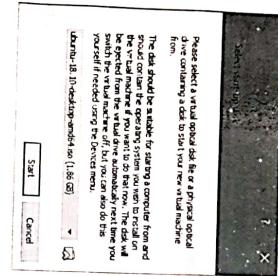
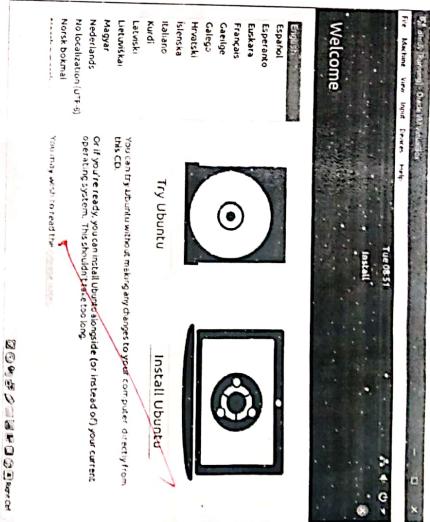


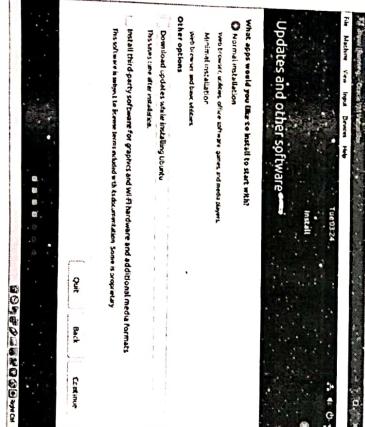
Step 1



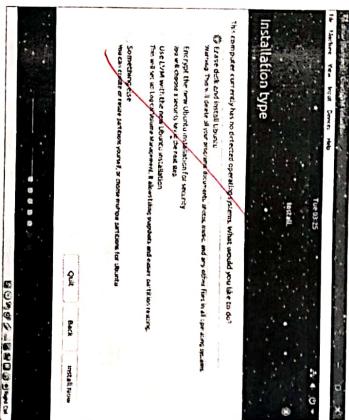
Step 2



Step 3



Step 4



Practical 1: Linux Installation

a. Install your choice of Linux distribution
eg: Ubuntu, Fedora, Debian.

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

→ 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 popup with all settings divided into personal, hardware and system options icons. Let's first select the appearance icon.

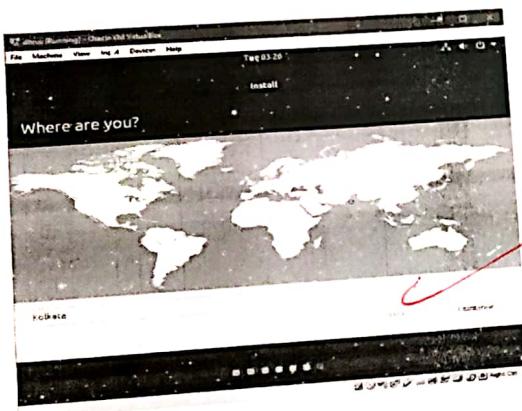
→ changing wallpaper picture

- 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.

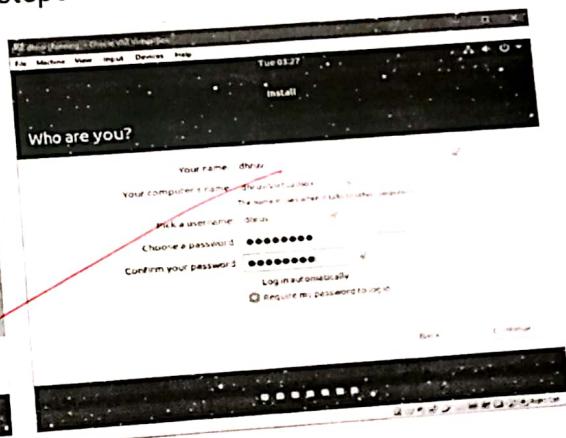
Clicking on any thumbnail our wallpaper will be changed right away, with a fading effect.

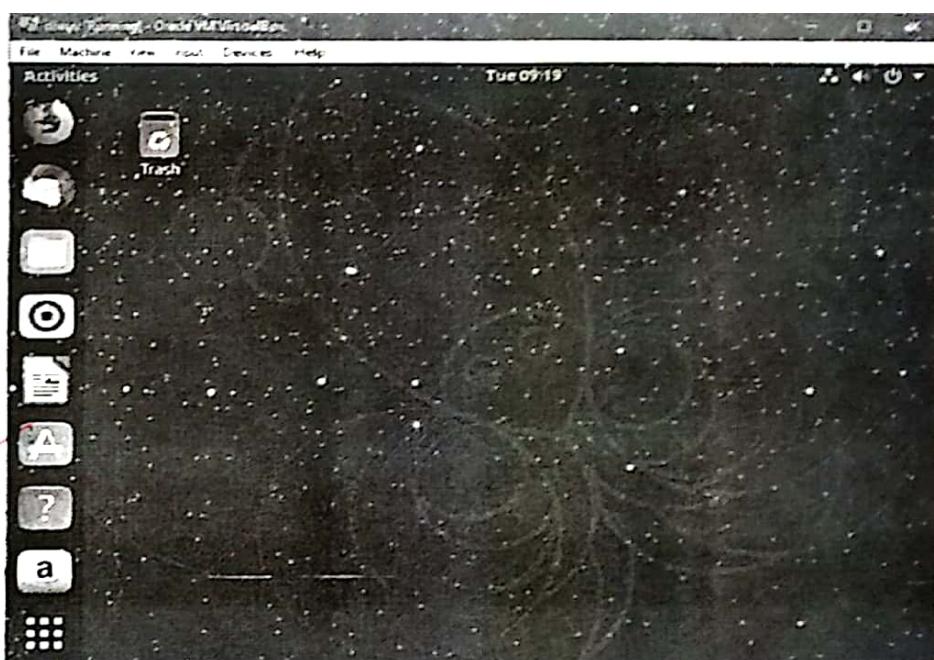
- If you want to select wallpaper from your Picture folder, click the drop down menu above thumbnails and select the Pictures folder.
 - You will see all the pictures in your Pictures folder as thumbnails, where you can select them as your wallpaper.
 - To add wallpaper that is in another folder, just 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 thumbnail and choose between Ambiance, Radiance or high contrast.

Step5



step6





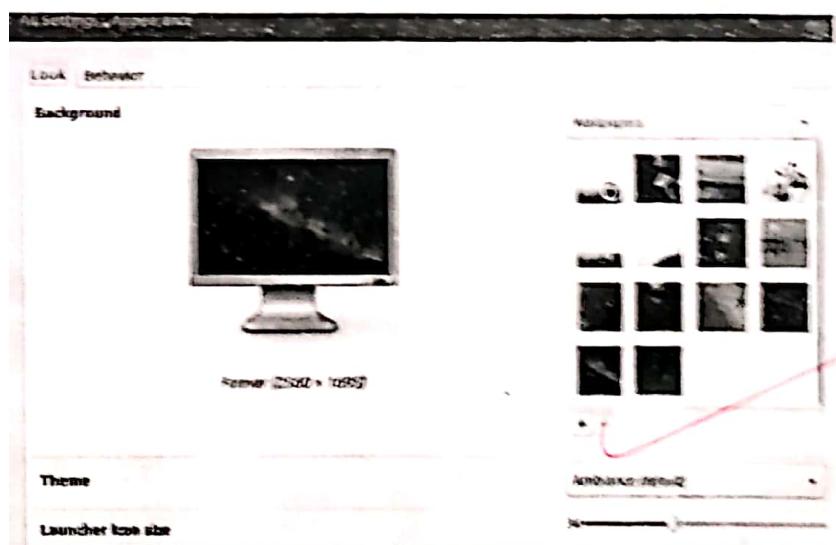
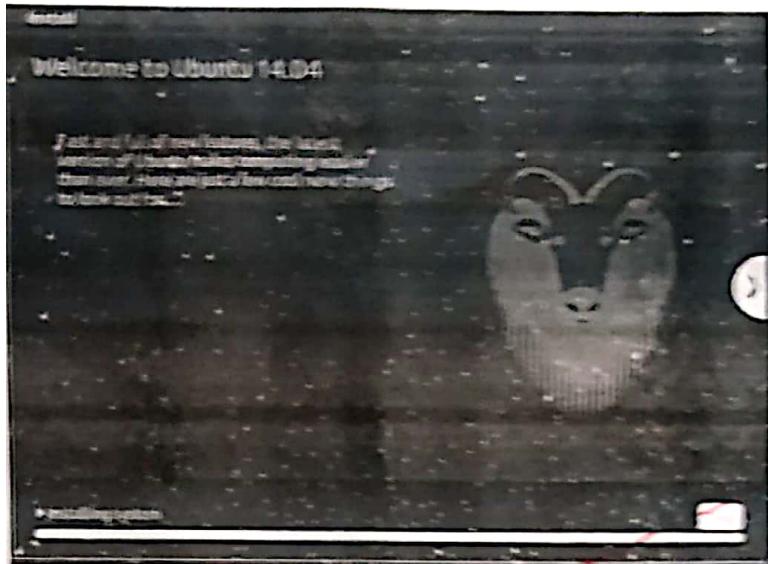
- Ambiance is a light theme that looks a bit more Mac-like, while Radiance is the darker brown theme used in Ubuntu by default.
 - Screen Resolution: Ascertain the current screen resolution for your desktop.
 - change the size or rotation of the screen.
 - You can change how big (or how detailed) things appear on the screen by changing the screen resolution.
 - You change 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 different settings on each display. Select a display in the previous area.
 - 4 select your desired resolution and orientation.

Click apply; the new settings will be applied for 30 seconds before reverting back. Next way, if you cannot see anything with the new.

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.

First click on the clock on the top bar and choose time and date settings. Once the time and date window opens, choose manually; you can change the time and date manually; otherwise choose your time zone from the map, and choose automatic.



Practical 2 : Installing and Removing Software

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

Step I:

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

Step II:

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

Step III:

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

NOW TO UNINSTALL 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.

Practical 3: Utilization of grep, man commands.

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' ob 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) and (backspace = down) keys.

You can also scroll through pages using keys.

Another more summarised form of showing info is the 'man' command. The command is same as 'info', but required data.

b) finding man pages from the and line: bring up the man page for the 'ls' command scroll down to the examples section.

→ To use the 'man' command simply type 'man' (command name). Note 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

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

Tar (1)

tar - an archiving utility

Synopsis

Traditional usage

tar [a/c/d/r/u/x] {GnSkUWg}

UNIX

style usage

tar -A [options] ARCHIVE

ARCHIVE

tar -c [-f ARCHIVE] [OPTIONS] [FILE...].

(cl) finding man pages by section from the cmd lines bring up the man page for the print fib function which manual page section are library function found.

→ 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 and list the std one.

There are certain terms that have different pages in different sections (eg : 'print f' as a command appears in section 1. as a 'std lib' function appears in section 3); in cases like that you can pass the section no to the man before the page name to choose which one you want or use man - a to show every matching page in a row.

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

- e) command line help lists the available options for the mkdir command. How can you do this?
- \$ mkdir -m a = error directory name.

10/10

Practical 4: Command line Operations

a) Install new package on your system

```
sudo apt-get install (package name)
```

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

c) find the passwd file in /using
 find command.

```
* # find / -name passwd.  

  ./usr/share/doc/mes-ldap-253/pam.d/  

  password
```

```
./usr/bin/passwd.  

/etc/pam.d/passwd  

./etc/passwd.
```

```
* # find the directory password file under  

  root and one level down.
```

```
* # find / -max depth 2 -name  

  password.  

  ./etc/passwd.
```

Find the password file under root
and 2 level down

```
# find 1 - maxdepth 3 - name passwd  
./usr/bin/passwd  
./etc/pam.d/passwd  
./etc/passwd
```

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

```
# find - max depth 3 - maxdepth 5 - name  
password  
./usr/bin/passwd  
./etc/pam.d/passwd
```

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

```
# ln -s file1 file2
```

e) Create an empty file example.txt
and move it to /tmp
directory using relative
path name

```
# touch example.txt  
# mv example.txt /tmp
```

4.5

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

```
# rm /tmp/example.txt
```

g find the location of ls ps , bash
commands
where is ~~ls~~

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

```
# where is ps
```

```
ps : /bin /ps /usr /share /meeps : /bin /ps /usr /  
share /man /man /ps /gz .
```

```
# where is bash
```

bash : /bin /bash /etc /hash /hashrc /usr /share
~~man /man /bash . 1.gz~~

~~9/10~~

Practical: 05

File operations

1 explore mounted file system on your computer
at -R



what are the different ways of exploring method in linux ? file system on 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   98748   4% /run
/dev/sda1        7692728  3383372  3326024  51% /
tmpfs            512076      216   511860   1% /dev/shm
tmpfs            51206          4   51116   1% /run/lock
tmpfs            512076       0   512076   0% /sys/fs/cgroup
tmpfs            102416      48  102368   1% /run/user/1000
```

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/pts type ppts (rw,nosuid,nodev,noexec,relatime) devtmpfs on /dev/pts (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/urandom type tmpfs (rw,nosuid,nodev,noexec,relatime)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/fuse type tmpfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
cpuset on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
perf_event on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
cgroup on /sys/fs/cgroup/agent type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
cgroup on /sys/fs/cgroup/bikto type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,nsdelegate=755)
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/hugepages type hugepages (rw,relatime,hugepages,nsroot)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/hugepages type hugepages (rw,relatime,hugepages,nsroot)
sysfs on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,relatime)
rootfs on / type rootfs (rw,relatime)
tmpfs on /dev/hugepages type hugepages (rw,relatime)
```


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1) archiving and backup the word directory using tar, gzip and bzip commands.

→ ~~gzip filename.txt
Bzip filename.txt~~

5. Use diff command to create
diff of two files
→ diff filename1 filename2

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

```
jeba@jeba-VirtualBox:~/jeba$ ls
aa.txt.gz
jeba@jeba-VirtualBox:~/jeba$ cat >aa.txt
hello world
^C
jeba@jeba-VirtualBox:~/jeba$ cat >bb.txt
this is linux
^C
jeba@jeba-VirtualBox:~/jeba$ dtrf aa.txt bb.txt
ido
< hello world
jeba@jeba-VirtualBox:~/jeba$ cat >bb.txt
this is Linux
^C
jeba@jeba-VirtualBox:~/jeba$ cat >bb.txt
this is Linux
^C
jeba@jeba-VirtualBox:~/jeba$ dtrf aa.txt bb.txt
lcl
< hello world
this is Linux
jeba@jeba-VirtualBox:~/jeba$ gzip aa.txt
jeba@jeba-VirtualBox:~/jeba$ gzip bb.txt
Binary files aa.txt and bb.txt.gz differ
```

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

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ who  
jeba    tty7          2020-01-15 20:32 (:0)  
jeba@jeba-VirtualBox:~$ whoami  
jeba  
jeba@jeba-VirtualBox:~$ who -t  
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
```

```
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
```

Practical - 06

User Environment

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

→ who command and whoami

b) display /etc/shadow file using cat command and understand the importance of shadow 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 characters. Case sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.
- Password, 13 characters encrypted. A blank entry (eg ::) indicates a password is not required to log in (usually a bad idea), and a "*" entry (eg: * :) indicates the account has been disabled.
- The no. of days (since Jan 1, 1970) since the password was last changed.

- The no. of days before password maybe changed (0* indicates it maybe changed at any time).
 - The number of days after which password must be changed (9999 times indicates user can keep his or her password unchanged for many, many years).
 - The no. of days to warn user for an expiring password (7 for a full week).
 - The no. of days after password expires that account is disabled.
 - The no. of days since Jan 1 1970 that an account has been disabled.
 - A reserved field for possible future use.
- Each field in a password entry is separated with ":" colon character, and are as follows:
- Username, upto 8 characters. Case sensitive, usually all lowercase.
 - An "x" in the password field. Passwords are stored in file

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

```
jeba@jeba-VirtualBox:~$ history  
1 who  
2 whoami  
3 who  
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_ls_2020-01-15_20:30  
LOGON tty1  
jeba@jeba-VirtualBox:~$ █
```

```
jeba@jeba-VirtualBox:~$ alias m="mkdtr new"  
jeba@jeba-VirtualBox:~$ m  
jeba@jeba-VirtualBox:~$ ls  
Downloads Desktop Documents Examples desktop  
Music Pictures Templates Videos  
new_ jj_ new_ public  
jeba@jeba-VirtualBox:~$ █
```

- "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" . This is assigned by the "adduser" script . Unix uses this field , plus the following group field , to identify which files belong to the user.
 - 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)
- c) →
- Get your current working directory.
~~password~~ pwd

d) explore different ways of getting command history now 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 command.

alias label = "command"

pp 20

jeba@jeba-VirtualBox ~

Hello
This is my Linux example
Welcome
Welldone
This is vi Editor
Thank you

:q/mysource/gc

0 0 0 jeba@jeba-VirtualBox ~
Hello
This is my Linux example
Welcome
Welldone
This is vi Editor
Thank you

0 0 0 jeba@jeba-VirtualBox ~
Hello
This is our Linux example
Welcome
Welldone
This is vi Editor
Thank you

Linux

search and navigate

a) Create, modify editor
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) Navigation:

Movement in four directions:-

Movement	Key	action
up	K	moves cursor up
down	J	moves cursor down
left	H	moves cursor left
right	L	moves cursor right

word navigation:

key	action
b	moves back to the beginning of the word.
e	moves forward to the end of the word.
w	moves forward to the beginning of the word.

(3 more)

\$ move to first character of a line
 move to the end of a line.

scrolling

key	action
ctrl+f	scroll forward
ctrl+b	scroll backward
ctrl+d	scroll half page
ctrl+u	scroll half page backward

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

i Replace

Syntax : !g / word to be replaced !s // newword

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

```
:set noresearch
```

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

```
:set nu
```

highlight
use set research

Show the line number
Use set hue

0.0
0.0
0.0
0.0

ii

iii

Topic : Linux security

Use of sudo to change user privileges to root.

Create an user named user1.
To give some users root
privileges edit /etc/sudoers using
visudo
enter new line as highlighted
below.

Identify operations that require
sudo privileges

Modify expiration date for new
user using password ageing.

- E : expiration date
- m : minimum no. of days before
password change
- M : no. of days password is valid
- I : account inactive
- W : No. of days of warning before a
password change is required

```
# 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-VirtualBox:~$ su user1
```

```
Word:
```

```
1@jeba-VirtualBox:/home/jeba$ mkdir folder1
r: cannot create directory 'folder1': Permission denied
1@jeba-VirtualBox:/home/jeba$ sudo sudo mkdir folder1
o] password for user1:
```

```
1 is not in the sudoers file. This incident will be reported.
```

```
ubnt@ubnt-VirtualBox:~$ sudo chage -E 25/01/2020 -F 10 -M 90 -I 30 -W 30 user1
ubnt@ubnt-VirtualBox:~$ sudo chage -l user1
last password change : Jan 21, 2020
password expires    : Apr 29, 2020
password inactive   : May 29, 2020
account expires      : Jan 01, 2022
minimum number of days between password change : 10
maximum number of days between password change : 90
warning number of days before password expires   : 36
ubnt@ubnt-VirtualBox:~$
```

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~~Delete newly added user~~

d

~~✓✓✓✓~~

Topic: Network management

Get IP address of your machine
using ifconfig

Get hostname of your machine

Use ping to check network connectivity to remote machines

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:153a%0:1d5a3:8d8e/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:53246 errors:0 dropped:0 overruns:0 carrier:0  
              collisions:0 txqueuelen:1  
              RX bytes:4225072 (4.2 MB) TX bytes:4225072 (4.2 MB)
```

(x) (o) jeba@jeba-VirtualBox:~
jeba@jeba-VirtualBox:~\$ hostname
jeba-VirtualBox
jeba@jeba-VirtualBox:~\$ █

```
jeba@jeba-VirtualBox:~$ ping www.google.com  
PING www.google.com (172.217.31.196) 56(84) bytes of data.  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.8 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.6 ms  
64 bytes from maa03s28-1n-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=90.9 ms  
^C  
[1]+  Stopped                  ping www.google.com █
```

```

jeba@jeba-VirtualBox:~$ dig www.google.com
; <>> DIG 9.10.3 -P4-Ubuntu <>> www.google.com
; Global options: +cmd
; Got answer:
; >>>HEADER<<
; 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 22:46:06 IST 2020
; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$ █

jeba@jeba-VirtualBox:~$ traceroute www.google.com
1 16.0.2.2 (16.0.2.2) 0.390 ms 0.143 ms 0.151 ms
2 * *
3 16.0.2.2 (16.0.2.2) 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    0      0   0 enp0s3
10.0.2.0        *              255.255.0.0  U     0      0   0 enp0s3
link-local      *              255.255.0.0  U     0      0   0 enp0s3
jeba@jeba-VirtualBox:~$ █

jeba@jeba-VirtualBox:~$ host -v
jeba@jeba-VirtualBox:~$ arpd
Address          HwAddress           Flags Mask
10.0.2.2          ether 52:54:00:12:35:02
3
jeba@jeba-VirtualBox:~$ █

```

d) Use of dig command

e) Troubleshooting networking using
trace route, route command

f) Use of arp command

g) Use of host command

h) Use of netstat command and
Nmap command.

```
jeba@jeba-VirtualBox:~$ netstat -an | grep ':443'
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State      Proto
Active UNIX domain sockets (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State      Proto
unix        2      [ ]          DGRAM
unix        2      [ ]          DGRAM
unix        3      [ ]          STREAM     CONNECTED
```

(Handwritten note: 100% confirmed)

```
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 (0.045s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:8111::2004
rDNS record for 216.58.196.68: bom0ss11-1n-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
```

```
tcsc@tcsc-VirtualBox:~
```

```
c@tcsc-VirtualBox:~$ echo $SHELL
```

```
n/bash
```

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

```
tcsc@tcsc-VirtualBox:~
```

```
! /bin/bash
```

```
echo "THIS IS LINUX!"
```

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

```
tcsc@tcsc-VirtualBox:~$ vi llinux.sh
```

```
tcsc@tcsc-VirtualBox:~$ chmod 777 llinux.sh
```

```
tcsc@tcsc-VirtualBox:~$ ./llinux.sh
```

```
THIS IS LINUX!
```

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

Ques: Shell Scripting

a) Basics of shell scripting

- To get a shell, you need to start a terminal
- To see what shell you have, run:
`echo $SHELL`
- In linux, the dollar sign (\$) stands for shell variable.
- The echo command just returns whatever you type in.
- `#!/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
```

- b) Steps to write and execute a shell script

ra

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 [you can use vi filename.sh or [you can use your favorite editor to edit the script]
- d) chmod 777 filename.sh [for making the script executable].
- e) 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"
```

```
#!/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:~$
```

```
tcsc@tcsc-VirtualBox:~
```

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

```
tcsc@tcsc-VirtualBox: ~  
tcsc@tcsc-VirtualBox:~$ vi llinux2.sh  
tcsc@tcsc-VirtualBox:~$ chmod 777 llinux2.sh  
tcsc@tcsc-VirtualBox:~$ ./llinux2.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
```

Program to find the sum of two variables.

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

→ SED
 sed command or stream editor is very powerful utility offered by Unix systems. It is mainly used for text substitution, find and 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.

1) displaying partial text of a file.

With sed, we can view only part of a file rather than seeing whole file.

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- 2) display all except some lines
To display all content of a file except for some portion, use option 'c'.
 - 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 a line number with 's' option.
 - 6) Add a line after l before the matched string.
To add a new line with some content after every match, use option 'a'.

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

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

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

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

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

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- 7) To add a new line with some content before every match , use option 'i'.
 - 7) To change a whole line with matched pattern
 - 7) 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 & option as follows .

8)

```
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
```