

PRACTICAL NO.1.

AIM: INSTALLATION OF UBUNTU AND BACKGROUND CHANGING.

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 F1 key to bring up the boot menu, but be careful not to hold it down that can cause an error message.

1. PREPARE TO INSTALL UBUNTU.

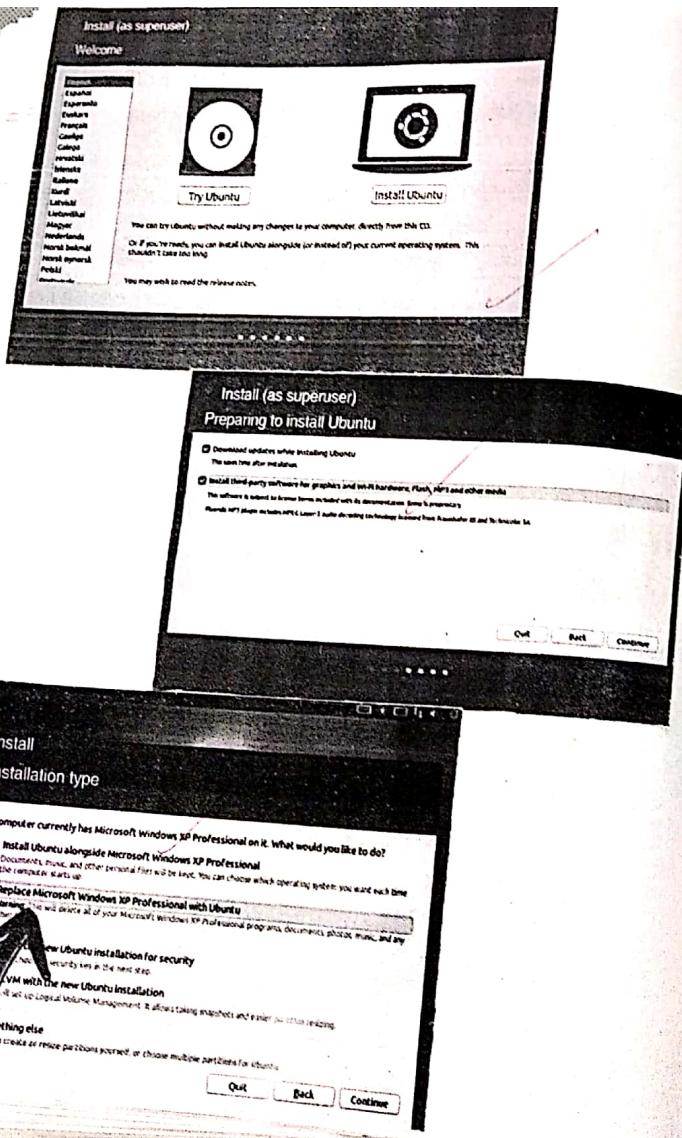
• We recommend you plug your computer into a power source.

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

• We advise you to select download updates while installing, and install this third-party software now.

• You should also stay connected to the internet so you can get the latest updates while you install Ubuntu.

• 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 installation so we can ensure your machine is up to date.



2. ALLOCATE DRIVE SPACE

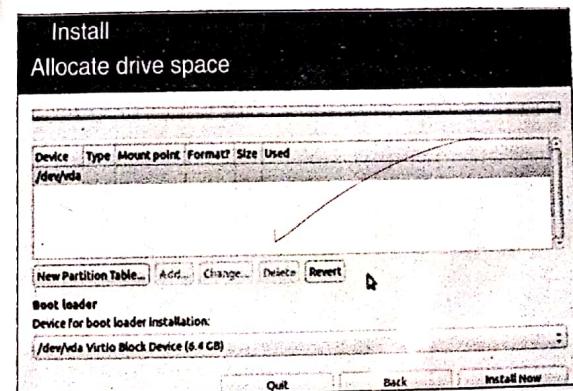
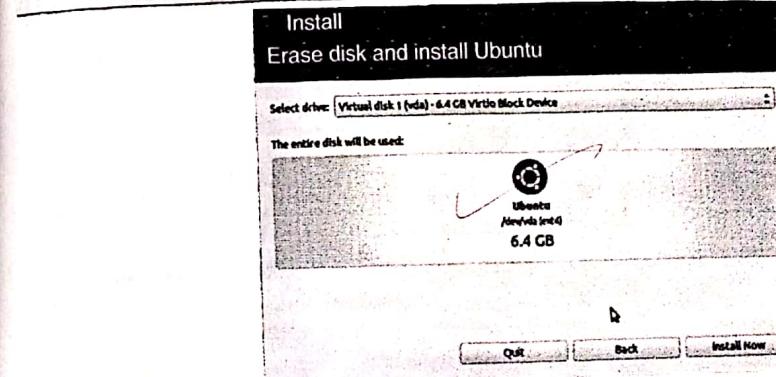
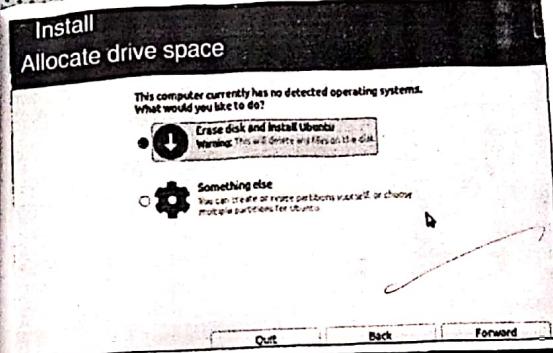
- Use the checkboxes to choose whether you had like to install Ubuntu alongside another operating system, delete your existing operating system and replace it with Ubuntu, or if you are an advanced user choose the Something else option.

3. 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.
- Ubuntu needs about 4.5 GB to install, so add a few extra GB to allow for your files

4. SELECT YOUR LOCATION

- If you are connected to the internet, this should be done automatically. Check your location is correct and 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.
- Tip: If you are having problems connecting to the internet, use the menu in the top-right hand corner to select a network.



E. 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.

F. ENTER YOUR LOGIN AND PASSWORD DETAILS

• Learn more about Ubuntu while the system installs.

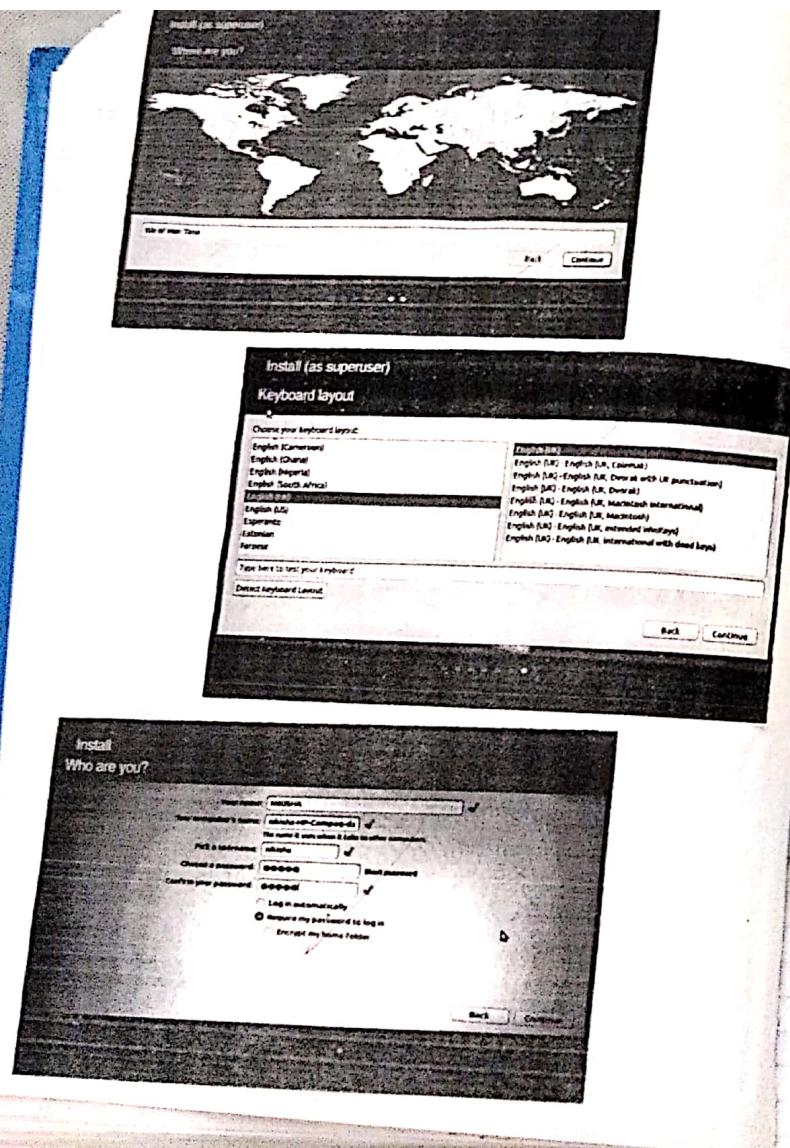
G. THAT'S IT.

All that's left is to restart your computer and start enjoying Ubuntu!

H. CUSTOMIZE DESKTOP ENVIRONMENT BY CHANGING DIFFERENT DEFAULT OPTIONS LIKE CHANGING DEFAULT BACKGROUND, THEMES, SCREENSAVERS.

I. ACCESSING APPEARANCE SETTINGS

- To access Appearance Settings in Ubuntu, let's click on user menu at the top right corner on the top menu bar and select System Settings... A window will pop-up with All Settings divided into Personal, Hardware and System Options. Icons like the appearance icon.

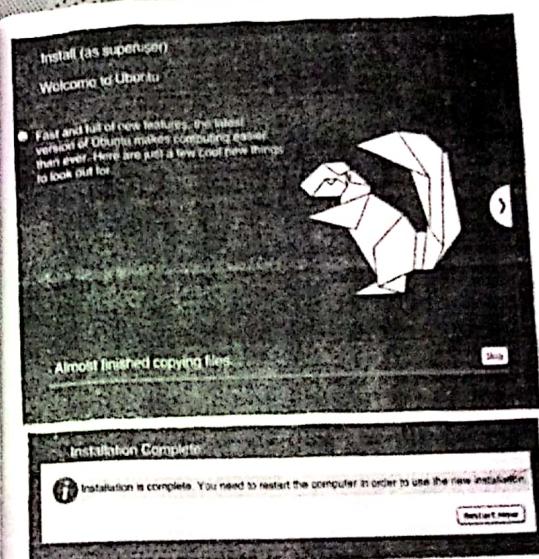


(2) CHANGING WALLPAPER PICTURE

- 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 wallpaper. Clicking on any thumbnail our wallpaper will be changed right away, with a fading effect.
- If you want to set 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.

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





1. b) SCREEN RESOLUTION: ASCERTAIN THE CURRENT SCREEN RESOLUTION FOR YOUR DESKTOP.

- CHANGE THE SIZE OR ROTATION OF THE SCREEN

- You can change how big (or how detailed) things appear on the screen by changing the screen resolution
- You can change which way up things appear (for example, if you have a rotating display) by changing the rotation

1. Click the icon on the very right of the menu bar and select System Settings.

2. Open Screen display:

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

4. Select your desired resolution and rotation.

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

. (c) TIME SETTING (CHANGE THE TIME ZONE OF YOUR SYSTEM TO (OR NEW WORK TIME))

• If you are currently in Indian time - how does the display time change?

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

✓ • Just click on the clock on the top bar, and choose Time and Date settings. Once the time and date window opens, choose manually. So you can change the time and date manually; otherwise choose your time zone from the map, and choose Automatic.

PRACTICAL NO: 2.

Aim: Installing and Removing Software

a] Install gcc package, verify that it runs and then remove it.

Step 1:

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

Step 2:

Type 'sudo apt-get install gcc'. After trying 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 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++`, `c++`... contained in that directory.

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Ans derivation of grep, man commands

Documentation

(3) Find info documentation from the command line, bring up the info page for the grep command. Bring up the usage section.

Ans To find info about any command 'info' command is used the syntax of info command is "info command name". We are going to find the info about the 'grep' command.

Open the terminal (ctrl+alt+t)
Type : info grep

After typing this command following output will be displayed screen

You can also scroll through pages using (space=up) & (backspace=down) keys
Another more summarized form of knowing info is the 'man' command. The command is same as 'info', but requires data

: info

output : This is the info main menu. (Info directory mode)

A few useful info commands

'q' quits;

'g' list all info commands;

'h' starts the info-tutorial;

'm Texinfo RET' visits the Texinfo manual, etc

* :~\$ man ls

OUTPUT: NAME:

ls - list directory contents

SYNOPSIS:

ls [OPTIONS] ... [FILE] ...

DESCRIPTION:

List information about the files sort entries alphabetically if none of -cftuvSUX nor --sort is specified

-a, --all

do not ignore entries starting with .

-A, --almost-all

do not list implied and .. --no

--author

With -L, print the author of each file

-b, --escape

Print C-style escapes for nongraphic characters
list entries by columns.

* :~\$ man tar

OUTPUT: NAME: The GNU version of the tar archiving utility

SYNOPSIS:

tar [-] A --concatenate | c --create

d --diff --compare | --delete | x --append

t --list | --test -l[abel]/u --update | x --extract

--get [OPTION] [pathname...]

DESCRIPTION:

Tar stores and extracts file from a tar or disk archive

FUNCTION LETTERS

-A --catenate, --concatenate

append tar files to an archive

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

Ans: To use the 'man' command, simply type

'man (command name)'

Now we are going to find the manual for 'ls' command.

Simply type: 'man ls'

(c) finding man pages by topic: what man pages are available -that document file compression

Ans: 'Tar', 'Zip' are some man pages which are

available for document file compression

Simply type: man zip
man tar

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left dealing man pages by section from the end lines to
up the man page for the printf like function
which manual page section are library function
based

Any the number corresponds to what section of the
manual page is from, its user command,
while # is a system stuff. The man page
for man itself explain it and list the stdio

There are certain terms that have different pages in
different sections (e.g. printf as a command) appear
in sections as a "stdio" function appears in both.
It is noted like that you can pass the section no
to the man before the page name to choose which an
page to show

You can tell what section a term fall in either
man -k (equivalent to a proper command)
It will do substring matching term so you need
to use "term" to limit it.

Command-line Help list the available options for
the mkdir command. How can you do this?

man -a -c -l -s

-c - generate or read archive

-l - list all files in a tar archive

-s - find a difference between archive and file system

-a - archive

-r - extract from the archive

-u - update

-p - append

-A - append link to the end of an archive

tar man 3 print()

man 3 print, esprint, spprint, Apunkt, esprint, spunkt,
vprint, vnpunkt, formatted output version

printoptions

The function in the print() family provides output
according to a format as described below

print(3) - print(3) - C library function -手册页

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 password file in / using find command

find / -name password

* /usr/share/doc/libpam-2.53/pam.d/password

* /usr/bin/password

* /etc/pam.d/password

* /etc/password

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

find / -maxdepth 2 -name password

* /etc/password

Find the password file under root and 2 level down:

find / -maxdepth 3 -name password

* /usr/bin/password

* /etc/pam.d/password

* /etc/password

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find the password file b/w sub-directories level 2 and 4!

find - maxdepth 3 - maxdepth 5 - name ^{pass}

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

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

ln -s file1 file2

(e) create an empty file example.txt and move it to /tmp directory using relative pathnames

touch example.txt

mv example.txt /tmp

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

rm /tmp/example.txt

(g) find the location of ls, ps, bash commands.

whereis ls

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

whereis ps

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

where is bash

~~bash; /bin/bash /etc/bash.bashrc /usr/share/man/man1/bash(1g)~~

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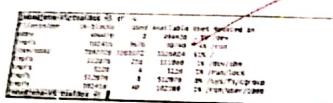
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PRACTICAL NO. 5

A) File operation

- 1) Explore mounted file systems on your Computer

Ans: `df -h`



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

Ans: `mount`



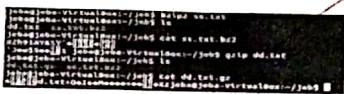
- 3) Copying text from files.

Ans: `cp` command, `mv` command



- (1) Archiving and backup the work directory using tar, gzip and bzip2 commands

Ans: `gzip filename.txt`
`bzip2 filename.txt`



- (5) Use diff command to create diff of two files

Ans: `diff filenames1 filenames2`



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



To/From

Aim: Use Environment.

- (1) Which account you are logged in? How do you find out?
 Ans: who command and whoami.

```
jeba@jeba-VirtualBox:~$ who
jeba      tty7          2020-01-15 20:32 (:0)
jeba      LOGIN      2020-01-15 20:30
jeba@jeba-VirtualBox:~$ who -l
jeba      tty1          2020-01-15 20:30
jeba@jeba-VirtualBox:~$ 780 id=tty1

jeba@jeba-VirtualBox:~$ w
20:35:04 up 4 min, 1 user, load average: 0.70, 0.79, 0.38
USER   TTY      FROM           LOGIN@ IDLE   JCPU   PCPU WHAT
jeba   tty7      :0          20:32    4:28   8.19s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -s
20:35:14 up 4 min, 1 user, load average: 0.60, 0.77, 0.37
USER   TTY      FROM           LOGIN@ IDLE   JCPU   PCPU WHAT
jeba   tty7      :0          4:38    /sbin/upstart --user
jeba@jeba-VirtualBox:~$ w -h
jeba   tty7      :0          20:32    4:44   8.67s  0.33s /sbin/upstart
jeba@jeba-VirtualBox:~$ w -f
20:36:12 up 5 min, 1 user, load average: 0.41, 0.69, 0.37
USER   TTY      LOGIN@ IDLE   JCPU   PCPU WHAT
jeba   tty7      20:32    5:36   0.00s  0.33s /sbin/upstart --user
```

- (2) Display /etc/shadow file using cat command and understand the importance of shadow file. How it's different than passwd file.
 Ans: cat /etc/shadow.

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

- User name, 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 (e.g. ::) indicates a password is not required to log in (usually a bad idea), and a "*" entry (e.g. *:*)

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- Indicates the account has been disabled
- The number of days (since January 1, 1970) since the password was last changed
- The number of days before password may be changed (0 indicates it may be changed at any time)
- The number of days after which password must be changed (99999 indicates user can keep his or her password unchanged for many, many years)
- The number of days to warn user of an expiring password (7 for a full week)
- The number of days after password expires that account is disabled
- The number of days since January 1, 1970 that an account has been disabled
- A reserved field for possible future use

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/shadow
[sudo] Password for Jeba:
root::18240:0:99999:7:::
daemon::10911:0:99999:7:::
bin::10911:0:99999:7:::
sys::10911:0:99999:7:::
sync::10911:0:99999:7:::
games::10911:0:99999:7:::
man::10911:0:99999:7:::
lp::10911:0:99999:7:::
mail::10911:0:99999:7:::
news::10911:0:99999:7:::
```

Each field in a password 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 group id. Red hat uses group id in a fairly unique manner for enhanced file security. Usually the group id

will match the user id

- Numeric user id. This is assigned by the "adduser" script. Unix user id is field, plus the following of 18 bytes 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 50 characters)
- User's home directory. Usually /home/username (eg. /home/smith). All user's personal files, web pages, mail forwarding, etc. will be stored here
- User's "shell account". Often set to "/bin/ksh" to provide access to the bash shell (my personal favorite shell)

```
jeba@jeba-VirtualBox:~$ sudo cat /etc/passwd
root:x:0:0:root:/root:/bin/nologin
daemon:x:1:1:daemon:/usr/sbin:/bin/nologin
bin:x:2:2:bin:/usr/sbin:/bin/nologin
sys:x:3:3:sys:/usr/sbin:/bin/nologin
sync:x:4:4:sync:/bin/sbin:/bin/nologin
games:x:5:5:games:/usr/games:/usr/sbin/nologin
man:x:6:6:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/bin/nologin
mail:x:8:8:mail:/var/spool/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
proxy:x:10:10: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:List Manager:/var/list:/usr/sbin/nologin
```

(c) Get your current working directory

And: pwd

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

(d) Explore different ways of getting command history, how to run previously executed command without typing it.

anshstry

! line number

```
jeba@jeba-VirtualBox:~$ history
1 who
2 whomail
3 whoami
4 clear
5 w
6 w -s
7 w -t
8 w -
9 zclear
10 zless
11 cat /etc/shadow
12 sudo cat /etc/shadow
13 sudo cat /etc/passwd
14 ps
15 ps aux
16 clear
17 history
jeba@jeba-VirtualBox:~$ 13
whoami
stty sane
LOGIN
```

(e) Create alias to most commonly used commands.

Alias command instructs the shell to replace one string another string while executing the commands

Ans : alias label = "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:~$
```

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Part b) vi Editor

(i) Create, modify, search and navigate a file in editor

Creating a file

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

(ii) Modifying the file

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

(iii) Search in a file

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

(iv) Navigate

Movement in four direction

Key	Action
k	moves cursor up
j	moves cursor down
h	moves cursor left
l	moves cursor right

word navigation

Key	Action
b	moves back to the beginning of the word
e	moves forward to the end of the word
w	moves forward to beginning of the word
0 (zero)	moves to first character of a line
\$	moves to the end of 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 command like search /replace, highlight, show line numbers

i) Replace

syntax: Old word to be replaced /<new word>/ge

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

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

```
jeba@jeba-VirtualBox:~$ replace with out synchroneous command  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```

ii) Highlight

use sed -l & cat < file

```
jeba@jeba-VirtualBox:~$ sed -l & cat < file  
Hello  
This is our Linux example  
Welcome  
Welldone  
This is Vi Editor  
Thank you
```

Edy
(iii) Show the line number
Use set nu

The screenshot shows a terminal window with the following text:

```
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
```

The terminal prompt is "jeba@jeba-VirtualBox ~". The text is displayed with line numbers 1 through 6 preceding each line. At the bottom of the screen, the command ":set nu" is visible.

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PRACTICAL WORK

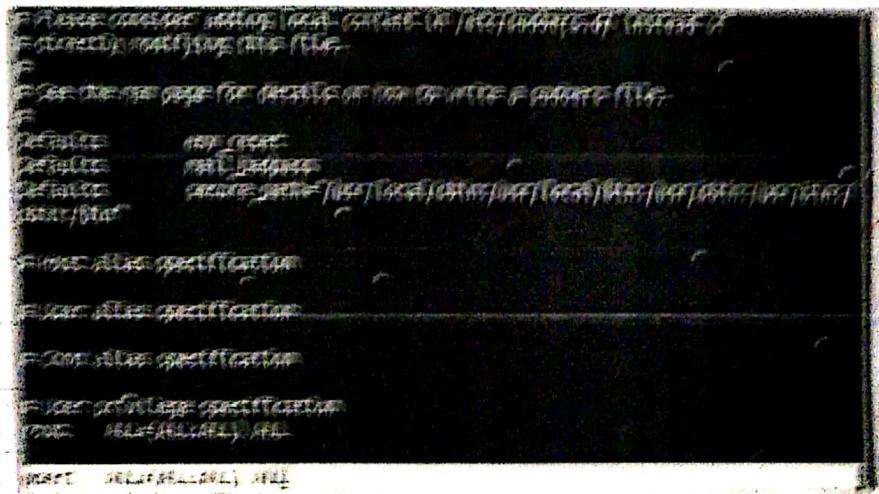
PA

NOT BURNDY GROUTER

The job site to change was 96 flages to 100 fl
Cable are use rated over



To give some user note privileged edit /etc/hosts
using vi/vim - Enter new line as highlighted below



(d) Identify operations that require sudo privileges

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

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

(e) Modify expiration date for new user using password aging

```
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
```

-E: Expiration Date

-m: Minimum number of days before password change
-M: Number of days password is valid

-I: Account inactive

-W: Number of days of warning before a password change is required

```
jeba@jeba-VirtualBox:~$ 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  
Last password change : Jan 21, 2020  
Password expires : Aug 09, 2020  
Password inactive : never  
Account expires : Jan 31, 2020  
Minimum number of days between password change : 100  
Maximum number of days between password change : 200  
Number of days of warning before password expires : 5  
jeba@jeba-VirtualBox:~$
```

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

Aim: Network management

- (a) Get IP address of your machine using ifconfig.

```
jeba@jeba-VirtualBox: ~
jeba@jeba-VirtualBox:~$ ifconfig
enp0s3    Link encap:Ethernet HWaddr 08:00:27:0e:6b:69
           inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
             inet6 addr: fe80::c0cd:53a0:d5a3:848e/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                  RX packets:2 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:73 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:1180 (1.1 KB) TX bytes:8518 (8.5 KB)

lo        Link encap:Local Loopback
           inet addr:127.0.0.1 Mask:255.0.0.0
             inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING MTU:65536 Metric:1
                  RX packets:53240 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:53240 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1
                  RX bytes:4225072 (4.2 MB) TX bytes:4225072 (4.2 MB)
```

- (b) 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-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.0 ms
64 bytes from maa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=98.9 ms
...
[1]+  Stopped                  ping www.google.com
jeba@jeba-VirtualBox:~$
```

(c) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
<<< DIG 9.10.3-P4-Ubuntu <<< www.google.com
global options: +cmd
got answer:
>>> opcode: QUERY, status: NOERROR, id: 52068
flags: qr aa rds res QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
OPT PSEUDOSECTION:
EDNS: version: 0, flags: udps: 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)
XFRM: Mon 20 22:49:06 IST 2020
MSGSIZE: rcvd: 59
jeba@jeba-VirtualBox:~$
```

(d) Troubleshooting network using traceroute , route command

```
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)  0.199 ms  0.143 ms  0.151 ms
2  *
3  10.0.2.2 (10.0.2.2)  68.568 ms  68.486 ms  68.463 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        *               255.255.255.0   U     0      0      0 enp0s3
link-local     *               255.255.0.0    U     0      0      0 enp0s3
jeba@jeba-VirtualBox:~$
```

(e) Use of arp command

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

(f) Use of host command

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

(h) use of netstat command and nmap command

```
jeba@jeba-VirtualBox:~$ netstat -an | grep '(w/o servers)'  
Active Internet connections (w/o servers)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN  
tcp        0      0 0.0.0.0:42149             0.0.0.0:*
```

```
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): 2404:6000:4007:811::2004  
DNS record for www.google.com (not scanned): 2404:6000:4007:811::2004  
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:~$
```

PRACTICAL NO: 10

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AIM: Shell scripting

Basics of shell scripting

- (a) To get a shell, you need to start a terminal
- (b) To see what shell you have, run \$ echo \$SHELL
- (c) In Linux, the dollar sign (\$) stand for shell variables
- (d) 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

Bash & SHELL

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

Vi filename.sh

#!/bin/bash
echo "This is Linux!"
#!/bin/bash
echo "THIS IS LINUX!"

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- * Chmod 777 filename.sh
• /filename.sh

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

- Step to write and execute a shell script

Shell Script is just a simple text file with .sh extension, having executable permission

(a) Open terminal

(b) Navigate to the place where you want to create script using Ed 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)

Program to display your name

#!/bin/bash

echo "Enter your name"

read name

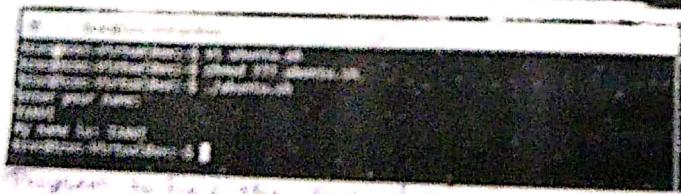
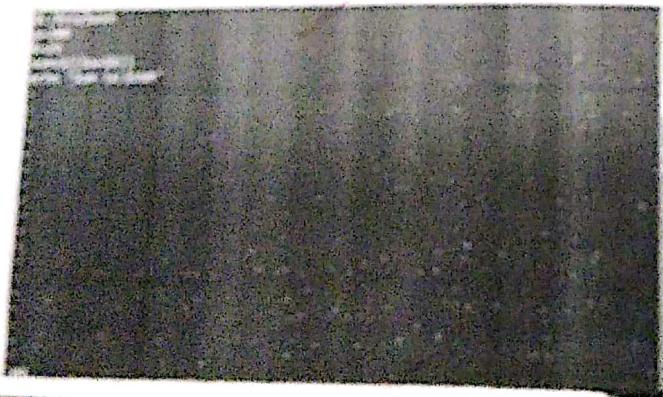
echo "My name is: \$name"

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```
tcsctcsc-VirtualBox:~$ /bin/bash
#!/bin/bash
echo "Enter your name"
read name
echo "My name is: $name"
```

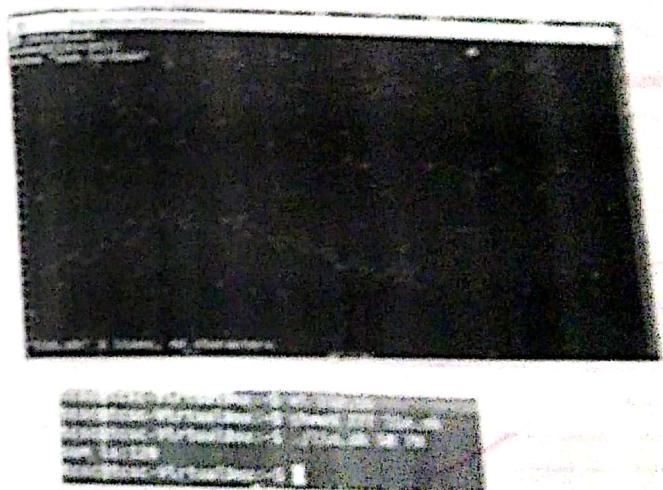
```
tcsctcsc-VirtualBox:~$ vi linux2.sh
tcsctcsc-VirtualBox:~$ chmod 777 linux2.sh
tcsctcsc-VirtualBox:~$ ./linux2.sh
Sum is:125
tcsctcsc-VirtualBox:~$
```

program to find sum over all tree nodes which
will have one or more children.
Algorithm
1. Create
 $t = \text{root}$
 $\text{sum} = \{t\}$
 $\text{tree_sum}(t, \text{sum})$



Program to find the sum of tree numbers (values
nodes having children)

Output
1 10
2 20
3 30
4 40
5 50
6 60
7 70
8 80
9 90
10 100
11 110
12 120
13 130
14 140
15 150
16 160
17 170
18 180
19 190
20 200
21 210
22 220
23 230
24 240
25 250
26 260
27 270
28 280
29 290
30 300
31 310
32 320
33 330
34 340
35 350
36 360
37 370
38 380
39 390
40 400
41 410
42 420
43 430
44 440
45 450
46 460
47 470
48 480
49 490
50 500
51 510
52 520
53 530
54 540
55 550
56 560
57 570
58 580
59 590
60 600
61 610
62 620
63 630
64 640
65 650
66 660
67 670
68 680
69 690
70 700
71 710
72 720
73 730
74 740
75 750
76 760
77 770
78 780
79 790
80 800
81 810
82 820
83 830
84 840
85 850
86 860
87 870
88 880
89 890
90 900
91 910
92 920
93 930
94 940
95 950
96 960
97 970
98 980
99 990
100 1000



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Bad Command or Format. Did you mean something else?
offered by home support. It is running well for the
construction, but this requires that it can perform certain local
manipulations like insertion, deletion, storage deallocation
etc. so the complete file needs to be handled
before it opens it.

Consider the following test file

1 10
2 20
3 30
4 40
5 50
6 60
7 70
8 80
9 90
10 100
11 110
12 120
13 130
14 140
15 150
16 160
17 170
18 180
19 190
20 200
21 210
22 220
23 230
24 240
25 250
26 260
27 270
28 280
29 290
30 300
31 310
32 320
33 330
34 340
35 350
36 360
37 370
38 380
39 390
40 400
41 410
42 420
43 430
44 440
45 450
46 460
47 470
48 480
49 490
50 500
51 510
52 520
53 530
54 540
55 550
56 560
57 570
58 580
59 590
60 600
61 610
62 620
63 630
64 640
65 650
66 660
67 670
68 680
69 690
70 700
71 710
72 720
73 730
74 740
75 750
76 760
77 770
78 780
79 790
80 800
81 810
82 820
83 830
84 840
85 850
86 860
87 870
88 880
89 890
90 900
91 910
92 920
93 930
94 940
95 950
96 960
97 970
98 980
99 990
100 1000

- (i) Deleting a line
To delete a line, use line number followed by 'd'

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

- (ii) Search and Replacing a string
's' option fits for searching a word

```
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
```

- (iii) Replace a string on a particular line
To replace a string on a particular line, use line number with 's' option

```
tcsc@tcsc-VirtualBox:~$ sed '3s/cs/computer/system /' cs.txt
subjects offered in cs
datastructure
database management
system
python
green tech
softskill
stats
calculus
computer basic
```

(1) Displaying partial text of a file.

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

```
tcsc@tcsc-VirtualBox:~$ vi cs.txt
tcsc@tcsc-VirtualBox:~$ sed -n 1,3p cs.txt
subjects offered in
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
tcsc@tcsc-VirtualBox:~$
```

(2) Display all except Some lines

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

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

(c) Add a line after / before the matched string
To add a new line with some content after every pattern
match & use option 'a'

```
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:~$
```

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

```
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:~$
```

(d) To change a whole line with matched pattern
To change a whole line to a new line when a search
Pattern matches, use option 's'

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```
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
```

(e) Appending lines

To add some content before every line with sed, use 't' and
'f' as follows

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

SP
11/02