

# **ASSESSMENT - 4**

## **Advanced Linux and Shell Scripting**

**TO  
THE  
NEW™**



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

**ANS :** The MBR (Master Boot Record) is 512 bytes.

1. 446 bytes Bootloader
2. 64 bytes (4 \* 16 bytes) Partition Tables
3. 2 bytes Magic Number

The Master Boot Record (MBR) is the information in the first sector of any hard disk that identifies how and where an operating system is located so that it can be loaded into the computer's main storage.

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

**ANS :**

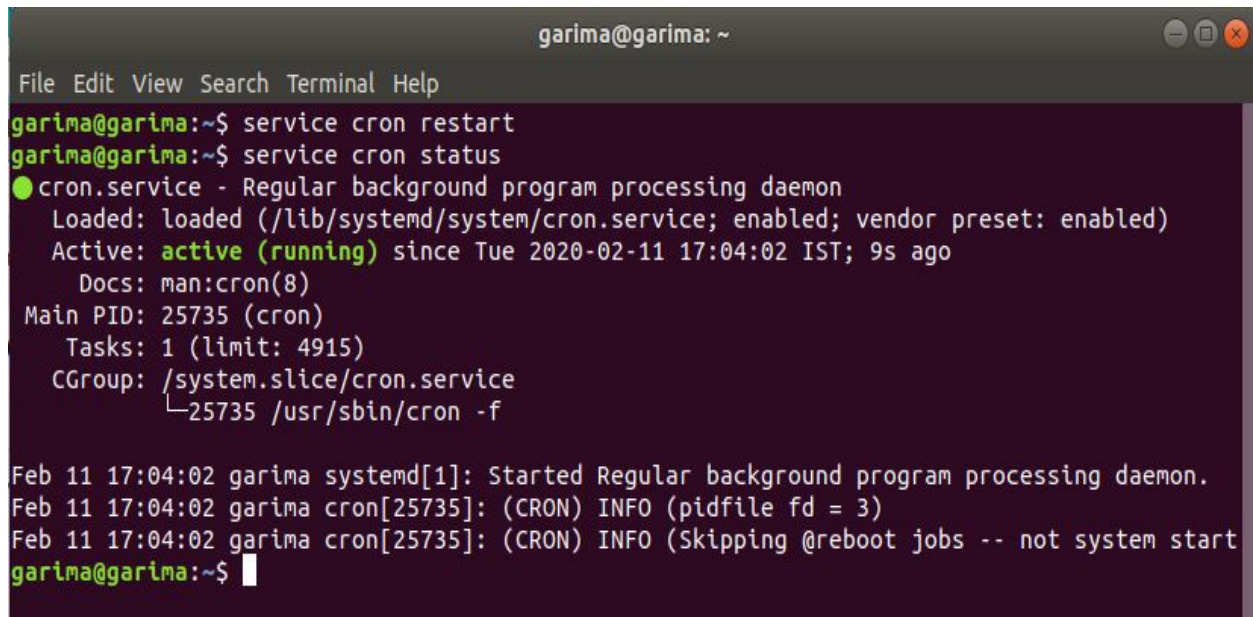
We will make an entry in rc.local file to execute the commands every time when our system starts.

### 3. Reboot the system using runlevel.

**ANS :** init 6

### 4. Restart cron service.

**ANS :**

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

```
garima@garima:~$ service cron restart
garima@garima:~$ 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 Tue 2020-02-11 17:04:02 IST; 9s ago
     Docs: man:cron(8)
 Main PID: 25735 (cron)
    Tasks: 1 (limit: 4915)
   CGroup: /system.slice/cron.service
           └─25735 /usr/sbin/cron -f

Feb 11 17:04:02 garima systemd[1]: Started Regular background program processing daemon.
Feb 11 17:04:02 garima cron[25735]: (CRON) INFO (pidfile fd = 3)
Feb 11 17:04:02 garima cron[25735]: (CRON) INFO (Skipping @reboot jobs -- not system start
garima@garima:~$
```

## 5. Create an ext4 filesystem.

**ANS :**       \$ mkfs.ext4 /dev/sdb1

## 6. Mount the created filesystem on /partition directory.

**ANS :**       \$ mkdir test  
              \$ mount /dev/sdb1 /test

## 7. Difference between LVM and RAID.

**ANS:**

S.No.	RAID	LVM
1.	RAID is used for redundancy.	LVM is a way in which you partition the hard disk logically.
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.	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 NOT any kind of Data backup solution. Its a solution to prevent disk failure.	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)

**ANS :**

1. Select physical storage device :  
      pvcreate /dev/sda2 /dev/sda3
2. Create the volume group:  
      vgcreate vol\_grp1 /dev/sda2 /dev/sda3
3. Create logical volume:  
      lvcreate -l 20 -n logical\_vol1 vol\_grp1

## 9. Create a RAID1 device(Slide 19)

ANS :

1. Installation : apt-get install mdadm rsync initramfs-tools
2. Creating Partitions : using fdisk on say /dev/sdb and /dev/sdc
3. Verifying the changes : mdadm -E /dev/sd[b-c]
4. Create RAID1 device  
mdadm --create /dev/md0 --level=mirror --raid-devices=2 /dev/sd[b-c]1  
cat /proc/mdstat
5. Check the raid devices type:  
mdadm -E /dev/sd[b-c]1  
mdadm --detail /dev/md0
6. Create file system and mount  
mkfs.ext4 /dev/md0  
mkdir /mnt/raid1  
mount /dev/md0 /mnt/raid1/

## 10. Create a swapfile of 500Mb(slide20)

ANS :

```
garima@garima:~$ sudo fallocate -l 500M /swapfile
garima@garima:~$ ls
a.sh          Documents    file1.txt    output.txt
assessment-folder Downloads    gitdemo     passwd_backup
backup.tar.gz d.sh        Music       Pictures
b.sh          error.txt    myfile      Public
c.sh          examples.desktop newdir      Templates
Desktop       exercise     newdir1     Videos
garima@garima:~$ cd /
garima@garima:/$ ls
bin    etc      lib      mnt    run    swapfile  var
boot  home    lib64    opt    sbin   sys       vmlinuz
cdrom  initrd.img lost+found proc  snap  tmp
dev    initrd.img.old media    root   srv    usr
gaScreenshotna:/$ ls -ld swapfile
-rw-r--r-- 1 root root 524288000 Feb 12 11:32 swapfile
garima@garima:/$ sudo mkswap /swapfile
mkswap: /swapfile: insecure permissions 0644, 0600 suggested.
Setting up swapspace version 1, size = 500 MiB (524283904 bytes)
no label, UUID=1ff828ac-aeec-4d4a-9db9-4e0c1132a7c3
garima@garima:/$ sudo chmod 0600 swapfile
garima@garima:/$ ls -ld swapfile
-rw----- 1 root root 524288000 Feb 12 11:35 swapfile
garima@garima:/$ sudo mkswap /swapfile
mkswap: /swapfile: warning: wiping old swap signature.
Setting up swapspace version 1, size = 500 MiB (524283904 bytes)
no label, UUID=671c8fae-d198-43f9-90b4-e6c65fbd8dbd
garima@garima:/$ sudo swapon /swapfile
garima@garima:/$ swapon -s
```

Filename	Type	Size	Used	Priority
/dev/sda6	partition	62498812		0-2
/swapfile	file	511996	0	-3

```
garima@garima:/$
```

**11. Set setuid and setgid on two different file.**

**ANS :**

```
garima@garima: ~  
File Edit View Search Terminal Help  
garima@garima:~$ vim f1.txt  
garima@garima:~$ vim f2.txt  
garima@garima:~$ ls -ld f1.txt  
-rw-r--r-- 1 garima garima 17 Feb 12 11:44 f1.txt  
garima@garima:~$ ls -ld f2.txt  
-rw-r--r-- 1 garima garima 18 Feb 12 11:44 f2.txt  
garima@garima:~$ chmod u+s f1.txt  
garima@garima:~$ ls -ld f1.txt  
-rwsr--r-- 1 garima garima 17 Feb 12 11:44 f1.txt  
garima@garima:~$ chmod g+s f2.txt  
garima@garima:~$ ls -ld f2.txt  
-rw-r-Sr-- 1 garima garima 18 Feb 12 11:44 f2.txt  
garima@garima:~$
```

**12. What is the use of Sticky bit.**

**ANS :** A Sticky bit is a permission bit that is set on a file or a directory that lets only the owner of the file/directory or the root user to delete or rename the file. No other user is given privileges to delete the file created by some other user.

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

**ANS :**

```
garima@garima: ~  
File Edit View Search Terminal Help  
garima@garima:~$ groups  
garima adm cdrom sudo dip plugdev lpadmin sambashare  
garima@garima:~$ id test  
uid=1001(test) gid=1001(test) groups=1001(test)  
garima@garima:~$ sudo usermod -G garima test  
garima@garima:~$ id test  
uid=1001(test) gid=1001(test) groups=1001(test),1000(garima)  
garima@garima:~$
```

OR we could have also used `sudo adduser test garima`



14. Lock this user.

ANS :

```
garima@garima: ~  
File Edit View Search Terminal Help  
garima@garima:~$ sudo usermod -L test  
garima@garima:~$ su test  
Password:  
su: Authentication failure  
garima@garima:~$
```

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

```
garima@garima: ~  
File Edit View Search Terminal Help  
GNU nano 2.9.3 /etc/sudoers.tmp  
Defaults secure_path="/usr/local/sbin:/usr/local/bin  
# Host alias specification  
# User alias specification  
# Cmnd alias specification  
# User privilege specification  
root ALL=(ALL:ALL) ALL  
test ALL=(ALL) NOPASSWD:ALL  
# Hosts of the above group may not need privileges
```

```
garima@garima:~$ sudo visudo
garima@garima:~$ su test
Password:
test@garima:/home/garima$ cd
test@garima:~$ sudo adduser newuser
Adding user `newuser' ...
Adding new group `newuser' (1002) ...
Adding new user `newuser' (1002) with group `newuser' ...
Creating home directory `/home/newuser' ...
Copying files from `/etc/skel' ...
Enter new UNIX password: █
```

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

ANS :

```
garima@garima: ~
File Edit View Search Terminal Help
garima@garima:~$ pwd
/home/garima
garima@garima:~$ sudo tar -czf backup.tar.gz /home/test/ .
tar: Removing leading `/' from member names
tar: ./backup.tar.gz: file changed as we read it
tar: ../.cache/google-chrome/Default/Cache: file changed as we read it
```

```
garima@garima: ~
File Edit View Search Terminal Help
garima@garima:~$ sudo userdel -r test
userdel: test mail spool (/var/mail/test) not found
garima@garima:~$ █
```

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

ANS :

```
garima@garima:~$ vim newfile
garima@garima:~$ cat newfile
hello everyone
garima@garima:~$ tr '[:lower:]' '[:upper:]' < newfile > output.txt
garima@garima:~$ cat output.txt
HELLO EVERYONE
garima@garima:~$ vim oldfile
garima@garima:~$ sed -e 's/\(.*\)/\U\1/' oldfile > outputs.txt
garima@garima:~$ cat outputs.txt
HELLO EVERYONE
garima@garima:~$
```

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

ANS :

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
20145	garima	20	0	924752	174456	98352	S	1.3	1.1	1:44.76	chrome

```
garima@garima:~$ renice -1 -p 20145
renice: failed to set priority for 20145 (process ID): Permission denied
garima@garima:~$ sudo !!
sudo renice -1 -p 20145
[sudo] password for garima:
20145 (process ID) old priority 0, new priority -1
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
20145	garima	19	-1	924752	171772	98356	S	1.7	1.1	1:51.78	chrome



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

ANS :

```
garima@garima: ~  
File Edit View Search Terminal Help  
garima@garima:~$ 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  
garima@garima:~$
```

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

ANS :

```
garima@garima:~$ sudo netstat -nltp | grep 22  
tcp        0      0 0.0.0.0:22          0.0.0.0:*          LISTEN     1092/sshd  
tcp6       0      0 :::22              :::*                LISTEN     1092/sshd  
garima@garima:~$
```

```
garima@garima:~$ telnet 10.1.225.28 22
Trying 10.1.225.28...
Connected to 10.1.225.28.
Escape character is '^]'.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4ubuntu0.3
Connection closed by foreign host.
garima@garima:~$
```

21. Create a cron job which runs once a week at 23:45.

ANS : 45 23 \* \* 1

eg:

```
garima@garima:~$ crontab -e
crontab: installing new crontab
garima@garima:~$ service cron restart
garima@garima:~$ cat abc.txt
hello
hello
garima@garima:~$ crontab -l
# 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)
#
# m h dom mon dow   command
* * * * * echo "hello" >> abc.txt
garima@garima:~$
```

## 22. Difference between dig and traceroute.

```
garima@garima:~$ dig www.google.com

; <<>> DiG 9.11.3-1ubuntu1.11-Ubuntu <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 63272
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

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

;; ANSWER SECTION:
www.google.com.                233     IN      A      172.217.31.196

;; Query time: 73 msec
;; Screenshot 127.0.0.53#53(127.0.0.53)
;; WHEN: Wed Feb 12 16:20:52 IST 2020
;; MSG SIZE rcvd: 59
```

```
garima@garima:~$ traceroute www.google.com
traceroute to www.google.com (172.217.31.196), 30 hops max, 60 byte packets
 1 _gateway (10.1.224.1) 7.357 ms 7.313 ms 7.269 ms
 2 nsg-static-185.160.71.182.airtel.in (182.71.160.185) 13.427 ms 13.420 ms 13.399 ms
 3 182.79.149.182 (182.79.149.182) 13.621 ms 13.570 ms 13.567 ms
 4 72.14.217.194 (72.14.217.194) 9.474 ms 9.451 ms 9.429 ms
 5 * * *
 6 172.253.67.84 (172.253.67.84) 9.273 ms 72.14.233.166 (72.14.233.166) 10.706 ms *
 7 108.170.251.108 (108.170.251.108) 10.638 ms 74.125.243.98 (74.125.243.98) 7.739 ms *
```