

Assessment 3– Advance Linux

Trainee Name : Gargi Sharma

Mentor Name : Mr. Ravi Kumar

College Name : UPES

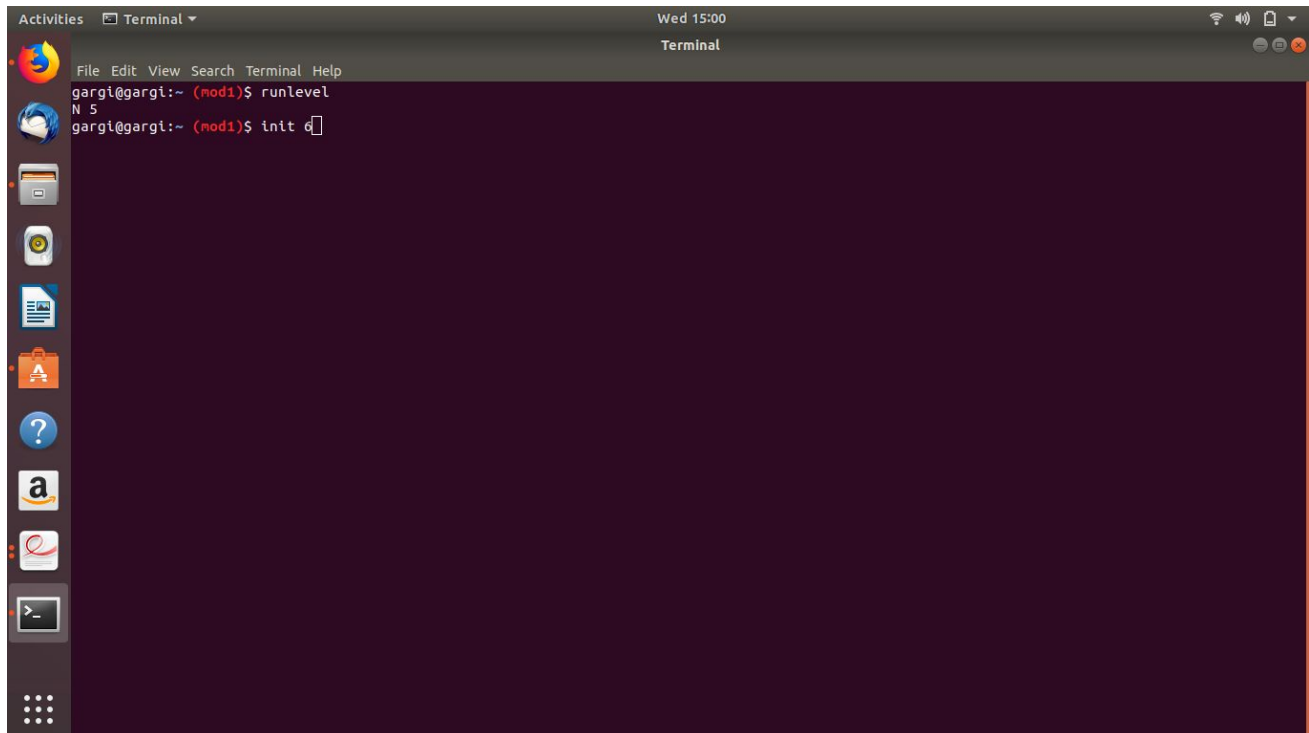
1. What is the size of MBR and what does it contain?

Ans. MBR stands for Master Boot Record. Its size is 512 Bytes. Each hard-drive (or Cd or other drive or device) has only 1 Master Boot Record. It is in a fixed position on the hard-drive and is mainly just for pointing to where the boot-loader is stored on the system. MBR provides address to grub loader.

2. In which file you can write commands which you want to run whenever Linux system starts/restarts?

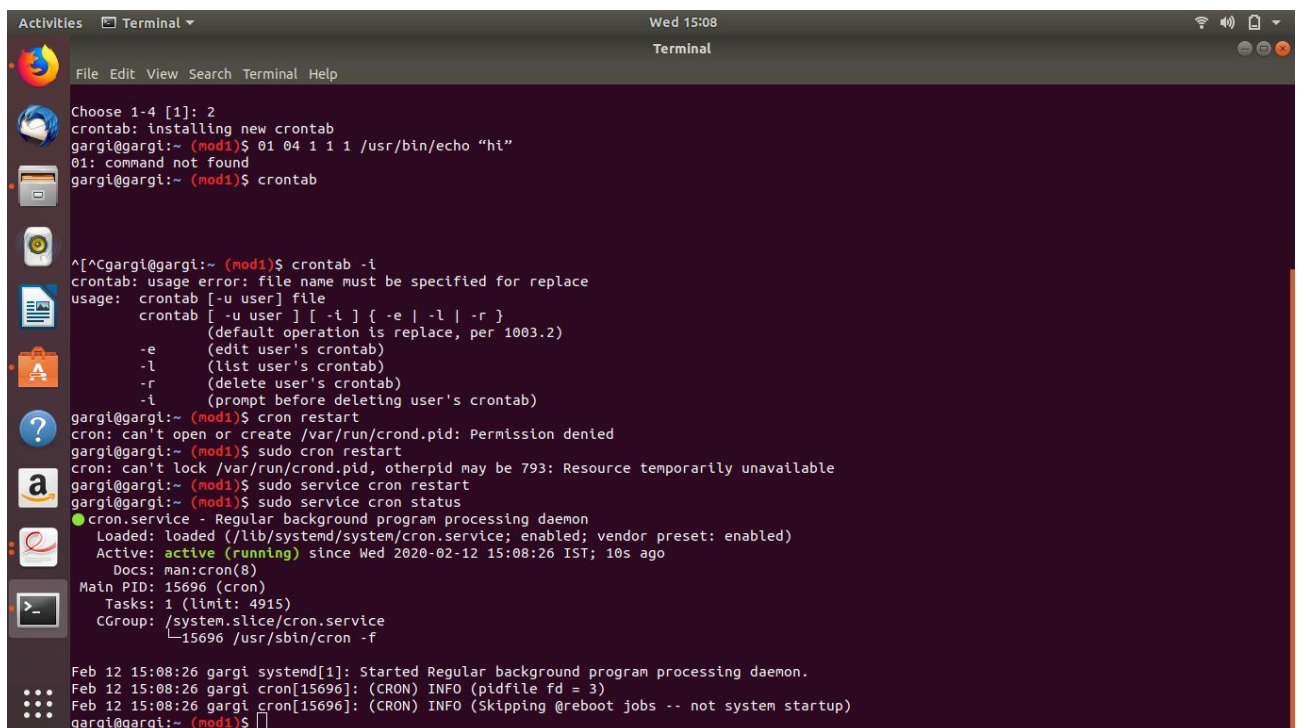
Ans. We can use the 'rc.local' file located in '/etc/' to execute our scripts and commands at startup. We will make an entry to execute the script in the file & every time when our system starts, the script will be executed. But we need to make this file /etc/c.local, executable. rc.local is not present already. But if we want to execute some command at run time, rc.local can be created in /etc and commands can be executed.

3. Reboot the system using runlevel.

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a sidebar with application icons. The terminal shows the user 'gargi' at host 'gargi' in a '(mod1)' environment. The commands entered are 'runlevel', which returns 'N 5', and 'init d', which is partially entered.

```
gargi@gargi:~ (mod1)$ runlevel
N 5
gargi@gargi:~ (mod1)$ init d
```

4. Restart cron service.

A terminal window titled 'Terminal' showing the process of restarting the cron service. The user enters 'crontab' and 'crontab -l', receiving usage information. Then, they attempt 'cron restart' (permission denied), 'sudo cron restart' (resource unavailable), and 'sudo service cron restart'. Finally, they check the status with 'sudo service cron status', which shows the service is active and running. The terminal also displays system logs for the cron service startup.

```
Choose 1-4 [1]: 2
crontab: installing new crontab
gargi@gargi:~ (mod1)$ 01 04 1 1 1 /usr/bin/echo "hi"
01: command not found
gargi@gargi:~ (mod1)$ crontab

^[[Cgargi@gargi:~ (mod1)$ crontab -l
crontab: usage error: file name must be specified for replace
usage: crontab [-u user] file
       crontab [-u user ] [ -i ] { -e | -l | -r }
           (default operation is replace, per 1003.2)
       -e      (edit user's crontab)
       -l      (list user's crontab)
       -r      (delete user's crontab)
       -i      (prompt before deleting user's crontab)
gargi@gargi:~ (mod1)$ cron restart
cron: can't open or create /var/run/crond.pid: Permission denied
gargi@gargi:~ (mod1)$ sudo cron restart
cron: can't lock /var/run/crond.pid, otherpid may be 793: Resource temporarily unavailable
gargi@gargi:~ (mod1)$ sudo service cron restart
gargi@gargi:~ (mod1)$ sudo service cron status
● cron.service - Regular background program processing daemon
   Loaded: loaded (/lib/systemd/system/cron.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2020-02-12 15:08:26 IST; 10s ago
     Docs: man:cron(8)
    Main PID: 15696 (cron)
      Tasks: 1 (limit: 4915)
    CGroup: /system.slice/cron.service
            └─15696 /usr/sbin/cron -f

Feb 12 15:08:26 gargi systemd[1]: Started Regular background program processing daemon.
Feb 12 15:08:26 gargi cron[15696]: (CRON) INFO (pidfile fd = 3)
Feb 12 15:08:26 gargi cron[15696]: (CRON) INFO (Skipping @reboot jobs -- not system startup)
gargi@gargi:~ (mod1)$
```

5. Create an ext4 filesystem Command: mkfs.ext4 /dev/sdb

6. Mount the created filesystem on /partition directory.

Command: `mount /dev/xvdf1 /test`

Where test is the mount point and /dev/xvdf1 is the partition to be mounted

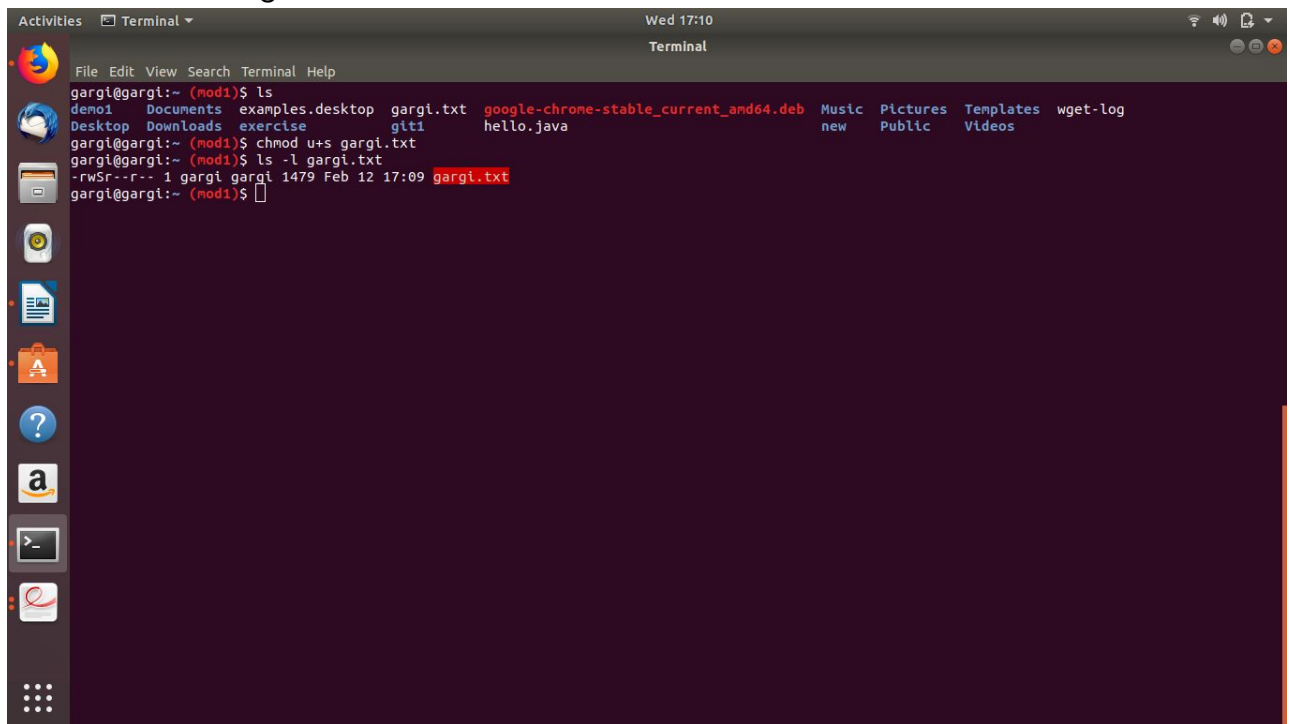
7. Difference between LVM and RAID.

Ans. RAID and LVM are two concepts of storing data. Difference in these two is the way the data is stored.

RAID is basically used for redundancy (base concept) which can be achieved by RAID 1 and RAID 5 (and some higher levels). **Whereas**, LVM provides more disk space at any point (i.e. you can increase the FS space by adding more disks at run time).

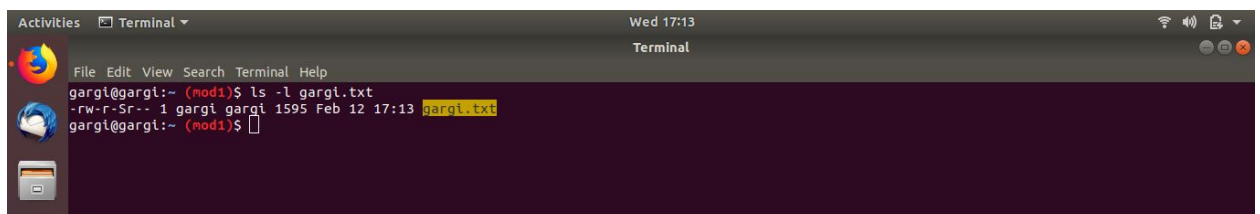
RAID used for redundancy. For example, when your data gets lost due to disk failure u shall get recovered by RAID. It is different from backup. A type of raid like disk mirroring writes the data to a mirror drive, so that you won't lose your data. **Whereas**, LVM is a way in which u partition the hard disk logically .

8. Set setuid and setgid on two different file.



A terminal window titled 'Terminal' showing the following commands and output:

```
gargi@gargi:~ (mod1)$ ls
demo1  Documents  examples.desktop  gargi.txt  google-chrome-stable_current_and64.deb  Music  Pictures  Templates  wget-log
Desktop Downloads  exercise          git1       hello.java
gargi@gargi:~ (mod1)$ chmod u+s gargi.txt
gargi@gargi:~ (mod1)$ ls -l gargi.txt
-rwSr--r-- 1 gargi gargi 1479 Feb 12 17:09 gargi.txt
gargi@gargi:~ (mod1)$
```



A terminal window titled 'Terminal' showing the following commands and output:

```
gargi@gargi:~ (mod1)$ ls -l gargi.txt
-rw-r-Sr-- 1 gargi gargi 1595 Feb 12 17:13 gargi.txt
gargi@gargi:~ (mod1)$
```

9. What is the use of Sticky bit.

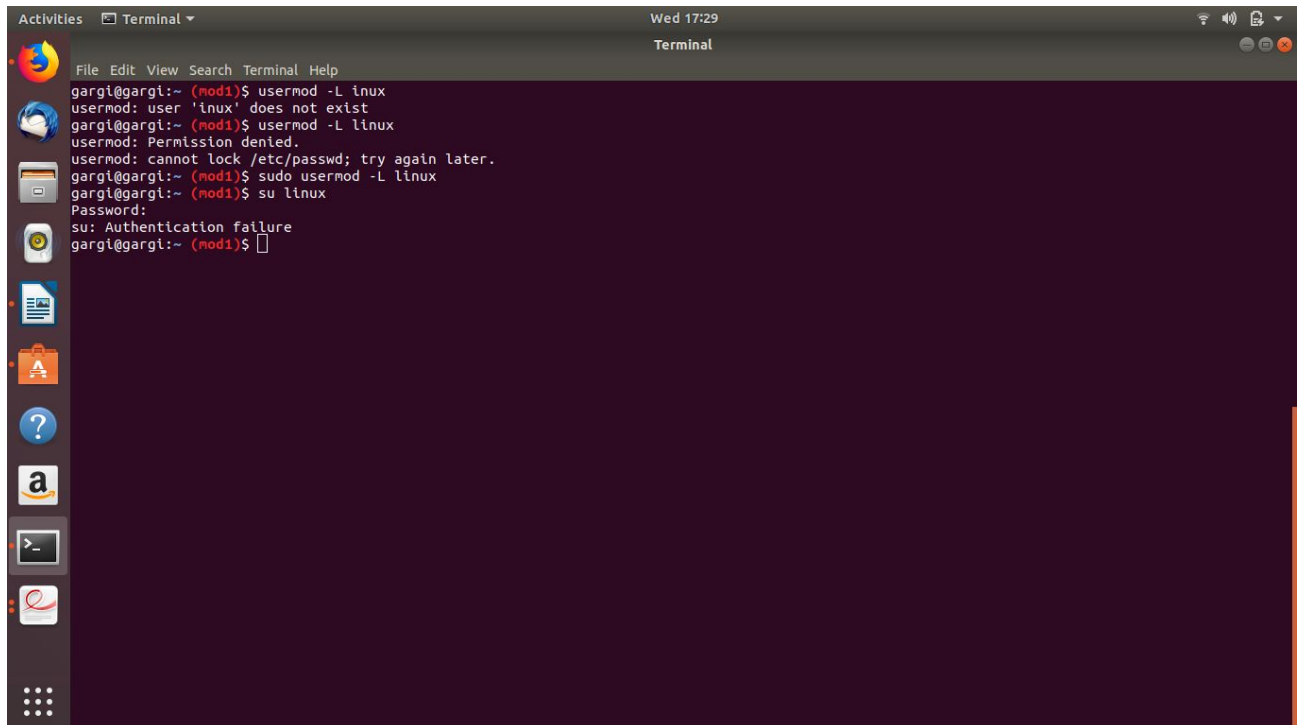
Ans. When a directory has the sticky bit set, its files can be deleted or renamed only by the file owner, directory owner and the root user.

Command: `chmod +t`

10. Create a user and add it to one secondary group.

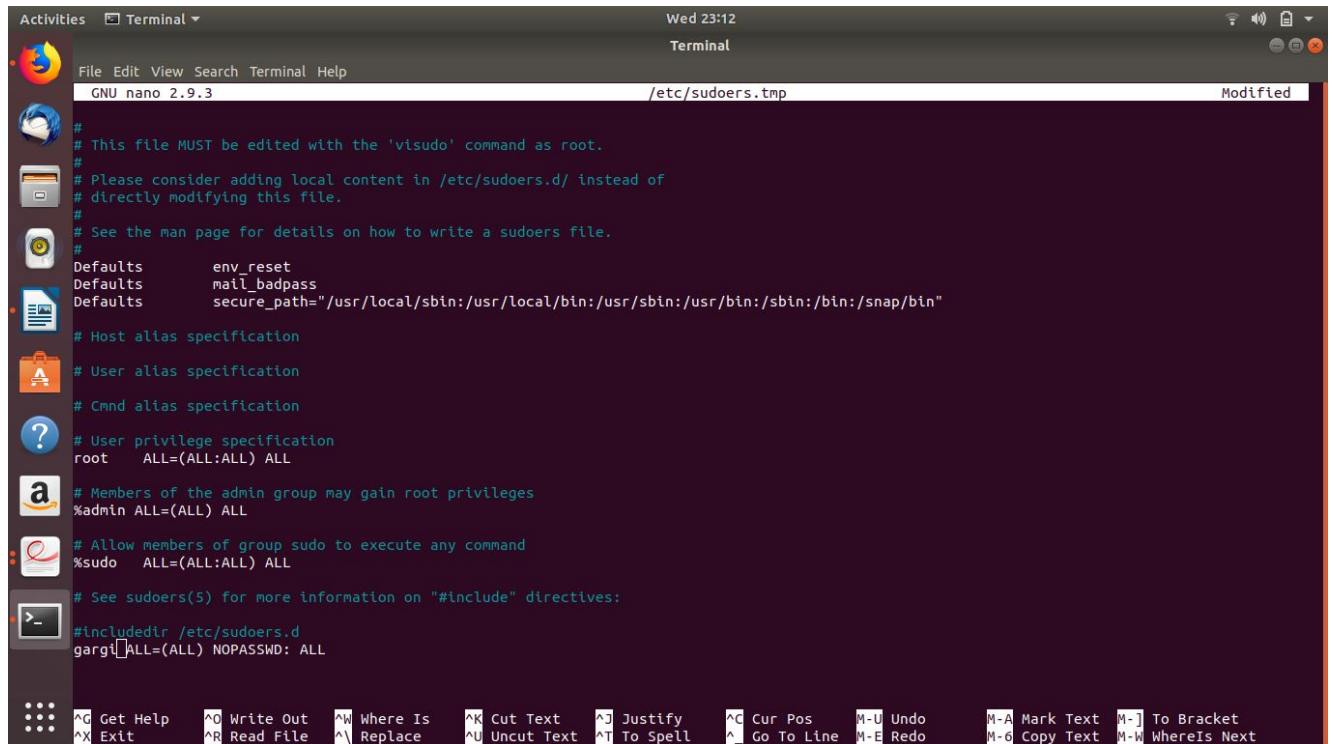
```
gargi@gargi:~ (mod1)$ sudo usermod -G gargi linux
gargi@gargi:~ (mod1)$ id linux
uid=1004(linux) gid=1004(linux) groups=1004(linux),1000(gargi)
gargi@gargi:~ (mod1)$
```

11. Lock this user.

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a sidebar with application icons. The terminal shows the following commands and output:

```
gargi@gargi:~ (mod1)$ usermod -L linux
usermod: user 'linux' does not exist
gargi@gargi:~ (mod1)$ usermod -L linux
usermod: Permission denied.
usermod: cannot lock /etc/passwd; try again later.
gargi@gargi:~ (mod1)$ sudo usermod -L linux
gargi@gargi:~ (mod1)$ su linux
Password:
su: Authentication failure
gargi@gargi:~ (mod1)$
```

12. Give this user full access (without password).

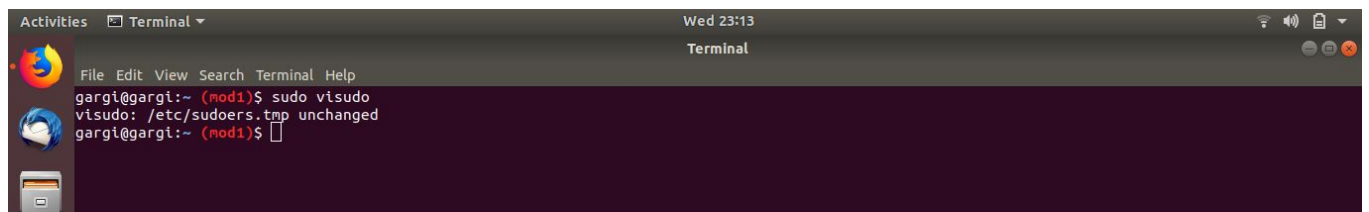


```
File Edit View Search Terminal Help
GNU nano 2.9.3 /etc/sudoers.tmp Modified

#
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults        env_reset
Defaults        mail_badpass
Defaults        secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"
# Host alias specification
# User alias specification
# Cmnd alias specification
# User privilege specification
root    ALL=(ALL:ALL) ALL
# Members of the admin group may gain root privileges
%admin   ALL=(ALL) ALL
# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL
# See sudoers(5) for more information on "#include" directives:

#include_dir /etc/sudoers.d
gargi ALL=(ALL) NOPASSWD: ALL

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text   ^J Justify    ^C Cur Pos   M-U Undo     M-A Mark Text  M-J To Bracket
^X Exit      ^R Read File  ^_ Replace    ^U Uncut Text ^T To Spell   ^_ Go To Line M-E Redo     M-C Copy Text M-W WhereIs Next
```



```
File Edit View Search Terminal Help
gargi@gargi:~ (mod1)$ sudo visudo
visudo: /etc/sudoers.tmp unchanged
gargi@gargi:~ (mod1)$
```

13. Delete the create user after taking backup of it home directory.

```
Activities Terminal Thu 11:11 root@gargi: /home
File Edit View Search Terminal Help
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for newuser
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] y
root@gargi:/# passwd newuser
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@gargi:/# cd /home
root@gargi:/home# ls
Assignments demo gargi lost+found newuser
root@gargi:/home# cd newuser
root@gargi:/home/newuser# ls
examples.desktop
root@gargi:/home/newuser# cd ..
root@gargi:/home# tar -cvf newuser.tar /home/newuser
tar: Removing leading '/' from member names
/home/newuser/
/home/newuser/examples.desktop
/home/newuser/.profile
/home/newuser/.bashrc
/home/newuser/.bash_logout
root@gargi:/home# ls
Assignments demo gargi lost+found newuser newuser.tar
root@gargi:/home# userdel newuser
root@gargi:/home# ls
Assignments demo gargi lost+found newuser newuser.tar
root@gargi:/home# su newuser
No passwd entry for user 'newuser'
root@gargi:/home#
```

14. Create a file with some content. Change all lower case letter to upper case letter and save output to another file using redirections.

```
Activities Terminal Thu 11:27 root@gargi: /home
File Edit View Search Terminal Help
demo1 Documents examples.desktop gargi.txt google-chrome-stable_current_amd64.deb Music Pictures Templates wget-log
Desktop Downloads exercise giti hello new Public Videos
gargi@gargi:~ (mod1)$ rm gargi.txt
gargi@gargi:~ (mod1)$ ls
demo1 Documents examples.desktop giti hello new Public Videos
Desktop Downloads exercise google-chrome-stable_current_amd64.deb Music Pictures Templates wget-log
gargi@gargi:~ (mod1)$ touch gargi.txt
gargi@gargi:~ (mod1)$ cat hello|tr "[a-z]" "[A-Z]" >> gargi.txt
gargi@gargi:~ (mod1)$ cat gargi.txt
Thu Feb 13 11:25:01 IST 2020
Thu Feb 13 11:26:01 IST 2020
HI MY NAME IS GARGI SHARMA.
gargi@gargi:~ (mod1)$
```

15. Set nice value of a process to -1.


```
Activities Terminal Thu 11:33 root@gargi: /home
File Edit View Search Terminal Help
27432 pts/1 00:00:00 su
27433 pts/1 00:00:00 bash
27530 ? 00:00:00 kworker/3:0
27561 ? 00:00:00 kworker/0:1
27588 pts/1 00:00:00 su
27589 pts/1 00:00:00 bash
27635 ? 00:00:00 kworker/0:2
27675 ? 00:00:00 kworker/u16:2
27676 ? 00:00:00 kworker/3:1
27677 ? 00:00:00 kworker/4:0
27680 ? 00:00:00 kworker/6:2
27695 ? 00:00:00 kworker/7:0
27737 ? 00:00:00 kworker/0:0
27820 ? 00:00:00 kworker/1:0
27821 ? 00:00:00 kworker/2:1
27823 ? 00:00:00 kworker/5:0
27824 ? 00:00:00 kworker/6:0
27845 ? 00:00:00 kworker/7:1
27859 ? 00:00:00 kworker/4:1
27871 ? 00:00:00 kworker/u16:3
27873 ? 00:00:00 kworker/u16:4
27874 ? 00:00:00 kworker/7:3
27880 ? 00:00:00 kworker/3:2
27888 pts/1 00:00:00 top
27890 ? 00:00:00 kworker/1:1
27894 pts/1 00:00:00 htop
27895 ? 00:00:00 kworker/2:2
27910 pts/1 00:00:00 ps
gargi@gargi:~ (mod1)$ nice -n 3 -p 1883
nice: invalid option -- 'p'
Try 'nice --help' for more information.
gargi@gargi:~ (mod1)$ renice -n -1 -p 1883
renice: failed to set priority for 1883 (process ID): Permission denied
gargi@gargi:~ (mod1)$ sudo renice -n -1 -p 1883
1883 (process ID) old priority 0, new priority -1
gargi@gargi:~ (mod1)$ sudo renice -n 0 -p 1883
1883 (process ID) old priority -1, new priority 0
gargi@gargi:~ (mod1)$
```

16. Get list of all files used by “telnet”.

Command: dpkg -L telnet

```
Activities Terminal Thu 12:06 root@gargi: /home
File Edit View Search Terminal Help
gargi@gargi:~ (mod1)$ dpkg -l | grep telnet
ii telnet 0.17-41 amd64 basic telnet client
gargi@gargi:~ (mod1)$ dpkg -L telnet
Command 'dpkg' not found, did you mean:
  command 'dpkg' from deb dpkg
Try: sudo apt install <deb name>
gargi@gargi:~ (mod1)$ dpkg -L telnet
./
/usr
/usr/bin
/usr/bin/telnet.netkit
/usr/share
/usr/share/doc
/usr/share/doc/telnet
/usr/share/doc/telnet/BUGS
/usr/share/doc/telnet/README.gz
/usr/share/doc/telnet/README.telnet
/usr/share/doc/telnet/README.telnet.old.gz
/usr/share/doc/telnet/changelog.Debian.gz
/usr/share/doc/telnet/copyright
/usr/share/lintian
/usr/share/lintian/overrides
/usr/share/lintian/overrides/telnet
/usr/share/man
/usr/share/man/man1
/usr/share/man/man1/telnet.netkit.1.gz
/usr/share/menu
/usr/share/menu/telnet
gargi@gargi:~ (mod1)$
```

17. Check if port 22 is listening using netstat and telnet command.

```
Activities Terminal Thu 12:09 root@gargi: /home
File Edit View Search Terminal Help
gargi@gargi:~ (mod1)$ telnet localhost 22
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4ubuntu0.3

Protocol mismatch.
Connection closed by foreign host.
gargi@gargi:~ (mod1)$ netstat -nltp
(Not all processes could be identified, non-owned process info
will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:80              0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:53:53          0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      -
tcp        0      0 0.0.0.0:1:631          0.0.0.0:*               LISTEN      -
tcp6       0      0 :::80                   :::*                    LISTEN      -
tcp6       0      0 :::22                   :::*                    LISTEN      -
tcp6       0      0 :::1:631                 :::*                    LISTEN      -
gargi@gargi:~ (mod1)$
```

18. Create a cron job which runs once in a week at 23:45.
Cron Job: 45 23 * * 0

```
Activities Terminal Thu 12:29
File Edit View Search Terminal Help
45 23 * * 0 /bin/date >> /home/gargi/gargi.txt
* * * * /bin/date >> /home/gargi/gargi.txt
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# Amazon mon dow command
-- INSERT --
1,48 All
```

19. Difference between dig and traceroute

Dig: Dig stands for domain name groper. It is a network administration command-line tool for querying Domain Name System (DNS) name servers. It is useful for verifying and troubleshooting DNS problems and also to perform DNS lookups and displays the answers that are returned from the name server that were queried.

Traceroute: It is a command in Linux that prints the route that a packet takes to reach the host. It shows the hops it takes to reach a particular host.