

Practical No: 1

033

- o) Install your choice of Linux distribution eg. Ubuntu, Fedora, Debian). 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.
- 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

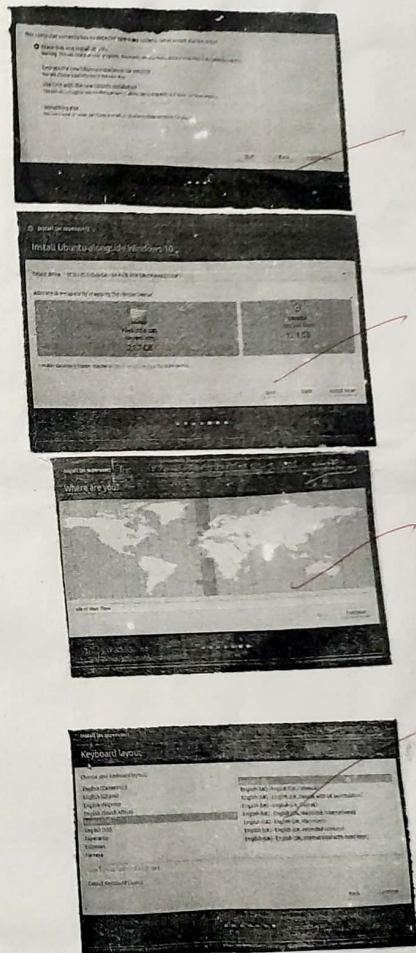
- * Depending on your previous selections, you can now verify that you have chosen the way in which you would like to install Ubuntu.
- * The installation process will begin when you click the Install Now button.
- * Ubuntu needs about 4.6 GB to install, so add a few extra GBs to allow for your files.

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.

5.] 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.



080



085

b) 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 and select System settings.
- * A window will pop-up with All settings divided into Personal, Hardware and System options icons. Let's first select the Appearance icon.

Changing Wallpaper picture

- * On the left side of Background part, you can see your current wallpaper.
- * On the right side is part where we can select one of Xubuntu wallpapers. Clicking on any thumbnail our wallpaper will be changed right away with a fading effect.
- * If you want to select wallpaper from your Picture folder, click the drop-down menu above the thumbnails and select the Pictures Folder.
- * You will see all the pictures in your Pictures folder as thumbnails, where you can select them as your wallpaper.
- * To add wallpaper that is in another folder, just click the plus icon below the thumbnails and then in pop-up window, select the path to our custom folder and choose the picture inside of it.

Changing Ubuntu theme

- * Ubuntu also has an option to change the Desktop theme, which is one click will change the entire computer looks.
- * To do that, click on the drop-down menu below the Wallpapers 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.

c) 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, you have a rotating display) by changing the rotation.
 - 1> Click the icon on the very right of the menu bar and select System settings.

2> Open Screen Display.

3> If you have multiple displays and they are not mirrored, you can have different settings on each display. Select display in the 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.

280



037

- Q Time settings Change the time zone of your system to (or New York Time)
- * If you are currently in Indian time). How does the displayed time change?
- * After nothing the time change, change the time zone back to your local time zone.
- * Just click on the clock on the top bar, 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 Add Automatic.

SP
26/10/14

Aim :- Installing and removing software.

→ 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 and C++ programming language.

Now To Uninstall GCC Computer? :-

In GCC 5.1.0, although there is no ~~exp~~ ^{cop} lnd uninstall target, some directories do have it, in particular gcc, so you can do.

Type:- cd build/gcc

sudo make install

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

Aim :- Utilization of group 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.

→ To Find info about any command 'info' command is used the syntax of info command is 'info : "info (command name)"'

We are going to find the info about the 'group' command:-

* Open the terminal (ctrl+Alt+T) and type:-
info grep.

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

* You can also scroll through pages using (space=up) & (backspace=down) keys.

* Another form of showing info is the 'no 'man' command. The command is same as 'info', but required data.

b) Finding man pages from the end line: bring up the man page for the 'ls' command. scroll down to the example section.

→ 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'.

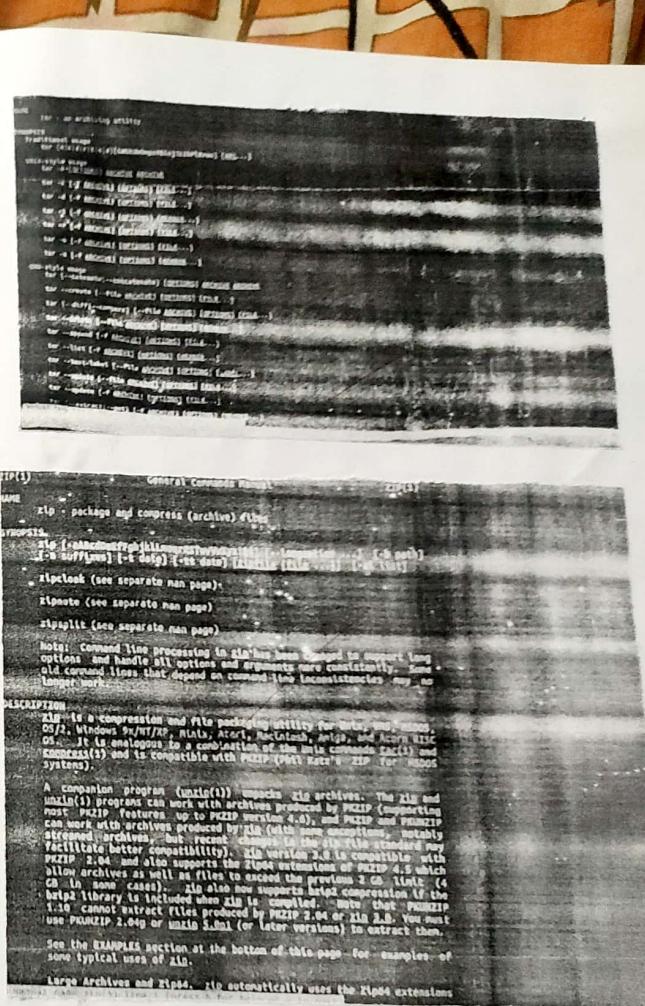
Q) Finding man pages by topic: What man pages are available that document file compression.
→ 'tar', 'zip' are some man pages which are available for document file compression.
Simply type: `man zip` `man tar..`

d) Finding man pages by section from the command lines: Bring up the man page for the printf library function. Which manual page section are library functions found?

→ The number corresponds to what section of the manual a page is from; 1 is user commands, while 8 is sysadmin stuff. The man page for man itself explain it and list the std ones.

There are certain terms that have different pages in different sections (eg: 'print' 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 one you want or use man -a to show every matching page.

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



040

041

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

\$ mkdir -m a=rwx directoryname

~~8
9/10~~

180 Practical No: 4

042

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/libss-ldap-2.53/pam.d/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 password file b/w sub-directories
 level 1, 2 & 4

~~# find -maxdepth 3 -maxdepth 5 -name passwd
 • /usr/bin/passwd
 • /etc/pam.d/passwd~~

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

~~# ln -s , # ln -s file1 file2~~

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

~~# 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.g2

whereis ps
ps : /bin /ps /usr /share /maps! /bin /ps /usr /share /man /man1 /ps.1.g2

whereis bash
bash : /bin /bash /etc /bash . bashrc /usr /share man /man1 /bash .1.g2

~~getopt -f -o -v -x -n -t -c -d -s -r -l -h -p -q -y -z -w -j -k -m -n -f -g -h -i -o -v -x -n -t -c -d -s -r -l -h -p -q -y -z -w -j -k -m -n -f -g -h -i~~

getopt -f -o -v -x -n -t -c -d -s -r -l -h -p -q -y -z -w -j -k -m -n -f -g -h -i

getopt -f -o -v -x -n -t -c -d -s -r -l -h -p -q -y -z -w -j -k -m -n -f -g -h -i

getopt -f -o -v -x -n -t -c -d -s -r -l -h -p -q -y -z -w -j -k -m -n -f -g -h -i

Practical No: 5File Operations:-

1. Explore mounted file systems on your computer.
 → df -k.

```
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:~$
```

2. What are the different ways of exploring mounted file systems on Linux?
 → mount.

```
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,ptmxnode=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=/)
cgroup on /sys/fs/cgroup/systemd-cgroups-agent type cgroup (rw,nosuid,nodev,noexec,relatime)
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/blnfmt_misc type autofs (rw,relatime,fd=32,pgrp=1,timeout=0,minp=5,maxproto=5,direct)
hugetlbfss on /dev/hugepages type hugetlbfss (rw,relatime)
```

240

3. Copying text from files:

→ cp command, mv command

```
joba@jeba-VirtualBox:~$ ls
Desktop  examples.desktop  Music  Public  Templates  Vtdeos
joba@jeba-VirtualBox:~$ /jebS cat .gg.txt
cat: .gg.txt: No such file or directory
joba@jeba-VirtualBox:~$ /jebS cat gg.txt
cat: gg.txt: No such file or directory
joba@jeba-VirtualBox:~$ /jebS touch dd.txt
Linux
joba@jeba-VirtualBox:~$ /jebS ls
dd.txt  gg.txt
joba@jeba-VirtualBox:~$ /jebS cp gg.txt dd.txt
joba@jeba-VirtualBox:~$ /jebS cat dd.txt
Linux
joba@jeba-VirtualBox:~$ /jebS cat dd.txt
Linux
joba@jeba-VirtualBox:~$ /jebS
joba@jeba-VirtualBox:~$ /jebS touch ss.txt
joba@jeba-VirtualBox:~$ /jebS mv gg.txt ss.txt
joba@jeba-VirtualBox:~$ /jebS cat gg.txt
cat: gg.txt: No such file or directory
joba@jeba-VirtualBox:~$ /jebS cat ss.txt
Welcome
Linux
joba@jeba-VirtualBox:~$ /jebS
```

4. Archiving and backup the work directory using tar.gz and bzip2 commands.

→ `tar, gzip` and `b2ip`
`gzip filename.txt`
`B2IP2filename.txt`

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

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

11/02

Practical No:-6

047

Use Environment

- at Which account you are logged in? How do you find out?
→ who command & whoami

```
jeba@jeba-VirtualBox:~$ who
jeba    pts/0        2010-01-15 20:32 (:0)
jeba@jeba-VirtualBox:~$ whoami
jeba
jeba@jeba-VirtualBox:~$ who -l
LOGIN   pts/1        2010-01-15 20:30          780  ld=tty1
jeba@jeba-VirtualBox:~$ w
```



```
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    tty1     :0              20:32   4:28  8.19s  0.33s /sbin/upstart -
jeba@jeba-VirtualBox:~$ w -s
20:35:14 up 5 min, 1 user, load average: 0.69, 0.77, 0.37
USER   TTY      FROM             IDLE WHAT
jeba    tty1     :0              4:38   /sbin/upstart -user
jeba@jeba-VirtualBox:~$ w -h
jeba    tty1     :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    tty1     20:32   5:36  9.00s  0.33s /sbin/upstart -user
```

- b) Display /etc/shadow file using cat command and understand the importance of shadow file. How it's difficult than passwd file.

→ cat /etc /shadow

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

- * Username, up to 8 characters. Case-sensitive, usually all lowercase. A direct match to the username in the /etc/passwd file.

FAQ

- * Password, 13 character encrypted. A blank entry (e.g.::) indicates a password is not required to login (usually a bad idea), and a "*" entry (e.g.:*) 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 this of 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:*: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:::
uucp:*:16911:0:99999:7:::
proxy:*: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
```

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 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 ids 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 (e.g. /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 favourite shell).

→ Get your current working directory
→ `pwd`

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

→ history
line number

```
jeba@jeba-VirtualBox:~$ history
1 who
2 whoami
3 who -l
4 clear
5 w
6 w -s
7 w -h
8 w
9 clear
10 cat /etc/shadow
11 sudo cat /etc/shadow
12 clear
13 who cat /etc/passwd
14 pwd
15 clear
16 history
jeba@jeba-VirtualBox:~$ ls
who -l
LOGIN      ttty1    2020-01-15 20:30
jeba@jeba-VirtualBox:~$ █
780 id:ttty1
```

~~→ 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".

```
jeba@jeba-VirtualBox:~$ alias m="mkdir new"
jeba@jeba-VirtualBox:~$ m
jeba@jeba-VirtualBox:~$ ls
Desktop  Downloads  Documents examples.desktop  jeb  Music  Pictures  Templates
jeba@jeba-VirtualBox:~$ ll
```

Practical No:-7

049

Linux Editors :- VI

ay (create, modify, search and navigate a file in editor.)
by creating a file.

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

iii) Modifying the file:

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

iii) Search in a file:

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

iv) Navigate

~~Movement in four directions~~

Key	Action
K	Moves cursor up
J	Moves cursor down
H	Moves cursor left
L	Moves cursor right

B20

Word Navigation

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

Scrolling

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

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

050

or Replace

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

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

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

Replace with our {y/n/a/q/l/^E/^Y}?

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

i) Highlight
Use set hisearch

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

ii) Show the line number
Use set nu

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

S
V
L
E
M

Practical No:-8

051

Linux Security

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

Create an user named user1

```
jeba@jeba-VirtualBox:~  
$ sudo useradd user1  
jeba@jeba-VirtualBox:~$ sudo passwd user1  
Enter new UNIX password:  
Re-type new UNIX password:  
passwd: password updated successfully  
jeba@jeba-VirtualBox:~$
```

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

```
# Please consider adding local context 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
```

b) Identify operations that requires sudo privileges

```
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.
```

180

c) Modify expiration date for new user
password ageing.

```
jeba@jeba-VirtualBox:~$ sudo chage -l user1
jeba@jeba-VirtualBox:~$ Last password change : Jan 20, 2020
Last password expires : never
Password inactive : never
Account expires : never
Minimum number of days between password change : 0
Maximum number of days between password change : 99999
Number of days of warning before password expires : 7
```

```
jeba@jeba-VirtualBox:~$ sudo chage user1
Changing the aging information for user1
Enter the new value, or press ENTER for the default
Minimum Password Age [0]: 100
Maximum Password Age [99999]: 200
Last Password Change (YYYY-MM-DD) [2020-01-20]: 2020-01-21
Password Expiration Warning [7]: 5
Password Inactive [-1]:
Account Expiration Date (YYYY-MM-DD) [-1]: 2020-01-31
jeba@jeba-VirtualBox:~$ sudo chage -l user1
Last password change : Jan 21, 2020
Last 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:~$ 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
Last 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
```

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

19/02

Network Management

a) Get IP address of your machine using ifconfig.

```
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:ds53:848e/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:188 (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:~$ hostname
jeba-VirtualBox
jeba@jeba-VirtualBox:~$
```

820

c) Use of dig command ping to check the network connectivity to reduce machines?

```
jeba@jeba-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.31.196) 56(84) bytes of data.
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=1 ttl=54 time=97.6 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=2 ttl=54 time=82.0 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=3 ttl=54 time=84.8 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=4 ttl=54 time=87.1 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=5 ttl=54 time=93.5 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=6 ttl=54 time=86.9 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=7 ttl=54 time=98.0 ns
64 bytes from naa03s28-in-f4.1e100.net (172.217.31.196): icmp_seq=8 ttl=54 time=99.9 ns
^Z
[1]+  Stopped                  ping www.google.com
jeba@jeba-VirtualBox:~$
```

d) Use of dig command

```
jeba@jeba-VirtualBox:~$ dig www.google.com
jeba@jeba-VirtualBox:~$ dig www.google.com
;; <> DIG 9.10.3-P4-Ubuntu <> www.google.com
;; global options: +cmd
;; Got answer:
;; ->HEADER<- 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: 127.0.1.1053(127.0.1.1)
;; WHEN: Mon Jan 20 22:40:06 IST 2020
;; MSG SIZE rcvd: 59
jeba@jeba-VirtualBox:~$
```

e) Troubleshooting route command network using traceroute,

054

```
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
link-local      *              255.255.255.0  U     100   0      0  enp0s3
jeba@jeba-VirtualBox:~$
```

f) 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
```

g) Use of host command

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

hy Use of netstat command and Nmap

JobabaJobs@VirtualBox: ~				Foreign Address	State
	(Peer) Identifier Peer connection/ active socket current flags	Local Address Local sockets (/w servers)	State	I-Node	Path
unx 2	[]	DGRAM	CONNECTED	9694	/run/systemd/journal/
dnotify	[]	DGRAM	CONNECTED	9695	/run/systemd/journal/
syslog	[]	DGRAM	CONNECTED	9704	/run/systemd/journal/
unx 36	[]	DGRAM	CONNECTED	9804	/run/systemd/notify/
unx 7	[]	DGRAM	CONNECTED	44842	@/run/dbus/CyneTe7A9Q
unx 3	[]	STREAM	CONNECTED	43331	@/run/dbus/CyneTe7A9Q
unx 3	[]	STREAM	CONNECTED	43332	@/run/dbus/CyneTe7A9Q
unx 3	[]	STREAM	CONNECTED	42690	@/run/dbus/CGGGCCG7P5
unx 3	[]	STREAM	CONNECTED	13242	/run/systemd/journal/
stdout	[]	STREAM	CONNECTED	43313	/run/systemd/journal/
stderr	[]	STREAM	CONNECTED	20012	/run/systemd/journal/
unx 3	[]	STREAM	CONNECTED	42935	/run/systemd/journal/

```
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 (0.644s latency).
Other addresses for www.google.com (not scanned): 2404:6800:4007:811::2004
DNS Record for 216.58.196.68: b0w5si1n-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:~$
```

Practical No:-10

055

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 (\$) 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 to the program /bin/bash.

Echo \$SHELL

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

• vi filename.sh
#!/bin/bash
echo "THIS IS LINUX!"

220.

```
tcsc@tcsc-VirtualBox:~  
#!/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:~$
```

Step to write and execute a shell object.

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

- a) Open terminal
- b) Navigate to the place where you want to create script using cd command
- c) Touch filename.sh

d) Vi filename.sh [You can use your favourite editor, to edit the script] 056
e) chmod 777 filename.sh (for making the script executable)
f) sh filename.sh or ./filename.sh (for running the program to display your name)

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

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

```
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:~$
```

Program to find the sum of two variables

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

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

```
tsc@tsc-VirtualBox:~  
tsc@tsc-VirtualBox:~$ vi linux2.sh  
tsc@tsc-VirtualBox:~$ chmod 777 linux2.sh  
tsc@tsc-VirtualBox:~$ ./linux2.sh  
Sun is:125  
tsc@tsc-VirtualBox:~$
```

057

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

```
tsc@tsc-VirtualBox:~  
#!/bin/bash  
sum=$((5+5))  
echo "sum is:$sum"  
lin.sh 3 lines, 46 characters
```

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

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.

053
Consider the following text file.

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

- 058
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  
datastructure  
green tech  
softskill  
stats  
calculus  
computer basic
```

- 3) Deleting a line

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

```
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:~$
```

- 4) Search and Replacing a string
's' option is 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
```

5) 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 '6 s/cs/computer system /' cs.txt
subjects offered in cs
datastructure
database management
linux
python
green tech
softskill
stats
calculus
computer basic
```

6) 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:~$
```

059

7. To change a whole line with matched pattern.

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

```
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
```

8. Appending lines

To add some content before every line with sed, use * and & 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
```

87
11/02