeric user id Red Hat uses group id 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 max length for this field is, but try to keep it reasonable.
- User's "shell account" often set to "/bin/bash" to provide access to the bash shell (my personal favorite shell)

3) Get your account working directory
⇒ pwd.

```
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:::
```

```
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:~$
```

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```
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:~$ ls
who -l
LOGIN    tty1      2020-01-15 20:30
jeba@jeba-VirtualBox:~$ █
788 1d=tty1.
```

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

4) Explore different ways of getting command history, how to run previously executed command without typing it
⇒ history
! Line number,

5) Create alias to most commonly used commands -

⇒ Alias commands is such the shell will replace one string with another string while executing the command alias label="command".

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Practical No - 7

Aim: vi (Linux Editor)

i) 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 and its extension.

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

<u>key</u>	<u>Action</u>
k	Move cursor up
j	Move cursor down
h	Move Cursor left
l	Move cursor right

Word navigation

<u>key</u>	<u>Action</u>
b	Moves back to the beginning of word.
e	Moves forward to the end of word.
w	Moves forward to the beginning of word
0 (zero)	Move to first character of a line.

1

7

Hello
This is our Linux example
Welcome
Welldone
This is Vi Editor
Thank you

```
debashis@VirtualBox: ~
```

```
Hello
This is my Linux example
Welcome
Well done
This is vi editor
Thank you
```

```
replace with our (y/n/s/q/l/RE/mY)? █
```

```
Java@Java-VirtualBox: ~
Hello
This is our 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
```

: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

scrolling :-

key

Action

Ctrl + F	scroll forward
Ctrl + b	scroll backward
Ctrl + d	scroll half page
Ctrl + u	scroll half page backward

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

- 1) Replace
- 2) Highlight
- Use ~~set mark~~
- 3) Show the line numbers.
use ~~let us~~

PP
11/02

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Practical No - 8

Aim: Linux Security -

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

→ Create a user ~~as~~ named user1:

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

2) Identify operators that require sudo privileges.

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

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

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:/
Host alias specification
User alias specification
Cmnd alias specification
User privilege specification
root ALL=(ALL:ALL) ALL

```
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 09, 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
```

3) 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 wrong-warning before a password change is required.

4) Delete newly added user

→ sudo Userdel User1

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

✓
21/02

```
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: 4696
; QUESTION SECTION:
;www.google.com.          IN      A
;
; ANSWER SECTION:
www.google.com.      91      IN      A      172.217.166.100
;
; Query time: 152 msec
; SERVER: 127.0.1.1#53(127.0.1.1)
; WHEN: Mon Jan 20 22:40:06 IST 2020
; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ 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:~$ arp
Address           HWtype  HWaddress           Flags Mask            Iface
10.0.2.2          ether   52:54:00:12:35:02  C     00:00:00:00:00:00  enp0s3
```

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4) Use of dig command -

→ dig www.google.com

5) Trouble shooting network using traceroute,
route command.

→ traceroute www.google.com

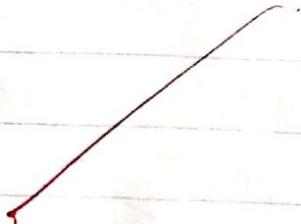
6) Use of arp command

→ arp

Q. 3

7) Use of host command

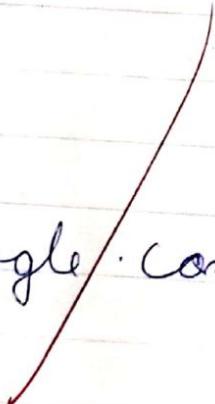
→ host -v



8) Use of netstat command and Nmap command.

→ netstat

Nmap www.google.com



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

```
jeba@jeba-VirtualBox:~$ netstat
jeba@jeba-VirtualBox:~$ netstat -an
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-CMGc8G7P5
unix  3      [ ]        STREAM   CONNECTED  42690  @/tmp/dbus-CMGc8G7P5
unix  3      [ ]        STREAM   CONNECTED  13242  /run/systemd/journal/
stdout
unix  3      [ ]        STREAM   CONNECTED  43113  /run/systemd/journal/
stderr
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: bome05$11-in-f4.1e100.net
Not shown: 998 filtered ports
PORT      STATE SERVICE
80/tcp    open  http
443/tcp   open  https
Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
jeba@jeba-VirtualBox:~$ █
```

*JP
11/62*

```
jebajeba-VirtualBox:~$ ifconfig  
enp0s3    Link encap:Ethernet  HWaddr 08:00:27:0e:6b:69  
inet addr:19.0.2.15  Bcast:19.0.2.255  Mask:255.255.255.0  
inet6 addr: fe80::c0c0:53a0:65a3:848e/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 frame:0  
      collisions:0 txqueuelen:1000  
      RX bytes:1180 (1.1 KB)  TX bytes:8518 (8.5 KB)  
  
lo      Link encap:Local Loopback  
inet6 addr: ::1/128  Scope:Host  
      UP LOOPBACK RUNNING  MTU:65536  Metric:1  
      RX packets:53246 errors:0 dropped:0 overruns:0 frame:0  
      TX packets:53246 errors:0 dropped:0 overruns:0 carrier:0  
      collisions:0 txqueuelen:1  
      RX bytes:4225672 (4.2 MB)  TX bytes:4225672 (4.2 MB)
```

```
jebajeba-VirtualBox:~$ hostname  
jeba-VrtualBox  
jebajeba-VirtualBox:~$
```

```
jebajeba-VirtualBox:~$ ping www.google.com  
PING www.google.com (172.217.31.196) 56(84) bytes of data.  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=  
71.5 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=  
71.4 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=  
71.8 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=  
71.2 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=  
73.5 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=  
80.9 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=  
98.0 ms  
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=  
99.9 ms  
72  
(1)+ Stopped                  ping www.google.com  
jebajeba-VirtualBox:~$
```

Lesson 10 - 9

Ques: Network Management

→ Get IP address of your machine using
ifconfig
→ ifconfig

→ Get hostname of your machine
→ hostname

3) Use ping to check the network connectivity to remote machines
→ ping www.google.com

~~Topic 10~~

~~by
Kiran~~

Aim: Shell Scripting

Basics of shell scripting

- a) To set 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 shell script and it passes the instruction to the program/binary.

Echo \$SHELL

- ex. file name: sh
- #!/bin/bash
- echo "This is Linux!"
- chmod 777 filename.sh
- /filename.sh

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

```
tesc@tesc-VirtualBox:~
```

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

```
"linux.sh" [New File]
```

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

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:~$
```

Step to write and execute a shell script

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

- 1) Open terminal
- 2) Navigate to the place where you want to create script using cd command
- 3) Touch filename.sh
- 4) vi filename.sh
- 5) chmod 777 filename.sh
- 6) sh filename.sh or ./filename.sh

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 fibaneish

#!/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"
Dw:
```

```
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:~$ ./lin.sh
#!/bin/bash
sum=$((S1+S2))
echo "sum is:$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 56 78
sum is:128
tcsc@tcsc-VirtualBox:~$
```

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 system. 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.

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

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

```
tcsc@tcsc-VirtualBox:~$ sed 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
```

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.

6) Add a line after / before a 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 matched, use option 'c'.

8) Appending lines

To add some content before every line
with sed, use * and & as follows:

tcsc@tcsc-VirtualBox:~\$ sed '/es/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:~\$

64

tcsc@tcsc-VirtualBox:~\$ sed '/cs/l "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

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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