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Practical - 1

Aim: Install your choice of Linux distribution. eg: Ubuntu, Fedora
2) Customize desktop environment by changing different default options like changing default background, Theme, screen saver, Screen resolution, time setting

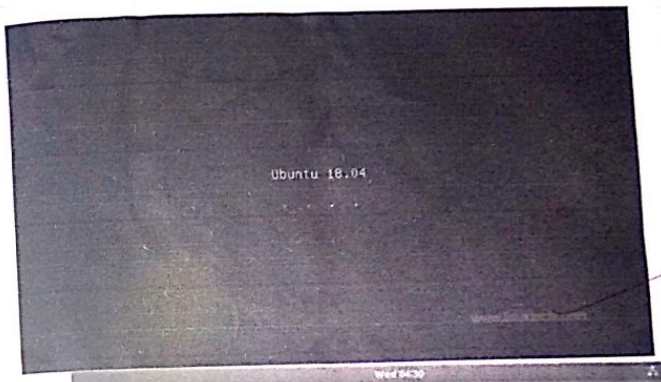
→ Open Google Chrome & type http://www.Virtualbox.org Then this image will open on your screen & click on Download Virtual box 5.1 with your O.S.

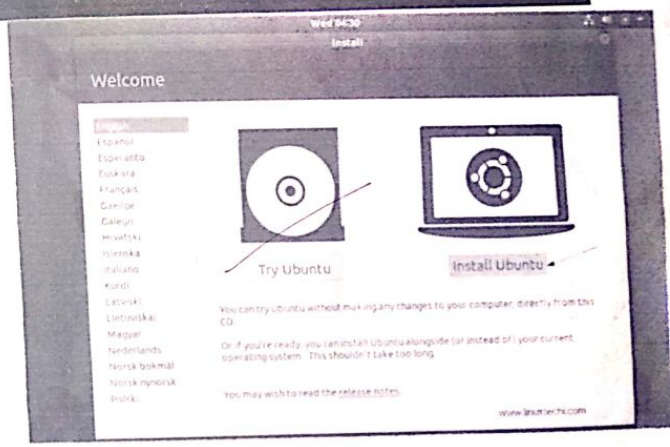
→ After installing Virtual box the important thing is to download extension of that same Version and if anything went wrong in that our Machine will pop-up error message. So, be careful while installing extension

→ After features are selected the message will appear to install Virtual box on your device, So click on install & the Setup will start installation

→ While installing, Virtual box various Software will ask permission to be installed on your device grant it by clicking on install button.

→ The installation is done just click on finish button & you are successfully install Virtual box on device.





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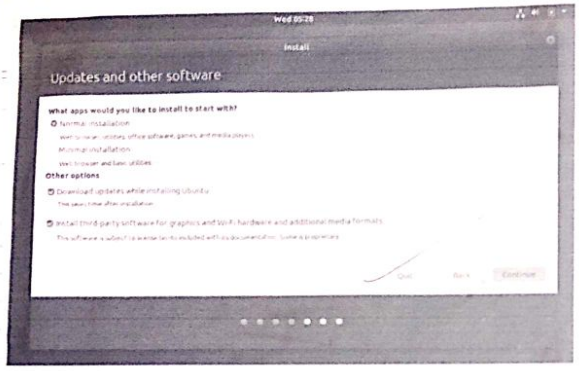

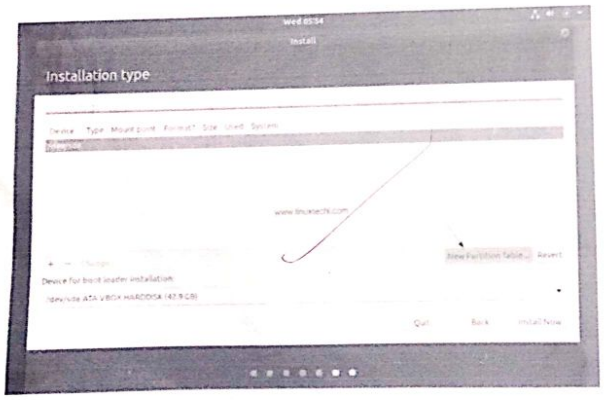

→ Now, after opening the Virtual box click on start button & following screen will appear & select as which you want to install

→ Now, allocate space for your OPs. After allocating SPACE click on next button.

→ After selecting Hard disk it will ask for hard disk type, select EVDI & click on next button

→ After clicking on next button a screen will appear in front of you in which we have to enter file name or just brows file in File Manager.

→ Now go to general setting & click on this storage option & select the empty option & in place of optical device just choose ~~Vit~~ Virtual Disk file.

→ After that select the OS which you want to install in Virtual box.

* Note:- The Operating System file should be ISO Type or else, it won't work.

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→ Now after Selecting the file you will see that place of empty file which you have Successful will be appearing. So, click on ok button

→ Congrats Successfully Created' Virtual Machine'

→ Now Just click Start button & you will see starting text on your top left side.

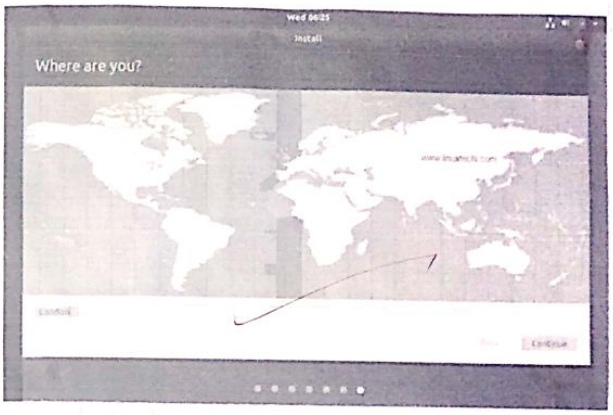
→ Your System is Starting

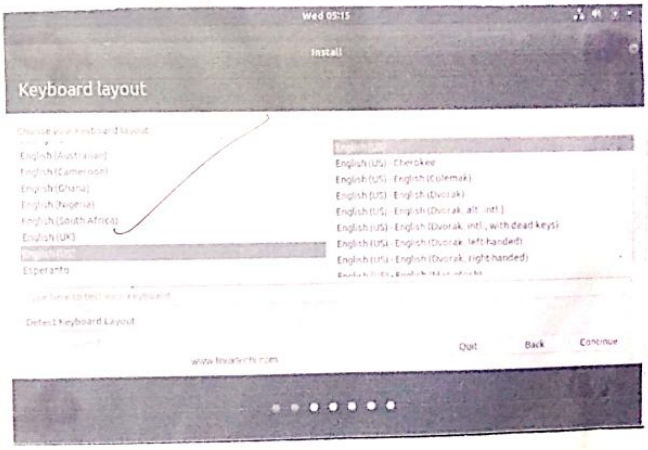
→ Just click on Install Ubuntu Option

→ Select your City in which kolkata is the best option as the time GSM is same of Metropolitities

→ Select your preferred language you want

→ Select you Username & Password Click on Continue button.





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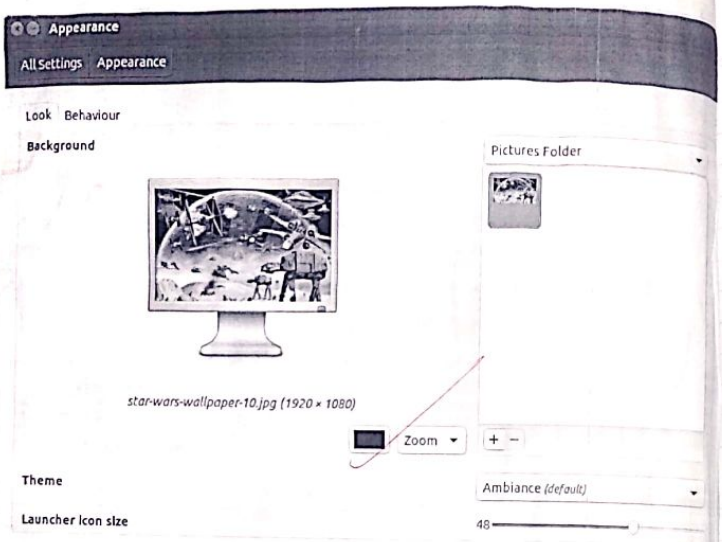

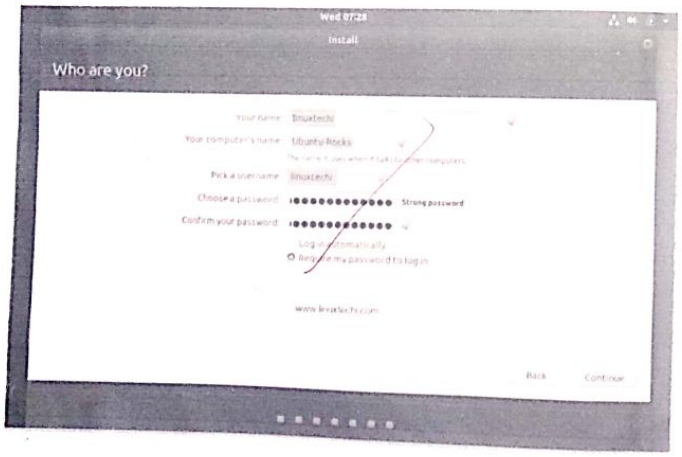

* Customize desktop environment by changing different default options like changing default background, themes screensavers,.

→ 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 & select System Settings ....

A window will pop-up with All Settings divided into Personal Hardware & 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 way, with a fading effect.

If you want to select Wallpaper from your picture folder, click the drop down menu above thumbnails & select the picture folder.

You will see all the pictures in your pictures folder as thumbnails, where you can select them as your wallpaper

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To add wallpaper that is in another folder, just click the plus icon below the ~~two~~ thumbnails & then in ~~pop~~ pop-up window, select the path in our custom folder & 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.

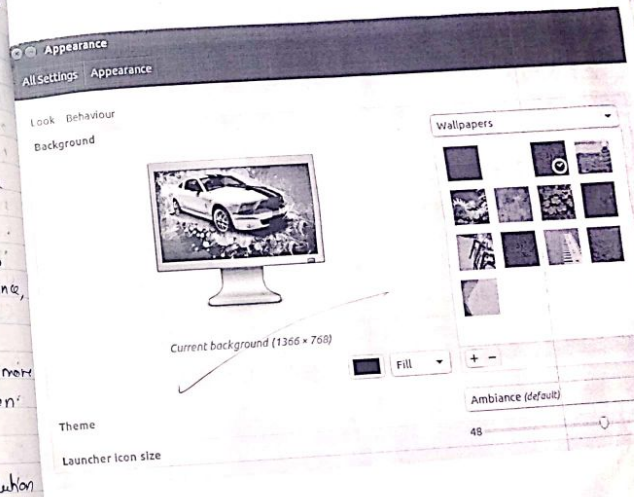
To do that, click on the drop-down menu below the Wallpaper thumbnails, & choose between Ambiance, Radiance or High Contrast

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

→ 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.



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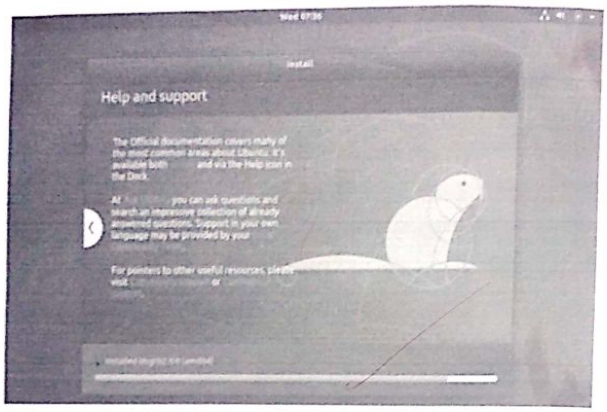

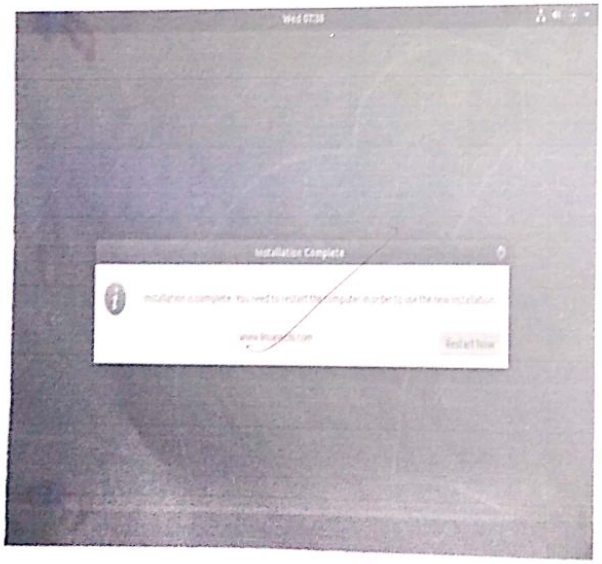

You can change which way up the things appear (for example, if you have a rotating display) by changing the rotation.

1. Click the icon on the every right of the menu bar & Select System Settings.

2 Open Screen Display

3. If you have multiple displays & they are not mirrored you can have different settings on each display. Select a display in the preview area.

4. Select your desired resolution & rotation.

5. Click Apply. The new settings will be applied for 30 seconds before reverting back. That way, if you cannot see anything with the new.

→ Time Setting 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.

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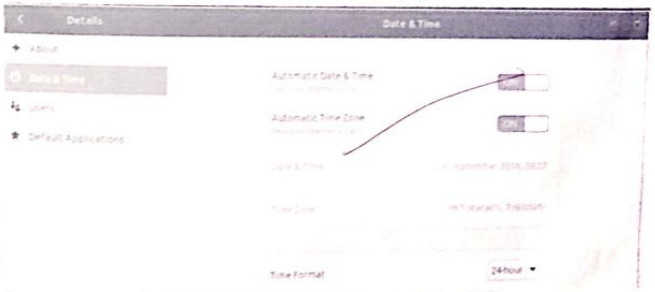
Just click on the clock on the top bar, & choose Time & date settings, once the time & date window opens, choose Manually, so you can change the time & data manually; otherwise choose your time zone from the map, & choose Automatic.



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Practical - 2

Aim :- Installing & removing Software

a) Install gcc package, Verify that it runs & then remove it.

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

Step 2:
Type 'Sudo apt-get install gcc'. After trying that following command installation will take place.

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

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No.

NOW, TO UNINSTALL GCC COMPILER:

In GCC 5.1.0, although there is no top text 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.

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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 'group' Command:

Open the terminal (Ctrl + Alt + T) & type: info grep.

After typing this Command following output will be displayed onto your Screen.

You can also Scroll through pages 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.

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b] Finding man pages from the cmd line. Bring up man page for the 'ls' Command Scroll down to the example 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 to document file Compression

Ans:] 'Tar', 'Zip' are some man pages which are available for document file Compression Simply type : map zip
man tar.

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d] Finding man pages by Section from the Cmd line bring up the man page for the printf 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 & list the std only.

There are certain terms that have different pages in different section (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 term falls in with 'man -k' (equivalent to apropos Command). It will also 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

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Practical-4

Aim:- Command line Operations.

Command line Operations

A] Install new packages on your System
→ Sudo apt-get install (package name)

B] Remove the package installed
→ Sudo apt-get remove (package name)

C] Find the password file in/using find Command.
→ find /-name password
/ rofs / etc / cron.daily / passwored
/ rofs / etc / pam.d / passwords
/ rofs / etc / passwords
/ rofs / usr / bin / passwords
/ rofs / usr / share / bash - Completion / Completions/p
/ rofs / usr / share / doc / passwords
/ rofs / usr / share / lintian / overrides / passwords

D] Find the directory passwords file under root & one level down.
→ find /-maxdepth 2 - name passwords
/etc / passwored

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E] Find the directory password file under root & two level down.

→ find / -maxdepth 3 -name password
/usr / bin /password
/ etc / pam.d /password
/ etc / password

F] Find the password file between sub-directories level 2 & 4.

→ find -maxdepth 3 -maxdepth 5 -name password
/ etc / cron.daily / password
/ etc / pam.d /password
/ etc / password
/ usr / bin / password
/ usr / share / bash-Completion/Completions/password
/ usr / share / doc / password
/ usr / share / lintian / overrides/ password

G] Create a Symbolic link to the file you found in last step

→ ln -s. filename1.txt filename2.txt
ls
filename2.txt

4] Find the location of ls, ps, bash commands,

→ whereis ls

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

→ whereis ps

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

→ whereis bash

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

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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        7092728 3383372   3326824  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,relatime,size=494436k,nr_inodes=123609,mode=755)
udev on /dev type devtmpfs (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=666)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,size=102416k,mode=755)
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
rotos=5,maxproto=5,direct)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
```


Pratical- 5

File Operation.

1. Explore mounted file System on your Computer

→ df-k

2. What are the different ways of exploring mounted file Systems on Linux?

→ mount

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3. Copying text from files.
→ cp command, mv command

4. Archiving & backup the work directory using tar, gzip & bzip2 Commands.

→ gzip filename.txt
Bzip2 filename.txt


```
jeba@jeba-VirtualBox:~$ ls
Desktop   Downloads   [redacted]  Music    Public   Videos
Documents  examples.desktop  13  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$
```

```
jeba@jeba-VirtualBox:/$ tar -cvf data.tar /nnn
tar: data.tar: Cannot open: Permission denied
tar: Error is not recoverable: exiting now
jeba@jeba-VirtualBox:/$ sudo tar -cvf data.tar /nnn
tar: Removing leading `/' from member names
/nnn/
/nnn/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      mntl root snap [redacted] vmlinuz
jeba@jeba-VirtualBox:/$ cat data.tar
nnn/0000755000000000000000000000000000001360537655701036 5ustar  rootrootnnn/hd/0000755000000
0000000000000000000001360537655701076 0 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•◆[redacted]◆[redacted]
'J◆◆$S◆◆[redacted]1 jeba@jeba-VirtualBox:~/jeb$ gzip dd.txt
jeba@jeba-VirtualBox:~/jeb$ ls
dd.txt.gz  ss.txt.bz2
jeba@jeba-VirtualBox:~/jeb$ cat dd.txt.gz
2[redacted]dd.txt+O◆I◆◆M◆◆◆◆◆◆◆◆[redacted]◆xzjeba@jeba-VirtualBox:~/jeb$
```

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```
jeba@jeba-VirtualBox:~/jeb$ ls
aa.txt.gz aa.txt bb.txt.gz
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 22:15:16.259898738 +0530
@@ -1,3 +1,3 @@
-hi
-hi
-hi
+hello
+hello
+hello
jeba@jeba-VirtualBox:~/jeb$
```


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

6. Use patch Command to patch a file. And analyze the patch using patch Commain again.

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PRACTICAL 6

Use Environment

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

→ who command & whoami

b) Display /etc/shadow file using cat Command & understand the importante 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 character, 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 character encrypted. A blank entry (eg.::) indicates a password is not required to log in (usually a bad idea), & 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)


```
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
LOGIN    tty1         2020-01-15 20:30                 788 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:::
```

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```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```


→ The number of days 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 characters, and are as follows:

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

→ An "x" in the password field. Passwords are stored in the "/etc/shadow" file.

→ Numeric user id. This is assigned by the "adduser" script. Unix uses this field, plus the following group field, to identify which files belong to the user.

→ Numeric group id. Red Hat uses group id's in a fairly unique manner for enhanced file security. Usually the group id will match the user id.

→ Full name of user. I'm not sure what the maximum length for this field is, but try to keep it reasonable (under 30 characters).

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

→ User's "shell account". Often set to "/bin/bash" to provide access to the bash shell (my personal favorite shell).

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c) Get your current working directory
→ pwd

d) Explore different ways of getting Command history, how to run ~~pre~~ previously executed Command without typing it
→ history
! line number

e) Create ~~alias~~ 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"


```
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:~$ !3
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                   Music   Pictures   Templates
Documents  examples.desktop  jj  new   Public   Videos
jeba@jeba-VirtualBox:~$
```

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PRACTICAL - 7

Linux Editors : Vi

Create, modify, Search & navigate a file in editor

Creating a file.

To create a file, on the terminal type vi followed by filename.

Modifying the file:

To modify a file, on the vi editor, type 'o'.

Search in a file:

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

Navigate

Movement in four directions.

Key	Actions
k	Moves cursor up
j	Moves cursor down
h	Moves Cursor left
l	Moves Cursor right

Word Navigation

Key	Actions
b	Moves back to the ~~begging~~ beginning of the word.
e	Moves forward to the end of the word
w	Moves forward to the beginning of the word
0(zero)	Moves to first character of a line
$	Move to the end of line

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Scrolling

Key	Action
Ctrl + f	Scrolls forward
Ctrl + b	Scrolls backward
Ctrl + d	Scrolls half page
Ctrl + u	Scrolls half page backward

b) Learn all essential Commands like Search/replace, highlight, show line numbers.

i Replace

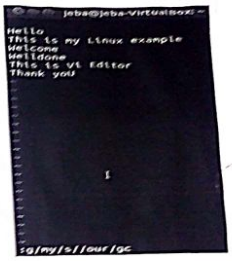
Syntax: :g/word to be replaced/s//new word/gc

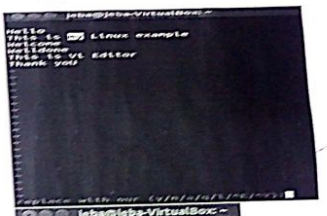
ii Highlight

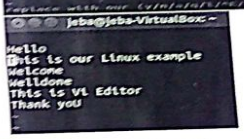
Use set hlsearch

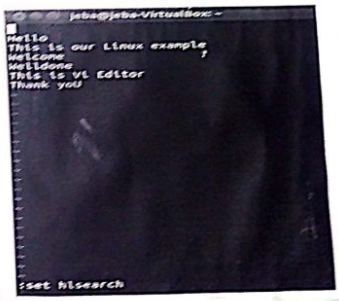
iii Show the line numbers

Use set nu









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```
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

Linux Security

a) 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 lines as highlighted below

b) Identify Operations that require sudo privileges

c) Modify ~~expiran~~ expiration date for new user using password ageing

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-E: Expiration Date
-m: Minimum number of days before password change
-M: Number of days password is valid
-I: Account inactive
-W: Number of days of warning before a password change is required.

d) Delete newly added user


```
jeba@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter the new value, or press ENTER for the default

        Minimum Password Age [0]: 100
        Maximum Password Age [99999]: 200
        Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21
        Password Expiration Warning [7]: 5
        Password Inactive [-1]:
        Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change                                    : Jan 21, 2020
Password expires                                        : Aug 08, 2020
Password inactive                                       : never
Account expires                                         : Jan 31, 2020
Minimum number of days between password change          : 100
Maximum number of days between password change          : 200
Number of days of warning before password expires       : 5
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ sudo chage -E 25/01/2020 -m 10 -M 90 -I 30 -W 30 user1
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change                                    : Jan 21, 2020
Password expires                                        : Apr 20, 2020
Password inactive                                       : May 20, 2020
Account expires                                         : Jan 01, 2022
Minimum number of days between password change          : 10
Maximum number of days between password change          : 90
Number of days of warning before password expires       : 30
jeba@jeba-VirtualBox:~$
```

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

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d) Use of dig Command

e) Troubleshooting network using traceroute, route Command

f) Use of arp Command

g) Use of host Command


```
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:~$
```

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

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

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ arp
Address                  HWtype  HWaddress           Flags Mask            Iface
10.0.2.2                 ether   52:54:00:12:35:02   C                     enp0s
3
```

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

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```
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-CMGGc6G7PS
unix  3      [ ]         STREAM     CONNECTED     13242    /run/systemd/journal/
stdout
unix  3      [ ]         STREAM     CONNECTED     43113    /run/systemd/journal/
stdout
unix  3      [ ]         STREAM     CONNECTED     43013
unix  3      [ ]         STREAM     CONNECTED     42935
```

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

Starting Nmap 7.01 ( https://nmap.org ) at 2020-01-20 22:51 IST
Nmap scan report for www.google.com (216.58.196.68)
Host is up (0.044s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004
rDNS record for 216.58.196.68: bom05s11-in-f4.1e100.net
Not shown: 998 filtered ports
PORT    STATE SERVICE
80/tcp  open  http
443/tcp open  https

Nmap done: 1 IP address (1 host up) scanned in 20.32 seconds
jeba@jeba-VirtualBox:~$
```

h) Use of netstat Command & ~~ooo~~ nmap Command.

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PRACTICAL- 10

SHELL SCRIPTING

Basic 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 of the program/bin/bash.

Echo $SHELL

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

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- chmod 777 filename.sh
  ./filename.sh

Step to write & execute a shell Script
Shell script is just a simple text file ~~with~~ 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 favorite editor, to edit the Script]
e) chmod 777 filename.sh (for making the Script executable
f) sh filename.sh or ./filename.sh (for running the Script.

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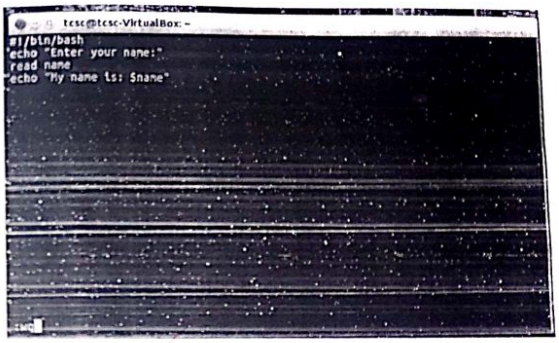
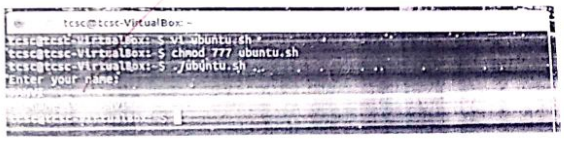
Program to display your name.

```
# 1/ bin /bash
Echo " Enter your name: "
Read name
Echo " My name is: $name"
```



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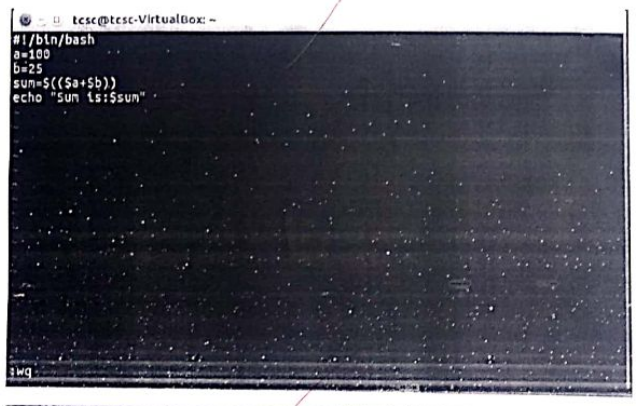

Program to find the Sum of two Variable.

vi file name.sh

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

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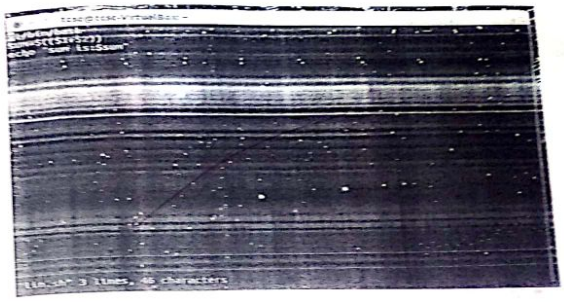
Program to find the sum of two numbers (values passed during execution).



```
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:~$
```

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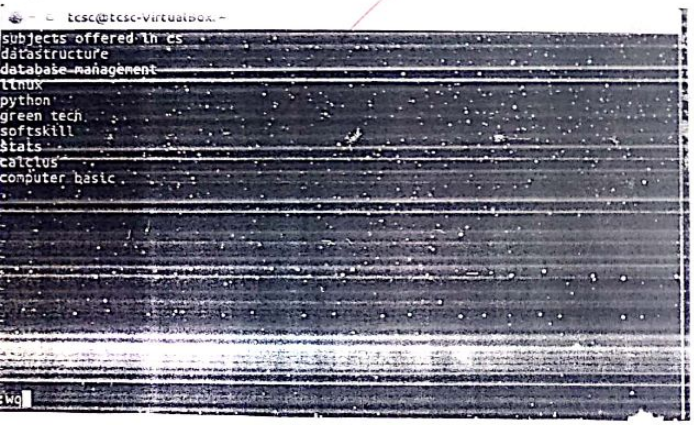

Sed

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

Consider the following text file.

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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 & Replacing a string

's' option is for searching a word.


```
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
```

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


5 Replace a string on a particular line

To replace a string on a particular line, use line number with 's' option.

6. Add a line after/before the matched string

To add a new line with some content after every pattern match, use option 'a'

To add a new line with some content before every pattern match, use option 'i'.

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7) To change a whole line with matched pattern

To change a whole line to a new line when a search patten matches, use option 'c'.

8) Appending lines

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


```
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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