1. list all available disks and partitions ?

```
[moe404@localhost ~]$ lsblk
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda      8:0    0    20G  0 disk
├─sda1   8:1    0     1G  0 part /boot
└─sda2   8:2    0    19G  0 part
  ├─cs-root
  │      253:0    0    17G  0 lvm  /
  └─cs-swap
         253:1    0     2G  0 lvm  [SWAP]
sdb      8:16   0     5G  0 disk
sr0     11:0    1 158.4M  0 rom  /run/media/moe404/CDROM
sr1     11:1    1  10.9G  0 rom  /run/media/moe404/CentOS-Stream-9-BaseOS-x86_64
[moe404@localhost ~]$ fdisk -l
fdisk: cannot open /dev/sda: Permission denied
fdisk: cannot open /dev/sdb: Permission denied
fdisk: cannot open /dev/mapper/cs-root: Permission denied
fdisk: cannot open /dev/mapper/cs-swap: Permission denied
```

2. create a new GPT partition table on /dev/sdb?

```
[moe404@localhost ~]$ sudo parted /dev/sdb mklabel gpt
Warning: The existing disk label on /dev/sdb will be destroyed and all data on this disk will be lost. Do you want to continue?
Yes/No? y
Information: You may need to update /etc/fstab.
```

3. create a 3 partitions on /dev/sdb?

```
[moe404@localhost ~]$ sudo parted /dev/sdb mkpart primary ext4 500MiB 1GiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ sudo parted /dev/sdb mkpart primary ext4 1GiB 2GiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda           8:0    0    20G  0 disk
├─sda1        8:1    0     1G  0 part /boot
└─sda2        8:2    0    19G  0 part
  ├─cs-root 253:0    0    17G  0 lvm  /
  └─cs-swap 253:1    0     2G  0 lvm  [SWAP]
sdb           8:16   0     5G  0 disk
├─sdb1        8:17   0   499M  0 part
├─sdb2        8:18   0   524M  0 part
└─sdb3        8:19   0     1G  0 part
```

4. remove a partition 2 and 3 ?

```
[moe404@localhost ~]$ sudo parted /dev/sdb rm 2
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ sudo parted /dev/sdb rm 3
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ lsblk
NAME        MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda           8:0    0    20G  0 disk
├─sda1        8:1    0     1G  0 part /boot
└─sda2        8:2    0    19G  0 part
  ├─cs-root 253:0    0    17G  0 lvm  /
  └─cs-swap 253:1    0     2G  0 lvm  [SWAP]
sdb           8:16   0     5G  0 disk
└─sdb1        8:17   0   499M  0 part
```

5. check the partition table type of a disk?

```
[moe404@localhost ~]$ sudo parted /dev/sdb print
Model: VMware, VMware Virtual S (scsi)
Disk /dev/sdb: 5369MB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End    Size   File system  Name     Flags
 1      1049kB  524MB  523MB               primary
```

6. format a new partition with ext4 and mount it?

```
[moe404@localhost ~]$ sudo mkfs.ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
/dev/sdb1 contains a ext4 file system
        created on Sat Mar 29 16:46:10 2025
Proceed anyway? (y,N) y
Creating filesystem with 510976 1k blocks and 127512 inodes
Filesystem UUID: 39e47502-6a7a-4a8f-8957-57b7844e51a4
Superblock backups stored on blocks:
        8193, 24577, 40961, 57345, 73729, 204801, 221185, 401409

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

[moe404@localhost ~]$ sudo mkdir /mnt/mydisk
[moe404@localhost ~]$ sudo mount /dev/sdb1 /mnt/mydisk
```

7. convert an GPT disk to MBR ?

```
[moe404@localhost ~]$ sudo parted /dev/sdb mklabel msdos
Warning: Partition(s) on /dev/sdb are being used.
Ignore/Cancel? i
Warning: The existing disk label on /dev/sdb will be destroyed and all data on this disk will be lost. Do you want to continue?
Yes/No? yes
Error: Partition(s) 1 on /dev/sdb have been written, but we have been unable to inform the kernel of the change, probably because
it/they are in use.  As a result, the old partition(s) will remain in use.  You should reboot now before making further changes.
Ignore/Cancel? i
Information: You may need to update /etc/fstab.
```

```
[moe404@localhost ~]$ sudo parted /dev/sdb print
[sudo] password for moe404:
Model: VMware, VMware Virtual S (scsi)
Disk /dev/sdb: 5369MB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:
```

8. create a 3 Primary partitions and 1 Extended on /dev/sdb?

```
[moe404@localhost ~]$ sudo parted /dev/sdb mkpart primary ext4 1MiB 500MiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ sudo parted /dev/sdb mkpart primary ext4 500MiB 1GiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ sudo parted /dev/sdb mkpart primary ext4 1GiB 2GiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$ sudo parted /dev/sdb mkpart extended 2GiB 3GiB
Information: You may need to update /etc/fstab.

[moe404@localhost ~]$
```

9. create a physical volume (PV) on a newly added virtual disks?

```
[moe404@localhost ~]$ sudo pvcreate /dev/sdc
[sudo] password for moe404:
  Physical volume "/dev/sdc" successfully created.
[moe404@localhost ~]$
```

10.create a volume group (VG) using multiple physical volumes?

```
[moe404@localhost ~]$ sudo vgcreate my_vg /dev/sdc /dev/sdd
[sudo] password for moe404:
  Physical volume "/dev/sdd" successfully created.
  Volume group "my_vg" successfully created
[moe404@localhost ~]$
```

11.create a logical volume (LV) of a specific size?

```
[moe404@localhost ~]$ sudo lvcreate -L 500M -n my_lv my_vg
  Logical volume "my_lv" created.
[moe404@localhost ~]$
```

12.check the available free space in a volume group?

```
[moe404@localhost ~]$ sudo vgdisplay my_vg
  --- Volume group ---
  VG Name               my_vg
  System ID
  Format                lvm2
  Metadata Areas        2
  Metadata Sequence No  2
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                1
  Open LV               0
  Max PV                0
  Cur PV                2
  Act PV                2
  VG Size               9.99 GiB
  PE Size               4.00 MiB
  Total PE              2558
  Alloc PE / Size       125 / 500.00 MiB
  Free  PE / Size       2433 / 9.50 GiB
  VG UUID               RLZ9kB-07CB-apji-gcON-WMs9-fjPb-1R0P42
```

13.format and mount a logical volume in Linux?

```
[moe404@localhost ~]$ sudo mkfs.ext4 /dev/my_vg/my_lv
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 512000 1k blocks and 128016 inodes
Filesystem UUID: 95bda080-94a5-4640-9ecd-1ef445f29ecb
Superblock backups stored on blocks:
        8193, 24577, 40961, 57345, 73729, 204801, 221185, 401409

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

[moe404@localhost ~]$ mkdir /mnt/my_lv
mkdir: cannot create directory ‘/mnt/my_lv’: Permission denied
[moe404@localhost ~]$ sudo mkdir /mnt/my_lv
[moe404@localhost ~]$ sudo mount /dev/my_vg/my_lv /mnt/my_lv
```

14.added a new 1GB virtual disk to your VM. How do you add it to LVM storage?

```
[moe404@localhost ~]$ sudo fdisk /dev/sde
[sudo] password for moe404:

Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x971cc8ba.

Command (m for help): p
Disk /dev/sde: 1 GiB, 1073741824 bytes, 2097152 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x971cc8ba

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

```
[moe404@localhost ~]$ sudo pvcreate /dev/sde
WARNING: dos signature detected on /dev/sde at offset 510. Wipe it? [y/n]: y
  Wiping dos signature on /dev/sde.
  Physical volume "/dev/sde" successfully created.
[moe404@localhost ~]$ vgextend my_vg /dev/sde
  WARNING: Running as a non-root user. Functionality may be unavailable.
  /run/lock/lvm/P_global:aux: open failed: Permission denied
[moe404@localhost ~]$ sudo vgextend my_vg /dev/sde
  Volume group "my_vg" successfully extended
```

15.Your application requires more storage. How do you extend an existing logical volume by 500MB?

```
[moe404@localhost ~]$ sudo lvextend -L +500M /dev/my_vg/my_lv
  Size of logical volume my_vg/my_lv changed from 500.00 MiB (125 extents) to 10
00.00 MiB (250 extents).
  Logical volume my_vg/my_lv successfully resized.
[moe404@localhost ~]$ sudo resize2fs /dev/my_vg/my_lv
resize2fs 1.46.5 (30-Dec-2021)
Please run 'e2fsck -f /dev/my_vg/my_lv' first.

[moe404@localhost ~]$ sudo e2fsck -f /dev/my_vg/my_lv
e2fsck 1.46.5 (30-Dec-2021)
/dev/my_vg/my_lv: recovering journal
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/my_vg/my_lv: 11/128016 files (0.0% non-contiguous), 42686/512000 blocks
[moe404@localhost ~]$ sudo resize2fs /dev/my_vg/my_lv
resize2fs 1.46.5 (30-Dec-2021)
Resizing the filesystem on /dev/my_vg/my_lv to 1024000 (1k) blocks.
The filesystem on /dev/my_vg/my_lv is now 1024000 (1k) blocks long.
```

16.Reduce an existing logical volume by 200MB?

```
[moe404@localhost ~]$ sudo umount /dev/my_vg/my_lv
umount: /dev/my_vg/my_lv: not mounted.
[moe404@localhost ~]$ sudo resize2fs /dev/my_vg/my_lv 800M
resize2fs 1.46.5 (30-Dec-2021)
Resizing the filesystem on /dev/my_vg/my_lv to 819200 (1k) blocks.
The filesystem on /dev/my_vg/my_lv is now 819200 (1k) blocks long.

[moe404@localhost ~]$ sudo lvreduce -L -200M /dev/my_vg/my_lv
  File system ext4 found on my_vg/my_lv.
  File system size (800.00 MiB) is equal to the requested size (800.00 MiB).
  File system reduce is not needed, skipping.
  Size of logical volume my_vg/my_lv changed from 1000.00 MiB (250 extents) to 8
00.00 MiB (200 extents).
  Logical volume my_vg/my_lv successfully resized.
[moe404@localhost ~]$ sudo mount /dev/my_vg/my_lv /mnt/my_lv
[moe404@localhost ~]$
```

17.remove a logical volume safely?

```
[moe404@localhost ~]$ sudo umount /dev/my_vg/my_lv
[moe404@localhost ~]$ sudo lvremove /dev/my_vg/my_lv
Do you really want to remove active logical volume my_vg/my_lv? [y/n]: y
  Logical volume "my_lv" successfully removed.
```

18.remove a volume group?

```
[moe404@localhost ~]$ sudo vgremove my_vg
  Volume group "my_vg" successfully removed
[moe404@localhost ~]$
```