

LINUX INSTALLATION

Install the Linux distribution of your choice i.e. Ubuntu, Fedora, Debian.

Steps to install Ubuntu:

Using a USB drive:

Most newer computers can boot from USB, you should see a welcome screen prompting you to choose your language and giving you the option to install Ubuntu or try it from the USB.

If your computer doesn't automatically do so, you might need to press the F12 key to bring up the boot menu, but be careful not to hold it down, that can cause an error message.

Prepare to install Ubuntu:

We recommend you plug your computer into a power source.

You should also make sure you have enough space on your PC to install Ubuntu.

we advise you to select download while installing & install this third party software now.

If you are not connected to the internet you will be asked to select a wireless network, if available. We advise you to connect during the installing so we can ensure your machine is upto date.

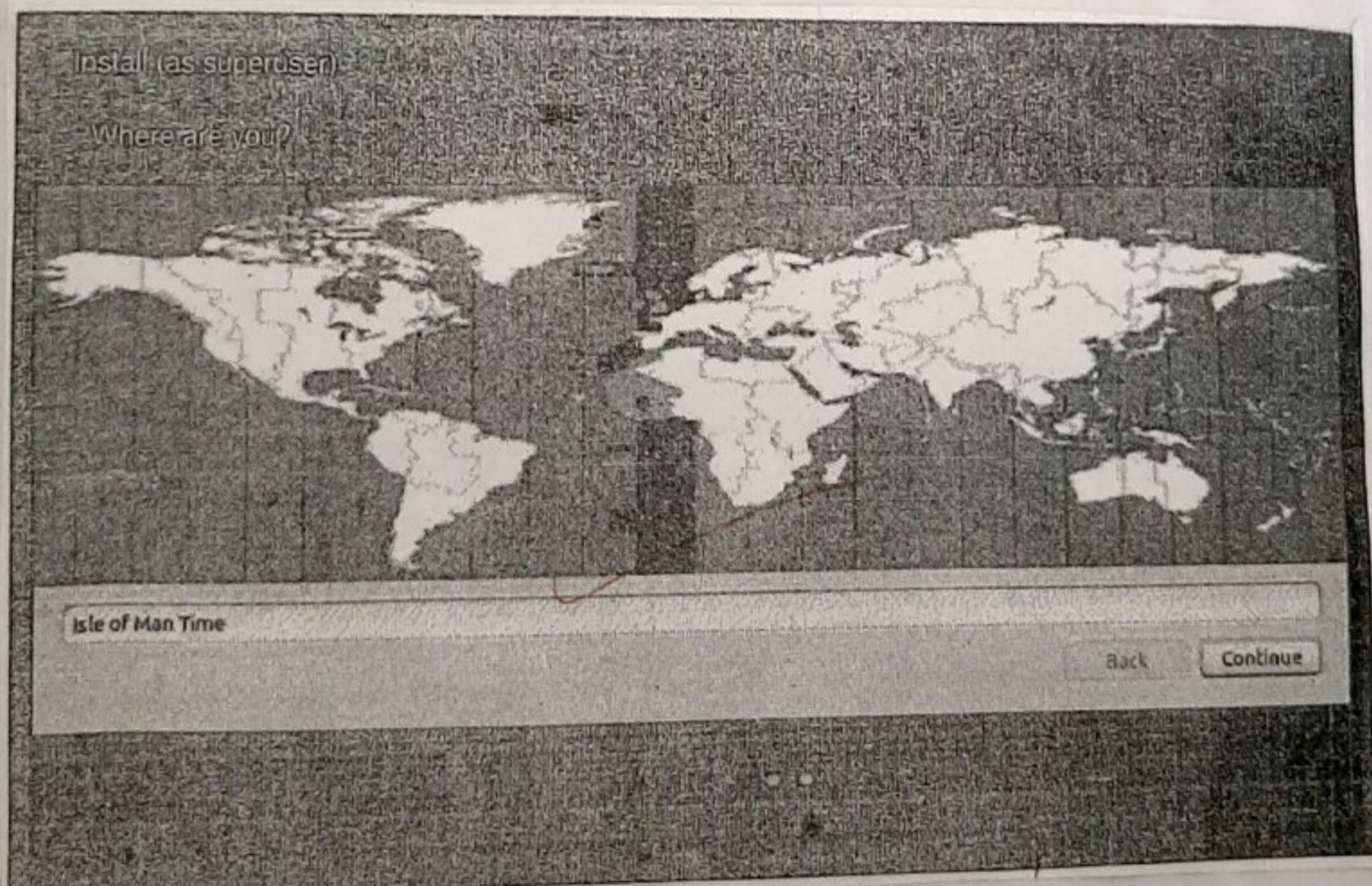
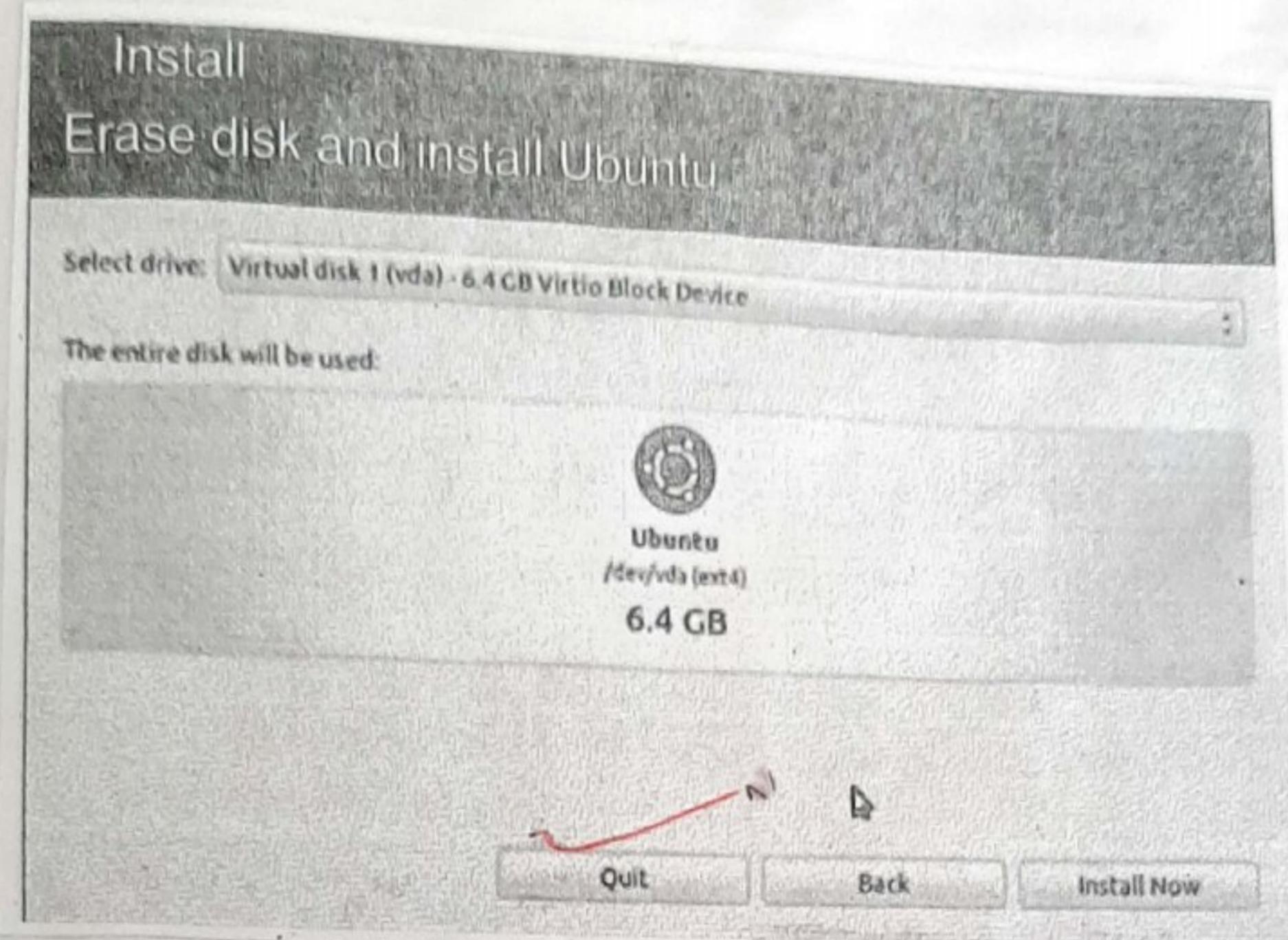
Allocate drive space:

Use the checkbox to choose whether you had like to install ubuntu alongside another operating system, delete your existing operating system and replace it with ubuntu or if you are an advanced user choose the 'something else' option.

Begin the installation:

Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install ubuntu.

The installation process will begin when you click the 'Install Now' button.



Install (as superuser)

Keyboard layout

Choose your keyboard layout:

English (Cameroon)

English (China)

English (Nigeria)

English (South Africa)

English (UK)

English (US)

Esperanto

Estonian

Faroese

English (US)

English (UK) - English (UK, Colemak)

English (UK) - English (UK, Dvorak with UK punctuation)

English (UK) - English (UK, Dvorak)

English (UK) - English (UK, Macintosh International)

English (UK) - English (UK, Macintosh)

English (UK) - English (UK, extended WinKeys)

English (UK) - English (UK, International with dead keys)

Type here to test your keyboard

Detect Keyboard Layout

Back

Continue

Install

Who are you?

Your name: nikisha

Your computer's name: nikisha-HP-Compaq-dm

The name it uses when it talks to other computers.

Pick a username: nikisha

Create a password: ooooo

Show password

Confirm your password: ooooo

Encrypt my home folder

Log in automatically

Require my password to log in

Back

Continue

Ubuntu needs about 4.5 GB to install, so add a few extra GB's to allow for your files.

Select your location:

If you are connected to the Internet, this should be done automatically. Check your location, if correct click 'Forward' to proceed. If you are unsure of your time zone, type the name of the town you are in or click on the map and we will help you find it.

Select your preferred keyboard layout:-

Click on the language option you need. If you're not sure, click 'the detect keyboard layout' button for help.

Enter your login & password details.

Learn more about Ubuntu while the system installs.

That's it! It's just a matter of waiting

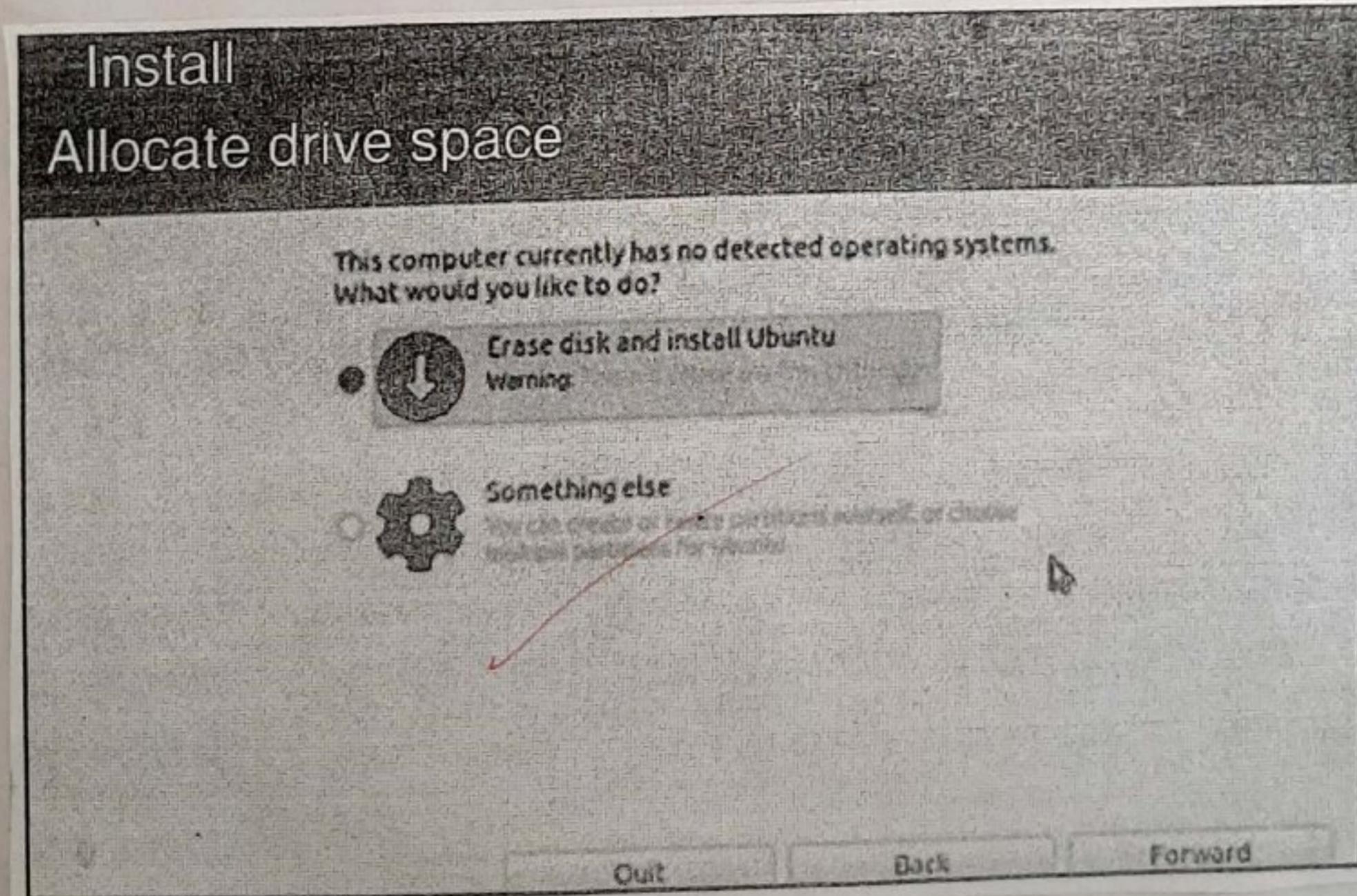
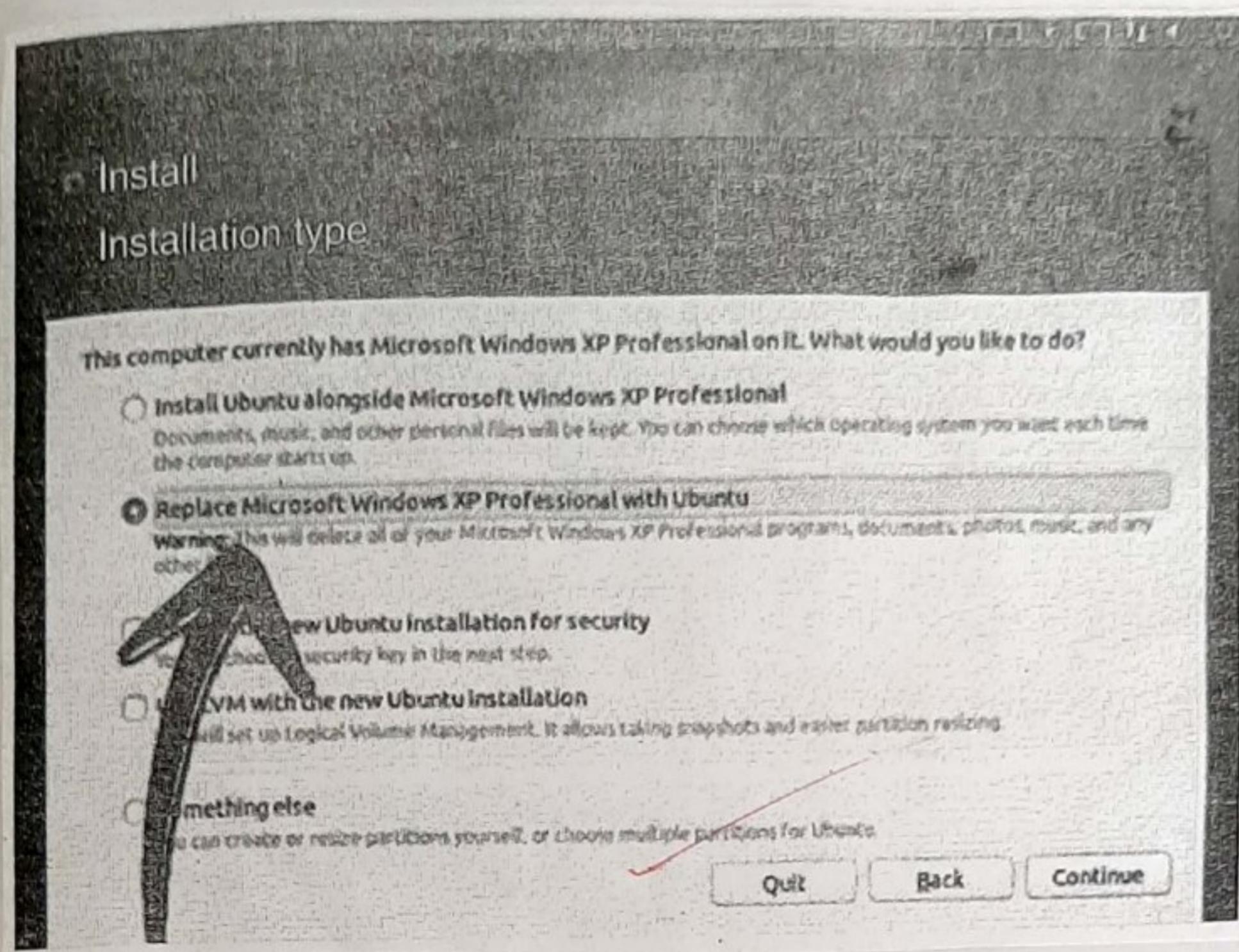
All that is left is to restart your computer and start Enjoying Ubuntu.

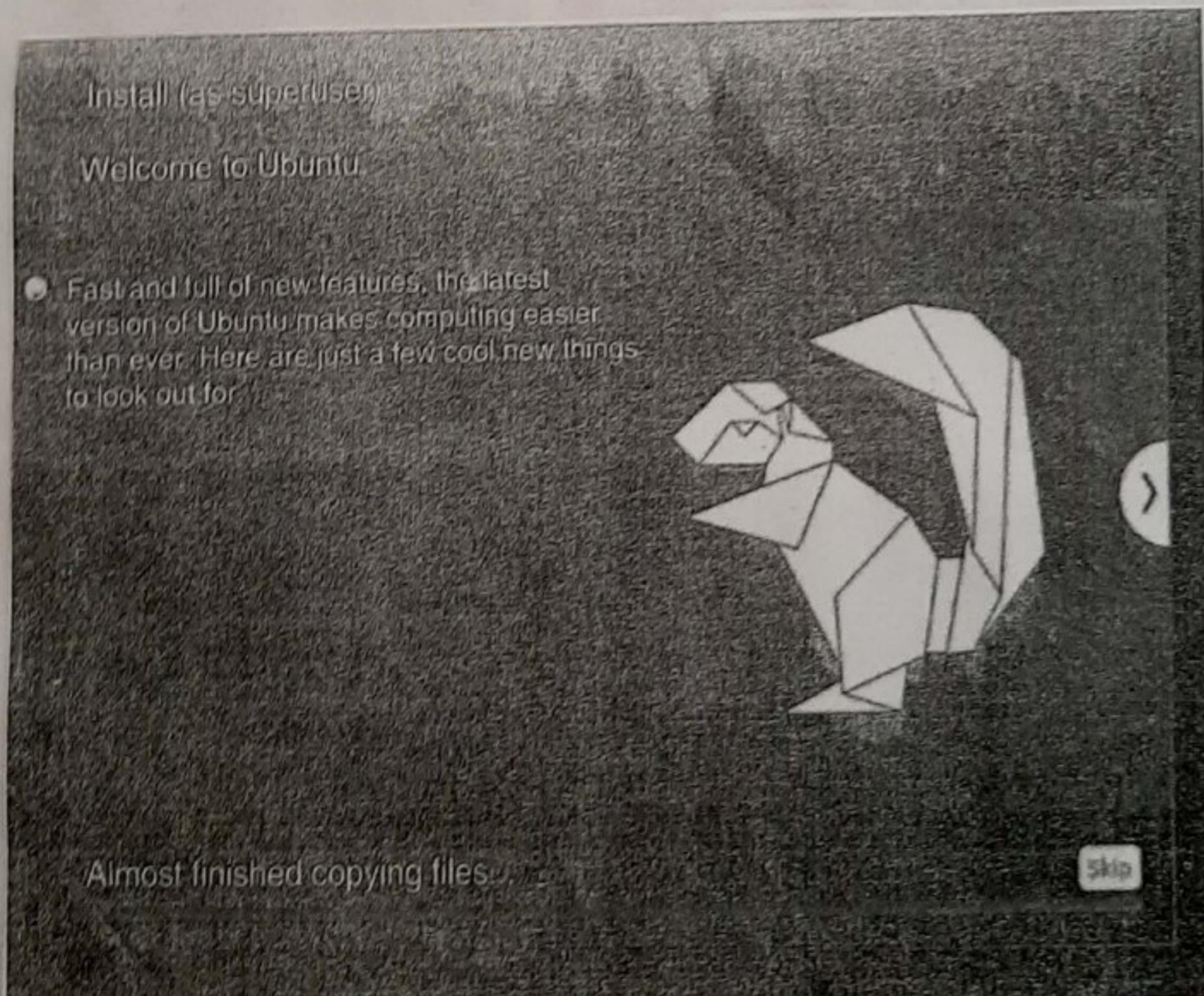
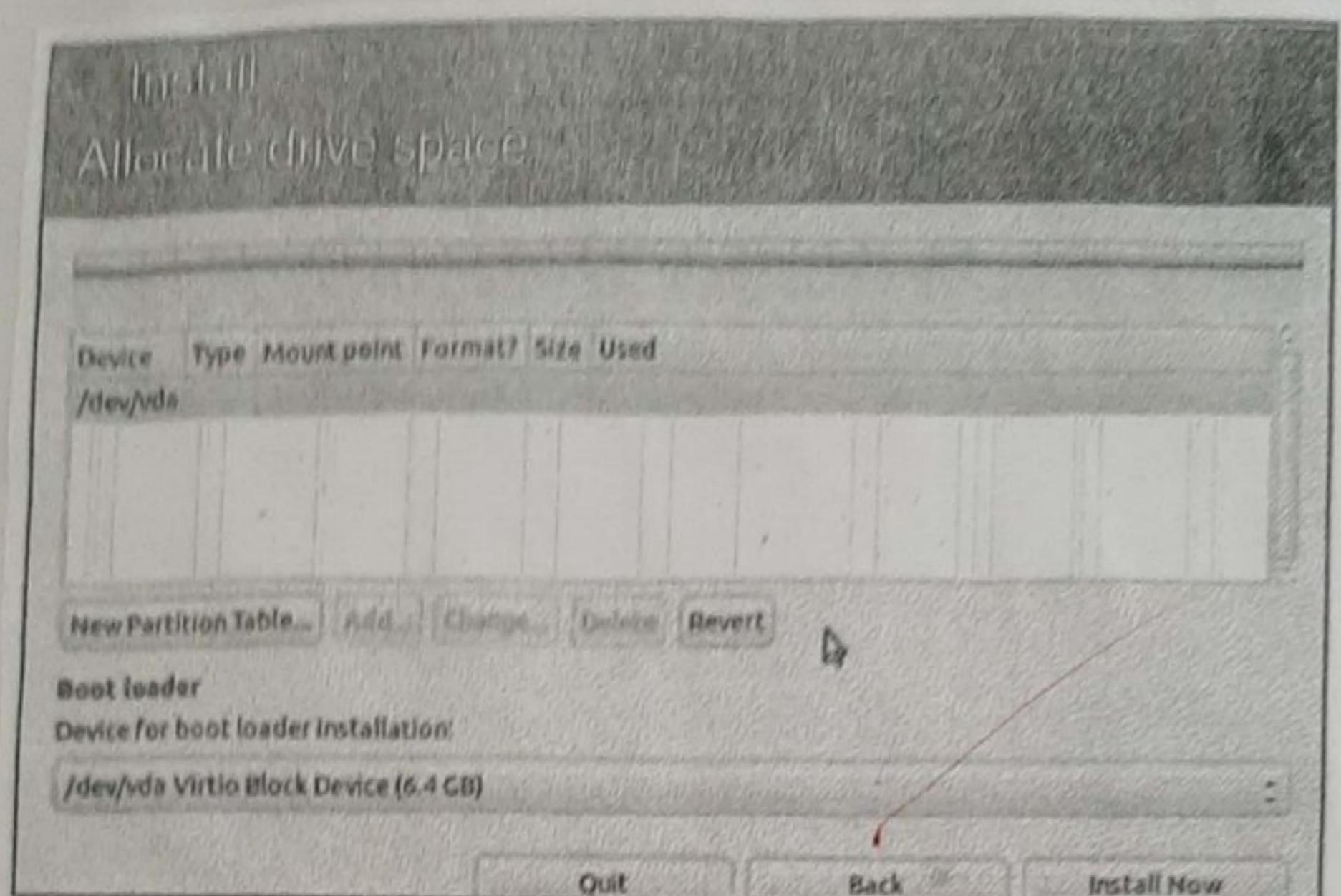
(b) Steps to change background settings of Ubuntu

Accessing Appearance settings :

- To access appearance settings in Ubuntu, let's click on user menu at top right corner, on top menu bar and select system settings.
- A window will pop up with all settings divided into personal hardware and system options.
- Changing wallpaper Picture :

- On the left side of the Background, ~~color~~ you can see your current wallpaper on right side where we can select one of the Ubuntu Wallpapers.
- If you want to select ~~wallpaper~~ from your Picture folder, click the drop down menu above thumbnails and select the Picture folder.
- You will see all the pictures in your Pictures folder as themselves thumbnails. That is where you can select them as your wallpaper background.





changing Ubuntu theme:

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

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

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

change the size or rotation of screen:

You can change how big things appear on the screen by changing the screen resolution.

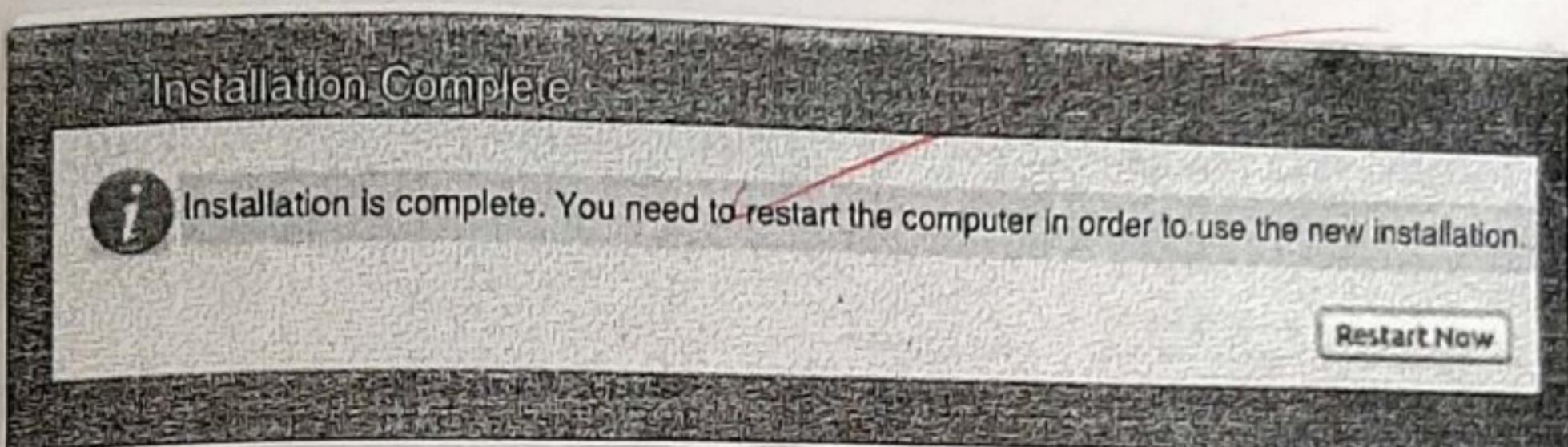
You can change which way up things appear by changing the rotation.

- (1) click the icon on the very right of menu bar and select system settings.
- (2) Open screen display.

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- (3) If you have multiple Displays, and they are not mirrored; you can have different settings on each display. Select a display on each preview area.
 - (4) Select your desired resolution and 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 settings.

Time settings change time zone of your system:

- If you are currently in Indian time, note the time change, change the time zone back to your local time zone.
- Just click on the clock on the top of bar, choose Time & Date settings & choose from map, & choose automatic display.



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Aim: Installing & improving software.

(1) Install gcc package; verify that it runs and then remove it:

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

Step 2: Type 'sudo apt-get install gcc'. After typing the 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 languages.

(2). Now To Uninstall gcc compiler:

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

Type : cd build/gcc
and make uninstall

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

80%
10%

Aim: Utilization of grep, man commands.

DOCUMENTATIONS :

(a) Finding info documentation line : bring up the info page from the command command. Bring up the usage page for the grep command.

Ans: To find info about any command info 'command info' command and is used the syntax of info command is "info (command name)".

We are going to find the info about the 'grep' command:

Open the terminal (ctrl + ALT + T) and type:
info grep.

After typing this command following output will be displayed onto your screen.

(b) finding man pages from cmd line bring up the man page for 'ls' command. Scroll down to the examples section.

Ans: To use 'man' command, type 'man (command name)'.

For ls, type 'man ls'.

(c) finding man pages by topic. What man pages are available that document file compression.

Ans: 'tar', 'zip' are some man pages which are available for document file commands, simply type 'man zip', 'man tar'.

(d) finding man pages by section from command bring up man page for printf function. Which man page section are library function found.

Ans: The number corresponds to what section of manual page is from; 1 is user command while 8 is system in stuff.

There are certain terms that have different page in different sections.

You can tell which section a term falls in with 'man -k'. It will do substring matches too, so you need to use "term" to limit it.

There are certain terms that have different pages in different sections (eg: 'printf' function); in cases like that you can pass the section no. to the man before the page name to choose which one you want or are using man -a to show every matching page in a row.

*OUTPUT :-

MANUAL SECTIONS

The standard sections of the manual include 68

- 1 User commands
- 2 System calls
- 3 Library Functions
- 4 Devices and special files.
- 5 File formats and conventions.
- 6 Games et. al.
- 7 Miscellanea
- 8 System Administration tools and Daemons

Distributions customize the manual section to their specifics, which often include additional sections.

\$ man 1 printf	
\$ man 3 printf	
\$ man -a printf	
\$ man -k ^printf	
printf	(2) -format and print date
printf	(7p) -write formatted output
printf	(3S) -formatted output conversion
printf	(3p) -print formatted output
printf	(1) -bash built-in commands, see bash(1)

\$ mkdir -m a=rwx directory name

You can add tell what section a term falls in, with 'man-k' (equivalent to approach command). It will do ~~something~~ matching matches too. So you need to use "term" to limit it.

✓
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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/nss-/dap-253/pamd/
passwd
· /usr/bin/passwd
· /etc/pam.d/passwd
· /etc/passwd
```

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

```
# find / -maxdepth 2 -name passwd
· /etc/passwd
```

find the passwd file under root and 2 level down.

```
# find / -maxdepth 3 -name passwd
```

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

find the passwd file b/w sub-directories level 2 and 4.

find -mandepth 3-mandepth - 5 -name passwd

- /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 & move it to /tmp directory using

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

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

~~# rm /tmp/example.txt~~

(g) Find the location of ls, ps, bash commands

where is ls

ls : /bin /ls /etc/usr/share/man/man ls.1.g2

where is ps

ps : /bin /ps /usr/share/meps : /bin /ps /usr/share/
man/man /ps.1.g2

where is bash

bash : /bin /bash /etc /has . bashrc /usr/share/
man/man /bash.1.g2

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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   3326024  51% /
tmpfs           512076     216    511860   1% /dev/shm
tmpfs            5120         4     5116   1% /run/lock
tmpfs           512076       0    512076   0% /sys/fs/cgroup
tmpfs           102416      48    102368   1% /run/user/1000
jeba@jeba-VirtualBox:~$
```

```
jeba@jeba-VirtualBox:~$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=494436k,nr_inodes=123609,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=102416k,mode=755)
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/systemd/systemd-cgroups-agent,name=systemd,nsroot=/)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset,nsroot=/)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_cls,net_prio,nsroot=/)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids,nsroot=/)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer,nsroot=/)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpu,cpuacct,nsroot=/)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices,nsroot=/)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory,nsroot=/)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio,nsroot=/)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event,nsroot=/)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb,nsroot=/)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minproto=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

Topic: File operations.

(1) Explore mounted file systems on your computer

→ df -K

(2) What are the different ways of exploring mounted file systems on Linux?

→ mount ✓

(3) copying text from files

→ cp command, mv command.

(4) Archiving and backup the work directory using tar, gzip and bzip2 commands.

→ gzip filename.txt
Bzip2 filename.txt

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```
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  Examples.desktop  Home  Music  Pictures  Public  Templates  Videos
Documents  jeb  jebS  cat  .gg.txt  gg.txt
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 dd.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:~/jeb$ ls  
jeba@jeba-VirtualBox:~/jeb$ cat aa.txt  
Hello world  
^C  
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt  
1bb  
+ Hello world  
jeba@jeba-VirtualBox:~/jeb$ cat >bb.txt  
this is Linux  
^C  
jeba@jeba-VirtualBox:~/jeb$ diff aa.txt bb.txt  
1aa  
+ Hello world  
^C  
+ 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$ █
```

use diff command to create diff of two files.

diff filename1 filename2

use patch command to patch a file. And analyze
the patch using patch command again.

diff -u filename1.txt filename2.txt > data.patch
patch -s data.patch
cat data.patch

SR
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Use Environment.

- (a) which account you are logged in? how do you find out?

Ans. who command & whoami

- (b) Display /etc/shadow file using cat command & understand the importance of shadow file. how its different than passwd file.

Ans. cat/etc/shadow.

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

- Username 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 indicated the account has been disabled.
- The number of days (since January 1, 1970) since the password was last changed.

```
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  
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           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
```

The number of days before password may be changed (99999 indicates user can keep his or her password unchanged for many, many years).

The number of days to warn user of an expiring password (7 for a full week).

The number of days after password expires that the 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 password entry is separated with ":" colon characters & 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 group id. Redhat uses group id's in a fairly unique manner for enhanced file security.

- 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 - all the user's personal files, web pages, mail forwarding, etc. will be stored here.
- User's "shell account". Often set to "/bin/bash" to ~~progr~~ provide to the bash shell (my personal favourite shell).

(c) Get your current working directory.

Ans: ~~passw~~ pwd

(d) Explore different ways to get command history, how to run previously ~~/~~ executed command without typing it.

Ans: history
! line number

```
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  
jeba@jeba-VirtualBox: ~$ █  
780 id=tty1
```

Red arrow pointing from the 'new' directory in the ls output to the 'new' alias command.

```
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: ~$ █
```

create alias to most commonly used commands.

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

alias label = "command"

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or
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PRACTICAL - 07

LINUX EDITORS : Vi

(as) create, modify, search and navigate a file in editor.

(i) creating a file : ^{To create file,} on the terminal type vi followed by filename.

(ii) Modifying a file :

To modify a file, on the 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 .

key	Action
k	Moves cursor up
j	Moves cursor down
h	Moves cursor left
l	Moves cursor right



```
jeba@jeba-VirtualBox:~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
  
:g/my/s//our/gc  
  
jeba@jeba-VirtualBox:~  
Hello  
This is my Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you  
  
jeba@jeba-VirtualBox:~  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```

Word Navigation

key	Action
b	Moves back to beginning of the word.
e	Moves back to forward to end of the word.
w	Moves forward to beginning of word.
0 (zero)	Moves to first character of a line.
\$	Moves to end of the line.

Scrolling

key	Action
Ctrl + f	Scrolls forward.
Ctrl + b	Scrolls backward.
Ctrl + d	Scrolls half-page.
Ctrl + u	scrolls half page backwards.

(b) Learn all essential commands like search/replace, highlight, show line numbers.

(ii) replace.

→

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

(ii) highlight

Use set hsearch

(iii) show the line number

Use set nu

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

: set hlsearch
```

) Show the line number

Use set nu

```
jeba@jeba-VirtualBox: ~
1 Hello
2 This is our Linux example
3 Welcome
4 Welldone
5 This is vi Editor
6 Thank you

: set nu
```

Topic: LINUX SECURITY.

use of sudo to change user privileges to root.

create an user named user1.

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

(b) Identify operations that require sudo privileges.

(c) modify expiration date for new user using password ageing.

- E : ~~Expiration Date~~

- m : ~~minimum no. 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~~

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(d) Delete newly added user.

→ sudo userdel user1

```
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
      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:~$
```

*js
07/02*

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ ifconfig  
enp0s3 Link encap:Ethernet HWaddr 00:0c:27:de:6b:69  
inet addr:10.0.2.15 Brdcast:10.0.2.255 Mask:255.255.255.0  
inet6 addr: fe80::c00:27ff:fed:6b69/64 Scope:Link  
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1  
RX packets:12 errors:0 dropped:0 overruns:0 frame:0  
TX packets:73 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:1180 (1.1 KB) TX bytes:8518 (8.5 KB)  
  
lo Link encap:Local Loopback  
inet addr:127.0.0.1 Mask:255.0.0.0  
inet6 addr: ::1/128 Scope:Host  
UP LOOPBACK RUNNING MTU:65536 Metric:1  
RX packets:53240 errors:0 dropped:0 overruns:0 frame:0  
TX packets:53240 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1  
RX bytes:4225072 (4.2 MB) TX bytes:4225072 (4.2 MB)
```

b) Get hostname of your machine

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

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

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

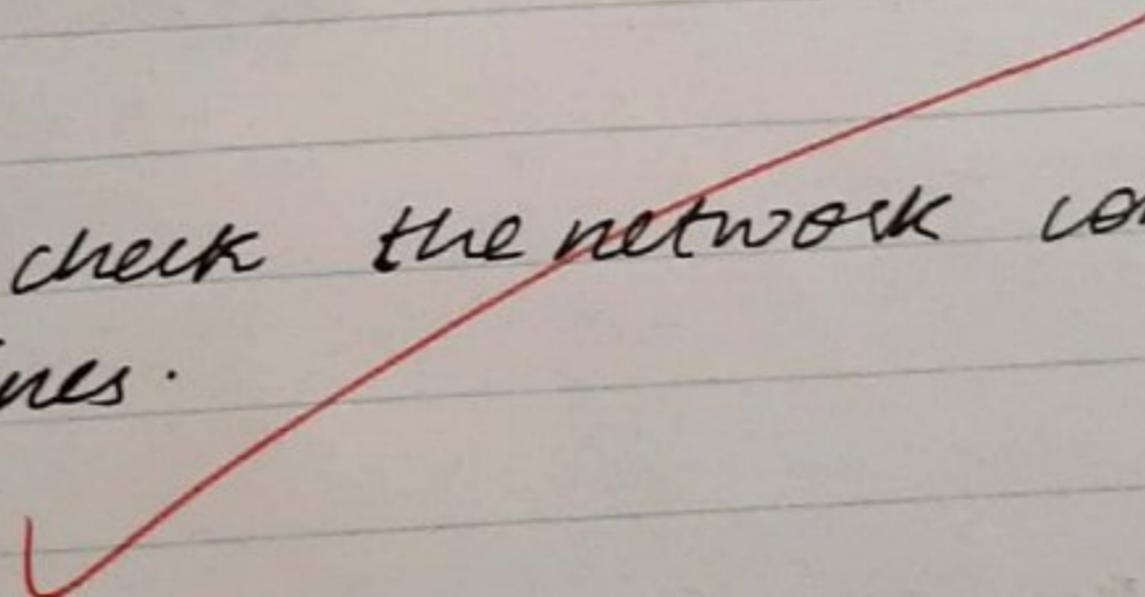
TOPIC : NETWORK MANAGEMENT .

Get IP address of your machine using ifconfig.

→ ifconfig

b) Get hostname of your machine .

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



(d) Use of dig command.

→ dig www.google.com

(e) Troubleshooting network using traceroute, route command.

→ traceroute www.google.com

→ route.

(f) Use of arp command.

→ arp

i) Use of dig command

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ dig www.google.com  
;; global options: +cmd  
;; Got answer:  
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52668  
;; flags: qr rd ra QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0  
;; OPT PSEUDOSECTION:  
; EDNS: version: 0, flags: ( udp: 4096  
; QUESTION SECTION:  
www.google.com.  
IN A  
;; ANSWER SECTION:  
www.google.com. 91 IN A 172.217.166.106  
;; Query time: 152 msec  
;; SERVER: 127.0.1.1#53(127.0.1.1)  
;; WHEN: Mon Jan 26 22:46:06 IST 2020  
;; MSG SIZE rcvd: 59
```

ii) Troubleshooting network using traceroute, route command

```
jeba@jeba-VirtualBox:~  
jeba@jeba-VirtualBox:~$ traceroute www.google.com  
traceroute to www.google.com (172.217.166.106), 30 hops max, 60 byte packets  
1 10.0.2.7 (10.0.2.7) 0.196 ms 0.143 ms 0.151 ms  
2 * * *  
3 10.0.2.2 (10.0.2.2) 68.568 ms 68.486 ms 68.485 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     105    0      0 enp0s3  
link-lncal     *              255.255.0.0    U     1000   0      0 enp0s3  
jeba@jeba-VirtualBox:~$
```

iii) Use of arp command

```
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             enp0s3  
3
```

iv) Use of host command

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

(g) Use of host command.

→ host -V

(h) Use of netstat command and Nmap command

→ netstat

→ nmap www.google.com

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↙ ↗ ↘

PRACTICAL-10

Aim: SHELL SCRIPTING.

Basics of shell scripting -

- (a) To get a shell, you need to start a terminal.
- (b) To see what shell you have, run: echo \$SHELL
- (c) To see \$ sign stands for shell variable in Linux.
- (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 passes the instruction to the program /bin/bash.

echo \$SHELL

- vi filename.sh
- #!/bin/bash
- echo "THIS IS LINUX"
- chmod 777 filename.sh
- ./filename.sh

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

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

```
tcsc@tcsc-VirtualBox: ~  
#!/bin/bash  
echo "THIS IS LINUX!"
```

"linux.sh" [New File]

```
tcsc@tcsc-VirtualBox: ~  
#!/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  
sum=$((S1+S2))  
echo "sum is:$sum"  
  
"lin.sh" 3 lines, 46 characters
```

```
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: ~$ █
```

step to write and execute a shell script :

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

open terminal.

- (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
- (E) chmod 777 filename.sh
- (F) sh filename.sh or ./filename.sh

Program to display your name:

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

Program to find the sum of two variables :

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

- Program to find the sum of 2 numbers (values passed during execution):

- 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

(1) Display partial text of a file:

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

(2) Display all except some files:

To display all content of a file except some portion, use option 'd'.

(3) Deleting a file:

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

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

```
tcsc@tcsc-VirtualBox: ~ vi lin.sh  
tcsc@tcsc-VirtualBox: ~ chmod 777 lin.sh  
tcsc@tcsc-VirtualBox: ~ ./lin.sh 50 70  
sum is:120  
tcsc@tcsc-VirtualBox: ~
```

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

```
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:~$ 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
```

- (4) Search & Replacing a string:
's' option for searching a ~~st~~ word.
- (5) Replace a string on a particular line:
To replace a string, use line number with 's' option.
- (6) Add a line after / before the matched string:
To add a line, use option 'a'.
- (7) To change a whole line with matched pattern:
Use option 'c'.
- (8) Appending lines:
To add some content before every line with sed,
use * and f as follows.

```
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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```
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 '/linux/c "this is linux"' cs.txt  
subjects offered in cs  
datastructure  
database management  
"this is linux"  
python  
green tech  
softskill  
stats  
calculus  
computer basic
```

```
tcsc@tcsc-VirtualBox:  
Thanks subjects of  
Thanks datastructur  
Thanks database man  
Thanks linux  
Thanks python  
Thanks green tech  
Thanks softskill  
Thanks stats  
Thanks calculus  
Thanks computer bas
```

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11/02