Advance Linux

Ques 1.What is the size of MBR and what does it contains.

Ans 1. Prior to the execution of GRUB, the system BIOS loads into memory the **Master Boot Record** (**MBR**) and executes it contents. The total **size** of the **MBR** is 512 bytes, which **contains** the bootloader program and disk partitioning information.

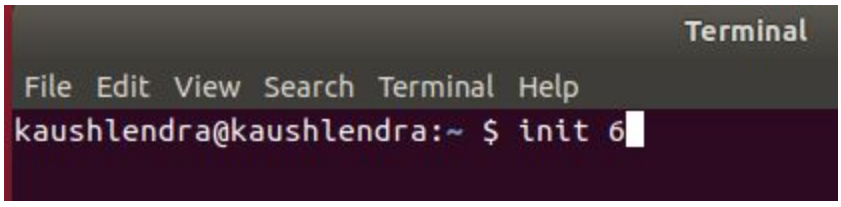
Ques 2. In which file you can write commands which you want to run whenever Linux system starts/restarts?

Ans 2. In this method, 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.
But we will first provide the permissions to make the file /etc/rc.local executable,

$ sudo chmod +x /etc/rc.local

Ques 3. Reboot the system using runlevel.

Ans 3.

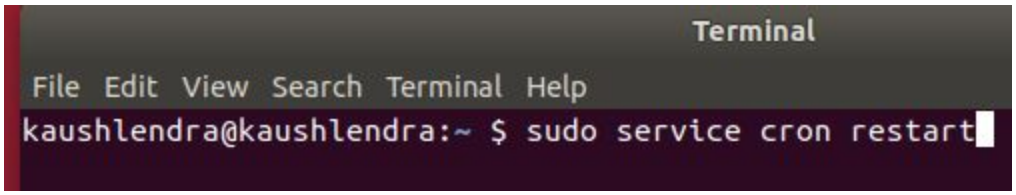


Runlevels define what tasks can be accomplished in the current state (or runlevel) of a Linux system

- 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

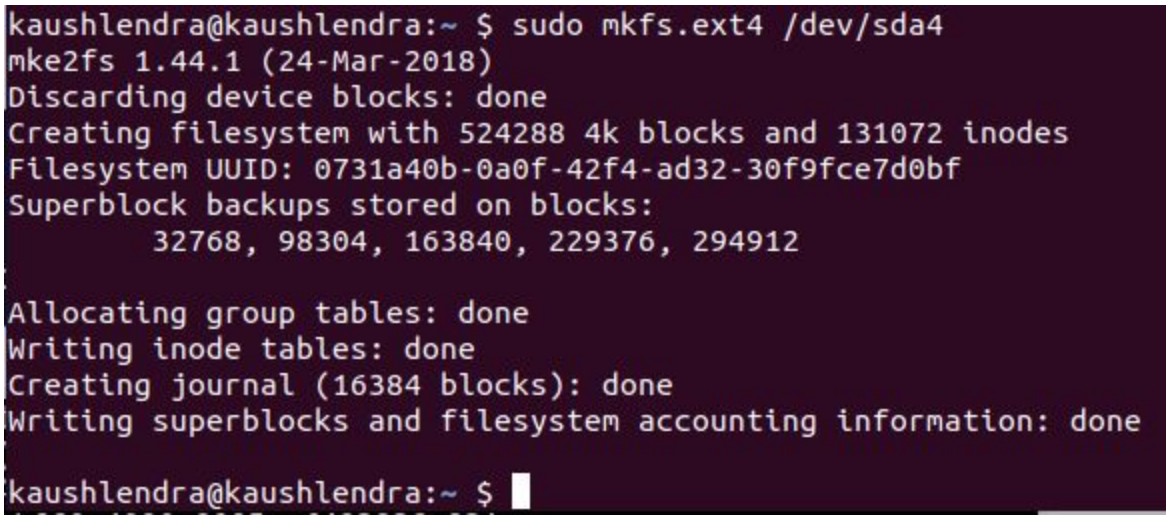
Ques 4. Restart cron service.

Ans 4. To restart cron service we use the command which is given below :
Sudo service cron restart



Ques 5. Create an ext4 filesystem

Ans 5.



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

Ans 6.

```
kaushlendra@kaushlendra:pan $ sudo mkdir /home/kaushlendra/pan/partition
kaushlendra@kaushlendra:pan $ sudo mount /dev/sda4 //home/kaushlendra/pan/partit
ion
```

Checking the mount

```
kaushlendra@kaushlendra:pan $ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
loop0         7:0    0   4.2M  1 loop /snap/gnome-calculator/544
loop1         7:1    0  54.7M  1 loop /snap/core18/1668
loop2         7:2    0 140.9M  1 loop /snap/gnome-3-26-1604/70
loop3         7:3    0  86.9M  1 loop /snap/core/4917
loop4         7:4    0 160.2M  1 loop /snap/gnome-3-28-1804/116
loop5         7:5    0   956K  1 loop /snap/gnome-logs/81
loop6         7:6    0  14.8M  1 loop /snap/gnome-characters/399
loop7         7:7    0   3.7M  1 loop /snap/gnome-system-monitor/51
loop8         7:8    0  44.9M  1 loop /snap/gtk-common-themes/1440
loop9         7:9    0  34.7M  1 loop /snap/gtk-common-themes/319
loop10        7:10   0 140.7M  1 loop /snap/gnome-3-26-1604/98
loop11        7:11   0   3.7M  1 loop /snap/gnome-system-monitor/127
loop12        7:12   0  14.5M  1 loop /snap/gnome-logs/37
loop13        7:13   0    13M  1 loop /snap/gnome-characters/103
loop14        7:14   0   2.3M  1 loop /snap/gnome-calculator/180
loop15        7:15   0  89.1M  1 loop /snap/core/8268
sda           8:0    0 931.5G  0 disk
├─sda1        8:1    0 372.5G  0 part /home
├─sda2        8:2    0     1K  0 part
├─sda3        8:3    0  1023K  0 part
├─sda4        8:4    0     2G  0 part /home/kaushlendra/pan/partition
├─sda5        8:5    0  93.1G  0 part /opt
└─sda6        8:6    0  59.6G  0 part [SWAP]
nvme0n1     259:0    0 238.5G  0 disk
└─nvme0n1p1 259:1    0 238.5G  0 part /
kaushlendra@kaushlendra:pan $
```

Ques 7. Difference between LVM and RAID.

Ans 7.

Difference between RAID and LVM

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 that can be anipulated 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.

Ques 8. Create a LVM

Ans 8. Creating Partition

```
kaushlendra@kaushlendra:~ $ sudo fdisk /dev/sda
[sudo] password for kaushlendra:

Welcome to fdisk (util-linux 2.31.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.


Command (m for help): p
Disk /dev/sda: 931.5 GiB, 1000204886016 bytes, 1953525168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disklabel type: dos
Disk identifier: 0x10975869

Device     Boot     Start        End   Sectors   Size Id Type
/dev/sda1            2048  781250559 781248512 372.5G 83 Linux
/dev/sda2       781252606 1101561855 320309250 152.8G  5 Extended
/dev/sda5       781252608  976562175 195309568  93.1G 83 Linux
/dev/sda6       976564224 1101561855 124997632  59.6G 82 Linux swap / Solaris
```

PV CREATION

```
kaushlendra@kaushlendra:~ $ pvcreate /dev/sda4
  WARNING: Running as a non-root user. Functionality may be unavailable.
  /run/lvm/lvmetad.socket: access failed: Permission denied
  WARNING: Failed to connect to lvmetad. Falling back to device scanning.
  /run/lock/lvm/P_orphans:aux: open failed: Permission denied
  Can't get lock for orphan PVs.
kaushlendra@kaushlendra:~ $ sudo pvcreate /dev/sda4
  Physical volume "/dev/sda4" successfully created.
kaushlendra@kaushlendra:~ $ sudo pvdisplay
  "/dev/sda4" is a new physical volume of "2.00 GiB"
  --- NEW Physical volume ---
  PV Name               /dev/sda4
  VG Name
  PV Size               2.00 GiB
  Allocatable           NO
  PE Size               0
  Total PE              0
  Free PE               0
  Allocated PE          0
  PV UUID               sQnc5f-6Adp-zugP-39p8-02G5-zwn3-NF4rgT
```

VG AND LV CREATION

```
kaushlendra@kaushlendra:~ $ sudo vgcreate vol_grp1 /dev/sda4
  Volume group "vol_grp1" successfully created
kaushlendra@kaushlendra:~ $ sudo lvcreate -l 20 -n logical_val1 vol_grp1
  Logical volume "logical_val1" created.
kaushlendra@kaushlendra:~ $ sudo lvm display
  No such command.  Try 'lvm help'.
kaushlendra@kaushlendra:~ $ sudo lvmdisplay
sudo: lvmdisplay: command not found
kaushlendra@kaushlendra:~ $ sudo lvdisplay
  --- Logical volume ---
  LV Path                /dev/vol_grp1/logical_val1
  LV Name                logical_val1
  VG Name                vol_grp1
  LV UUID                zUCCfg-HghM-Wjif-44IQ-0PVP-d8Fo-qq05W1
  LV Write Access        read/write
  LV Creation host, time kaushlendra, 2020-02-12 12:09:43 +0530
  LV Status              available
  # open                 0
  LV Size                80.00 MiB
  Current LE             20
  Segments               1
  Allocation             inherit
  Read ahead sectors     auto
  - currently set to     256
  Block device           253:0

kaushlendra@kaushlendra:~ $
```

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

Ans 10.

```
kaushlendra@kaushlendra:~ $ sudo fallocate -l 500M /swapfile
kaushlendra@kaushlendra:~ $ sudo mkswap /swapfile
mkswap: /swapfile: insecure permissions 0644, 0600 suggested.
Setting up swapspace version 1, size = 500 MiB (524283904 bytes)
no label, UUID=8df1df7e-9812-4b2b-a755-cc09552429a8
kaushlendra@kaushlendra:~ $ sudo chmod 600 /swapfile
kaushlendra@kaushlendra:~ $ sudo mkswap /swapfile
mkswap: /swapfile: warning: wiping old swap signature.
Setting up swapspace version 1, size = 500 MiB (524283904 bytes)
no label, UUID=3ad88cce-d33c-4e40-9bc6-90ba26335da8
kaushlendra@kaushlendra:~ $ sudo swapon /swapfile
kaushlendra@kaushlendra:~ $ sudo swapon -s
Filename                                Type            Size    Used    Priority
/dev/sda6                               partition       62498812        0       -2
/swapfile                               file            511996  0       -3
kaushlendra@kaushlendra:~ $
```

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

Ans 11.

setid

```
kaushlendra@kaushlendra:~ $ ls -l output.txt
-rw-r--r-- 1 kaushlendra kaushlendra 32 Feb 11 23:30 output.txt
kaushlendra@kaushlendra:~ $ sudo chmod u+s output.txt
kaushlendra@kaushlendra:~ $ ls -l output.txt
-rwSr--r-- 1 kaushlendra kaushlendra 32 Feb 11 23:30 output.txt
kaushlendra@kaushlendra:~ $
```

setgid

```
kaushlendra@kaushlendra:~ $ ls -ld pan
drwxr-xr-t 2 kaushlendra kaushlendra 4096 Feb 11 23:22 pan
kaushlendra@kaushlendra:~ $ sudo chmod g+s pan
kaushlendra@kaushlendra:~ $ ls -ld pan
drwxr-sr-t 2 kaushlendra kaushlendra 4096 Feb 11 23:22 pan
kaushlendra@kaushlendra:~ $
```

Ques 12. What is the use of Sticky bit.

Ans 12. 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 fil**e.**

```
kaushlendra@kaushlendra:~ $ ls -ld  pan
drwxr-xr-x 2 kaushlendra kaushlendra 4096 Feb 11 20:46 pan
kaushlendra@kaushlendra:~ $ sudo chmod o+t / pan
kaushlendra@kaushlendra:~ $ ls -ld  pan
drwxr-xr-t 2 kaushlendra kaushlendra 4096 Feb 11 20:46 pan
kaushlendra@kaushlendra:~ $
```

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

Ans 13.

```
kaushlendra@kaushlendra:~ $ sudo adduser sam
Adding user `sam' ...
Adding new group `sam' (1002) ...
Adding new user `sam' (1002) with group `sam' ...
The home directory `/home/sam' already exists.  Not copying from `/etc/skel'.
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for sam
Enter the new value, or press ENTER for the default
        Full Name []: sam
        Room Number []: sam
        Work Phone []: sam
        Home Phone []: sam
        Other []: sam
Is the information correct? [Y/n] y
kaushlendra@kaushlendra:~ $ sudo addgroup linux
Adding group `linux' (GID 1004) ...
Done.
kaushlendra@kaushlendra:~ $ sudo usermod -a -G linux sam
kaushlendra@kaushlendra:~ $ groups sam
sam : sam linux
kaushlendra@kaushlendra:~ $
```

Ques 14. Lock this user.

Ans 14.

```
kaushlendra@kaushlendra:~ $ sudo usermod -L sam
kaushlendra@kaushlendra:~ $ sudo passwd  --status sam
sam L 02/11/2020 0 99999 7 -1
kaushlendra@kaushlendra:~ $
```

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

Ans 15.

```
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
%sam    ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "#include" directives:

#includedir /etc/sudoers.d
```

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

Ans 16.

```
kaushlendra@kaushlendra:~ $ sudo deluser --remove-home --backup-to /home/kaushlendra/pan sam
[sudo] password for kaushlendra:
Looking for files to backup/remove ...
Backing up files to be removed to /home/kaushlendra/pan ...
backup_name = /home/kaushlendra/pan/sam.tar
/bin/tar: Removing leading `/' from member names
Removing files ...
Removing user `sam' ...
Warning: group `sam' has no more members.
Done.
kaushlendra@kaushlendra:~ $
```

Ques 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 17.

```
kaushlendra@kaushlendra:~ $ echo " convert lowercase to uppercase" >new.txt
kaushlendra@kaushlendra:~ $ tr '[a-z]' '[A-Z]' <new.txt | tee >output.txt
kaushlendra@kaushlendra:~ $ cat new.txt
 convert lowercase to uppercase
kaushlendra@kaushlendra:~ $ cat output.txt
 CONVERT LOWERCASE TO UPPERCASE
kaushlendra@kaushlendra:~ $
```

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

Ans 18. Nice value is a value that increment and decrements the priority of process. The nice value is come from nice () system calls. To calculate the nice value of a process use this equation.

```
kaushlendra@kaushlendra:~ $ nice -1 ping localhost
PING localhost (127.0.0.1) 56(84) bytes of data.
64 bytes from localhost (127.0.0.1): icmp_seq=1 ttl=64 time=0.072 ms
64 bytes from localhost (127.0.0.1): icmp_seq=2 ttl=64 time=0.101 ms
64 bytes from localhost (127.0.0.1): icmp_seq=3 ttl=64 time=0.104 ms
64 bytes from localhost (127.0.0.1): icmp_seq=4 ttl=64 time=0.093 ms
64 bytes from localhost (127.0.0.1): icmp_seq=5 ttl=64 time=0.092 ms
```

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

Ans 19.

```
kaushlendra@kaushlendra:~ $ 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
kaushlendra@kaushlendra:~ $
```

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

Ans 20.

```
kaushlendra@kaushlendra:~ $ telnet 10.1.211.108 22
Trying 10.1.211.108...
Connected to 10.1.211.108.
Escape character is '^]'.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4ubuntu0.3
```

```
Connection closed by foreign host.
kaushlendra@kaushlendra:~ $ sudo netstat -plnt | grep 22
[sudo] password for kaushlendra:
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      1044/sshd
tcp6       0      0 :::22                   :::*                    LISTEN      1044/sshd
kaushlendra@kaushlendra:~ $
```

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

Ans 21.

```
kaushlendra@kaushlendra:~ $ crontab -e
no crontab for kaushlendra - using an empty one
crontab: installing new crontab
kaushlendra@kaushlendra:~ $ 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
45 23 * * 0 echo "hii"
kaushlendra@kaushlendra:~ $
```

Ques 22. Difference between dig and traceroute

Ans 22.

Traceroute - The trace should have the last hop at a HostGator server.
Dig - The Dig will be listed under *Answer Records*, showing the information from the DNS zones. This information is much more advanced.

Traceroute.

```
kaushlendra@kaushlendra:~ $ traceroute www.google.com
traceroute to www.google.com (172.217.166.196), 30 hops max, 60 byte packets
 1  _gateway (192.168.0.1)  118.648 ms  118.597 ms  118.540 ms
 2  103.55.88.6.rev.ultranet.co.in (103.55.88.6)  122.195 ms  122.174 ms  122.143 ms
 3  * * *
 4  72.14.208.49 (72.14.208.49)  30.510 ms  30.520 ms  32.630 ms
 5  * * *
 6  72.14.233.216 (72.14.233.216)  36.351 ms 72.14.235.108 (72.14.235.108)  12.628 ms 209.85.251.230 (209.85.251.230)  5.838 ms
 7  74.125.244.197 (74.125.244.197)  3.678 ms 66.249.95.149 (66.249.95.149)  6.595 ms 66.249.95.75 (66.249.95.75)  10.441 ms
 8  del03s13-in-f4.1e100.net (172.217.166.196)  10.054 ms  3.465 ms  3.540 ms
kaushlendra@kaushlendra:~ $
```

DIG

```
kaushlendra@kaushlendra:~ $ 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: 38803
;; 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.         239     IN      A       172.217.166.196

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Feb 11 23:58:25 IST 2020
;; MSG SIZE  rcvd: 59

kaushlendra@kaushlendra:~ $
```