Advanced Linux

ASSIGNMENT

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1. What is the size of MBR and what does it contains.
   - Master Boot Record (MBR) is the information in the first sector of any hard disk or diskette that identifies how and where an operating system is located so that it can be boot(loaded) into the computer's main storage or ram.
   - The Master Boot Record is also sometimes called the "partition sector" or the "master partition table" because it includes a table that locates each partition that the hard disk has been formatted into.
   - MBR also includes a program that reads the boot sector record of the partition containing the operating system to be booted into RAM. In turn, that record contains a program that loads the rest of the operating system into RAM.
2. In which file you can write commands which you want to run whenever Linux system starts/restarts?

Using Rc local:we will use '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.

3. Reboot the system using runlevel.

Init 6

0- Halt

1- Single user mode (recovery)

2- Debian/Ubuntu default

3- RHEL/Fedora/SUSE text mode

4- free

5- RHEL/Fedora/SUSE graphical mode

6- reboot

4. Restart cron service.

Sudo service cron start

5. Create an ext4 filesystem
   mkfs –t ext4 /dev/sda3

6. Mount the created filesystem on /partition directory.
sudo mount /dev/sda3 /mnt/media

7. Difference between LVM and RAID.

S.No.	RAID	LVM
1.	RAID is used for redundancy.	LVM is a way in which you partition the hard disk logically and it contains its own advantages.
2.	A RAID device is a physical grouping of disk devices in order to create a logical presentation of one device to an Operating System for redundancy or performance or a combination of the two.	LVM is a logical layer that can be manipulated in order to create and, or expand a logical presentation of a disk device to an Operating System.
3.	RAID is a way to create a redundant or striped block device with redundancy using other physical block devices.	LVM usually sits on top of RAID blocks or even standard block devices to accomplish the same result as a partitioning, however it is much more flexible than partitions. You can create multiple volumes crossing multiple physical devices, remove physical devices without loosing data, resize the volumes, create snapshots, etc

4.	RAID is either a software or a hardware technique to create data storage redundancy across multiple block devices based on required RAID levels.	LVM is a software tool to manage large pool of storage devices making them appear as a single manageable pool of storage resource. LVM can be used to manage a large pool of what we call Just-a-bunch-of-Disk (JBOD) presenting them as a single logical volume and thereby create various partitions for software RAID.
5.	RAID is NOT any kind of Data backup solution. Its a solution to prevent one of the SPOFs (Single Point of Failure) i.e. DISK failure. By configuring RAID you are just providing an emergency substitute for the Primary disk. It NEVER means that you have configured DATA backup.	LVM is a disk management approach that allows us to create, extend, reduce, delete or resize the volume groups or logical volumes.

8. Create a LVM(Slide 13)

=> -Select the Physical Storage Devices for LVM

$pvcreate /dev/sda1 /dev/sda2

-Create the Volume Group

$vgcreate vol_grp1 /dev/sda1 /dev/sda2

-Create Logical Volumes

$lvcreate -l 20 -n logical_vol1 vol_grp1

9. Create a RAID1 device(Slide 19)

```
# mdadm --create /dev/md0 --level=mirror --raid-devices=2 /dev/sd[b-c]1
# cat /proc/mdstat
```

10. Create a swapfile of 500Mb(slide20)

```
sudo fallocate -l 500M /swapfile
```

11. Set setuid and setgid on two different file.

```
maithely@maithely:~$ ls -l file.txt
-rw-r--r-- 1 maithely maithely 0 Feb 12 16:05 file.txt
maithely@maithely:~$ chmod u+S file.txt
chmod: invalid mode: ‘u+S’
Try 'chmod --help' for more information.
maithely@maithely:~$ chmod 'u+s' file.txt
maithely@maithely:~$ ls -l file.txt
-rwSr--r-- 1 maithely maithely 0 Feb 12 16:05 file.txt
```

```
maithely@maithely:~$ ls -l file1.txt
-rw-r--r-- 1 maithely maithely 0 Feb 12 16:15 file1.txt
maithely@maithely:~$ chmod g+s file1.txt
maithely@maithely:~$ ls -l file1.txt
-rw-r-Sr-- 1 maithely maithely 0 Feb 12 16:15 file1.txt
maithely@maithely:~$
```

12. What is the use of Sticky bit.

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.

Chmod +t

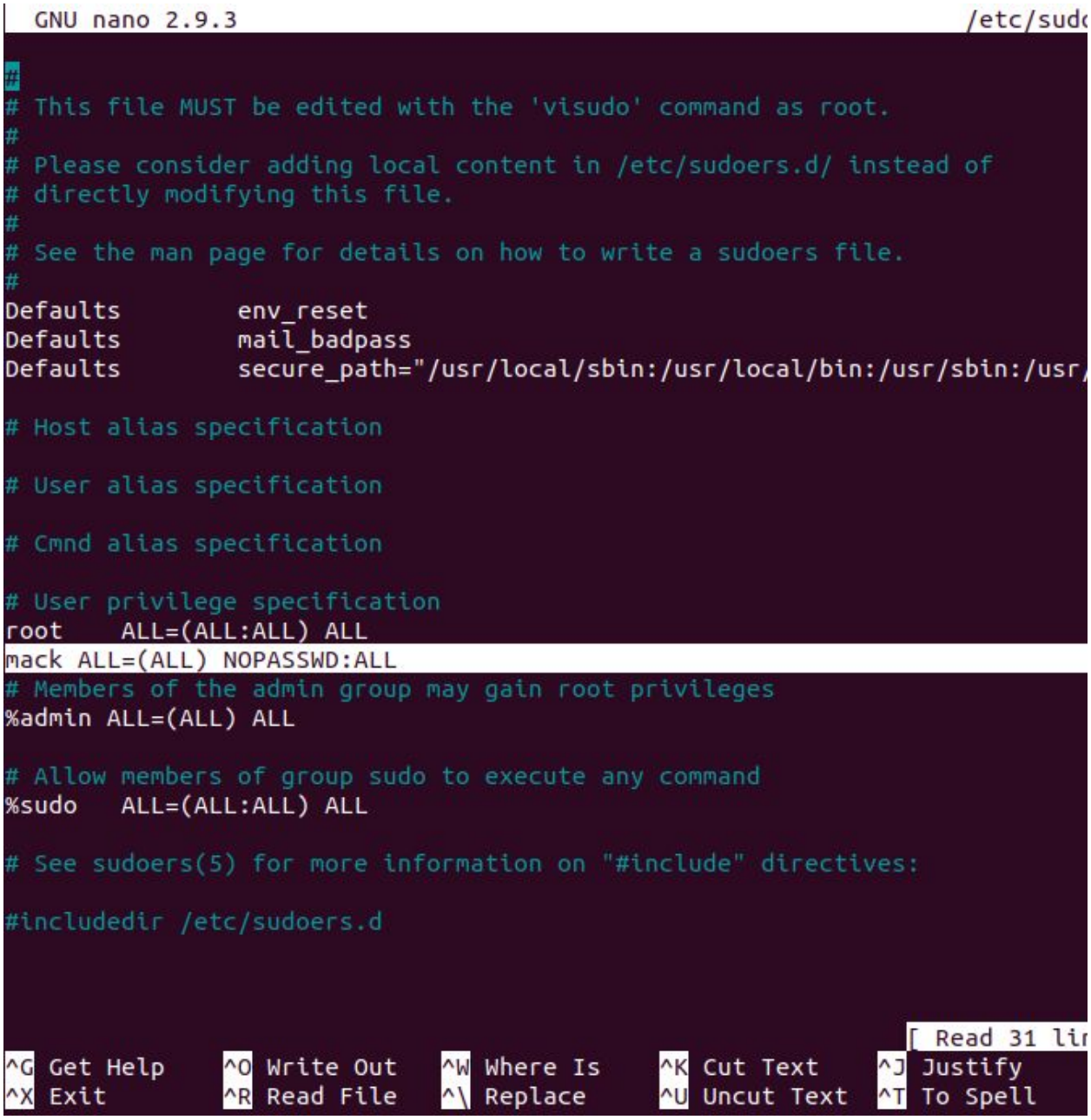
13. Create a user and add it to one secondary group.

```
maithely@maithely:~$ sudo useradd mack
[sudo] password for maithely:
maithely@maithely:~$ sudo usermod -G maithely mack
maithely@maithely:~$ id mack
uid=1001(mack) gid=1001(mack) groups=1001(mack),1000(maithely)
maithely@maithely:~$
```

14. Lock this user.

```
maithely@maithely:~$ sudo usermod -L mack
maithely@maithely:~$ su mack
Password:
su: Authentication failure
maithely@maithely:~$
```

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


GNU nano 2.9.3 /etc/sudo
#
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/
Host alias specification
User alias specification
Cmnd alias specification
User privilege specification
root ALL=(ALL:ALL) ALL
mack ALL=(ALL) NOPASSWD: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:
#includedir /etc/sudoers.d
[Read 31 lin
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell

```
maithely@maithely:~$ su mack
Password:
mack@maithely:/home/maithely$ sudo apt install gcc
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  gcc-7 libasan4 libatomic1 libc-dev-bin libc6-dev libcilkrts5 libgcc-7-dev
  libitm1 liblsan0 libmpx2 libquadmath0 libtsan0 libubsan0 linux-libc-dev
  manpages-dev
Suggested packages:
  gcc-multilib make autoconf automake libtool flex bison gcc-doc
  gcc-7-multilib gcc-7-doc gcc-7-locales libgcc1-dbg libgomp1-dbg libitm1-dbg
  libatomic1-dbg libasan4-dbg liblsan0-dbg libtsan0-dbg libubsan0-dbg
  libcilkrts5-dbg libmpx2-dbg libquadmath0-dbg glibc-doc
The following NEW packages will be installed:
  gcc gcc-7 libasan4 libatomic1 libc-dev-bin libc6-dev libcilkrts5
  libgcc-7-dev libitm1 liblsan0 libmpx2 libquadmath0 libtsan0 libubsan0
  linux-libc-dev manpages-dev
0 upgraded, 16 newly installed, 0 to remove and 0 not upgraded.
Need to get 16.9 MB of archives.
After this operation, 73.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] Killed
```

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

```
maithely@maithely:~$ sudo deluser --remove-home --backup-to /tmp/ mack
Looking for files to backup/remove ...
Backing up files to be removed to /tmp/ ...
backup_name = /tmp//mack.tar
Removing user `mack' ...
Warning: group `mack' has no more members.
Done.
maithely@maithely:~$
```

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

```
maithely@maithely:~$ cat > file.txt
helloooo
byeee
^Z
[1]+  Stopped                 cat > file.txt
maithely@maithely:~$ tr '[:lower:]' '[:upper:]' < file.txt> out.txt
maithely@maithely:~$ cat out.txt
HELLOOOO
BYEEE
maithely@maithely:~$
```

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

```
 8253 pts/0    00:00:00 pager
 8272 ?        00:00:00 kworker/u16:0
 8300 pts/0    00:00:00 ps
maithely@maithely:~$ sudo renice -1 8253
8253 (process ID) old priority 0, new priority -1
maithely@maithely:~$
```

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

```
maithely@maithely:~$ dpkg-query --listfiles 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
maithely@maithely:~$
```

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

```
maithely@maithely:~$ netstat -ntlp
(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 0.0.0.0:80              0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN      -
tcp6       0      0 :::80                   :::*                    LISTEN      -
tcp6       0      0 ::1:631                 :::*                    LISTEN      -
maithely@maithely:~$ telnet localhost 22
Trying 127.0.0.1...
telnet: Unable to connect to remote host: Connection refused
```

21. Create a cron job which runs once in a week at 23:45.
    crontab -e
    45 23 * * 1

22. Difference between dig and traceroute

Traceroute - The trace should have the last hop at a HostGator server.

```
maithely@maithely:~$ traceroute google.com
traceroute to google.com (172.217.160.238), 30 hops max, 60 byte packets
 1  _gateway (10.155.1.1)  1.085 ms  1.683 ms  1.884 ms
 2  static-217.91.12.61-tataidc.co.in (61.12.91.217)  18.167 ms  20.610 ms  20.915 ms
 3  10.124.210.165 (10.124.210.165)  8.593 ms  7.205 ms  7.781 ms
 4  * * *
 5  10.43.147.42 (10.43.147.42)  7.284 ms  8.143 ms  8.392 ms
 6  14.141.116.253.static-Delhi.vsnl.net.in (14.141.116.253)  25.970 ms  13.523 ms  5.873 ms
 7  14.140.113.238.static-Delhi-vsnl.net.in (14.140.113.238)  6.080 ms  7.880 ms  7.239 ms
 8  108.170.251.97 (108.170.251.97)  5.363 ms  5.102 ms 108.170.251.113 (108.170.251.113)  8.406 ms
 9  64.233.174.17 (64.233.174.17)  7.728 ms  7.728 ms 64.233.174.151 (64.233.174.151)  7.907 ms
10  del03s09-in-f14.1e100.net (172.217.160.238)  6.673 ms  7.674 ms  58.495 ms
```

Dig - The Dig will be listed under *Answer Records*, showing the information from the DNS zones. This information is much more advanced.

```
maithely@maithely:~$ dig google.com

; <<>> DiG 9.11.3-1ubuntu1.11-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 2061
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             283     IN      A       172.217.160.238

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Thu Feb 13 15:27:41 IST 2020
;; MSG SIZE  rcvd: 55

maithely@maithely:~$
```