## 1. Display the current time and date

```
[root@22P31A0538 ~]# date
Wednesday 11 October 2023 10:34:21 AM IST
[root@22P31A0538 ~]# time

real    0m0.000s
user    0m0.000s
sys     0m0.000s
[root@22P31A0538 ~]#
```

## 2. Use the wc command and bash shortcuts to display the size of /etc/passwd

```
[root@22P31A0538 ~]# wc /etc/passwd
  37    90 2108 /etc/passwd
[root@22P31A0538 ~]# wc -w /etc/passwd
90 /etc/passwd
[root@22P31A0538 ~]#
```

## 3. 3. Display the first 10 lines of /etc/passwd

```
[root@22P31A0538 ~]# head -n10 /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
[root@22P31A0538 ~]#
```

## 4. Display the last 10 lines at the bottom of the /etc/passwd

```
[root@22P31A0538 ~]# tail -n10 /etc/passwd
pipewire:x:984:984:PipeWire System Daemon:/var/run/pipewire:/sbin/nologin
flatpak:x:983:983:User for flatpak system helper:/:/sbin/nologin
clevis:x:982:982:Clevis Decryption Framework unprivileged user:/var/cache/clevis
:/usr/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:981:980::/run/gnome-initial-setup/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/sbin/nologin
chrony:x:980:979:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:979:978:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
tcpdump:x:72:72::/:/sbin/nologin
madhurya:x:1000:1000:Madhurya:/home/madhurya:/bin/bash
[root@22P31A0538 ~]#
```

**5. Repeat the previous command, but use the -n 20 option to display the last 20 lines in the file**

```
[root@22P31A0538 ~]# tail -n20 /etc/passwd
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
libstoragemgmt:x:992:992:daemon account for libstoragemgmt:/:/usr/sbin/nologin
systemd-oom:x:991:991:systemd Userspace OOM Killer:/:/usr/sbin/nologin
geoclue:x:990:990:User for geoclue:/var/lib/geoclue:/sbin/nologin
tss:x:59:59:Account used for TPM access:/:/sbin/nologin
cockpit-ws:x:989:989:User for cockpit web service:/nonexisting:/sbin/nologin
cockpit-wsinstance:x:988:988:User for cockpit-ws instances:/nonexisting:/sbin/no
login
colord:x:987:987:User for colord:/var/lib/colord:/sbin/nologin
sssd:x:986:986:User for sssd:/:/sbin/nologin
setroubleshoot:x:985:985:SELinux troubleshoot server:/var/lib/setroubleshoot:/us
r/sbin/nologin
pipewire:x:984:984:PipeWire System Daemon:/var/run/pipewire:/sbin/nologin
flatpak:x:983:983:User for flatpak system helper:/:/sbin/nologin
clevis:x:982:982:Clevis Decryption Framework unprivileged user:/var/cache/clevis
:/usr/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:981:980::/run/gnome-initial-setup/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/sbin/nologin
chrony:x:980:979:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:979:978:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
```

**6. Create the following users, groups and group memberships:**

a. Create a group named admin.

```
[root@22P31A0538 ~]# groupadd admin
[root@22P31A0538 ~]# tail -n1 /etc/group
admin:x:1002:
[root@22P31A0538 ~]#
```

b. Create a user Krish who belongs to admin as a secondary group.

```
[root@22P31A0538 ~]# useradd -G admin krish
[root@22P31A0538 ~]# tail -n2 /etc/passwd
Pikachu:x:1326:1001::/home/Pikachu:/bin/bash
krish:x:1327:1327::/home/krish:/bin/bash
[root@22P31A0538 ~]# tail /etc/group
gnome-initial-setup:x:980:
sshd:x:74:
chrony:x:979:
slocate:x:21:
dnsmasq:x:978:
tcpdump:x:72:
madhurya:x:1000:
Pikachu:x:1001:
admin:x:1002:krish
krish:x:1327:
[root@22P31A0538 ~]#
```

c. Create a user Veeru who does not have access to an interactive shell on the system and who is not member of admin.

```
[root@22P31A0538 ~]# useradd Veeru -s /sbin/nologin
[root@22P31A0538 ~]# tail /etc/passwd
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:981:980::/run/gnome-initial-setup/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/sbin/nologin
chrony:x:980:979:chrony system user:/var/lib/chrony:/sbin/nologin
dnsmasq:x:979:978:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
tcpdump:x:72:72::/:/sbin/nologin
madhurya:x:1000:1000:Madhurya:/home/madhurya:/bin/bash
Pikachu:x:1326:1001::/home/Pikachu:/bin/bash
krish:x:1327:1327::/home/krish:/bin/bash
Veeru:x:1328:1328::/home/Veeru:/sbin/nologin
[root@22P31A0538 ~]#
```

d. The users Krish and Veeru should all have password of password.

```
[root@22P31A0538 ~]# passwd krish
Changing password for user krish.
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: all authentication tokens updated successfully.
[root@22P31A0538 ~]#
```

**7. Log into your Krish account**

In Krish Home Directory a. create six files with names of the form songX.mp3.

```
[root@22P31A0538 ~]# mkdir krish
[root@22P31A0538 ~]# cd krish
[root@22P31A0538 krish]# pwd
/root/krish
[root@22P31A0538 krish]# touch song{1..6}.mp3
[root@22P31A0538 krish]# ls
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
[root@22P31A0538 krish]#
```

b. Create six files with names of the form snapX.jpg.

```
[root@22P31A0538 krish]# touch snap{1..6}.jpg
[root@22P31A0538 krish]# ls
snap1.jpg  snap3.jpg  snap5.jpg  song1.mp3  song3.mp3  song5.mp3
snap2.jpg  snap4.jpg  snap6.jpg  song2.mp3  song4.mp3  song6.mp3
[root@22P31A0538 krish]#
```

c. From your home directory (Krish Home Dir), move the song files into your Music subdirectory, the snapshot files into your Pictures subdirectory

moving the song files into Music subdirectory

```
[root@22P31A0538 krish]# mkdir Music
[root@22P31A0538 krish]# mv song{1..6}.mp3 Music
[root@22P31A0538 krish]# ls
Music  snap1.jpg  snap2.jpg  snap3.jpg  snap4.jpg  snap5.jpg  snap6.jpg
[root@22P31A0538 krish]# cd Music
[root@22P31A0538 Music]# ls
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
```

moving the snap files into Pictures subdirectory

```
[root@22P31A0538 krish]# mkdir PICTURES
[root@22P31A0538 krish]# mv snap{1..6}.jpg PICTURES
[root@22P31A0538 krish]# ls
Music  PICTURES
[root@22P31A0538 krish]# cd PICTURES
[root@22P31A0538 PICTURES]# ls
snap1.jpg  snap2.jpg  snap3.jpg  snap4.jpg  snap5.jpg  snap6.jpg
[root@22P31A0538 PICTURES]#
```

**10. Partitions and Disks**

a. Add one hard disk of type SATA of size 5GB to your VM.

   1.Adding hard disk :

In the partitions concept, that we first create the hard disk with the required hard disk and the GB

And then checking whether the hard disk is created or not   with an  lsblk command and then

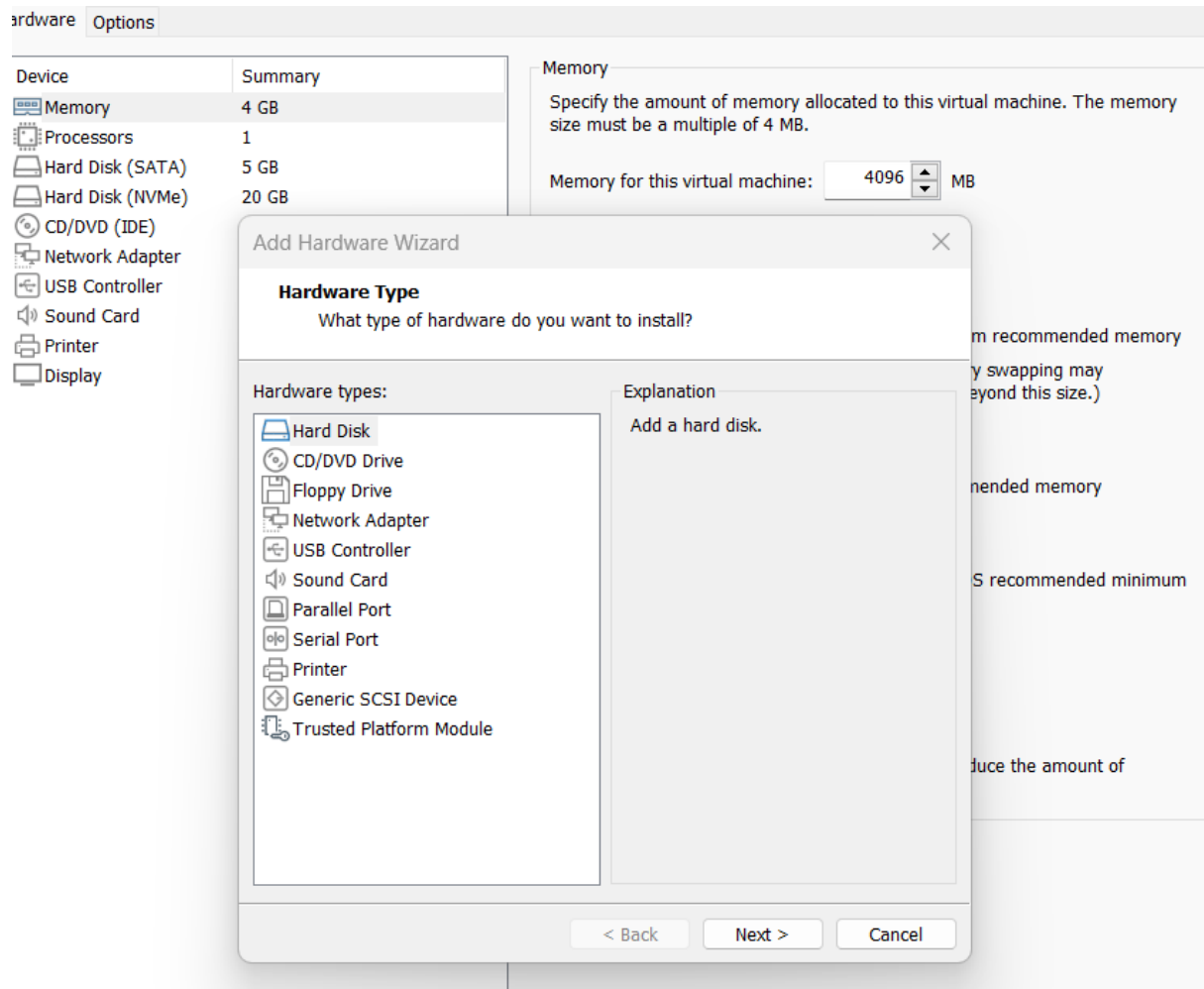Creating an partition of the hard disk with the required GB the save it into the folder where we want

Store the partition of the hard disk and then finish the creation of the partition .

Next, check the partition with the command blkid whether it was created or not

After checking creating an type of the file system with the types like ex:xfs,ext4 …etc.

Mounting the partition :

                    Creating one required directory and the mounting that directory into the partition with the command called mount /dev/partition(sda1) /mnt/directory that we created

ardware Options

| Device | Summary |
|---|---|
| Memory | 4 GB |
| Processors | 1 |
| Hard Disk (SATA) | 5 GB |
| Hard Disk (NVMe) | 20 GB |
| CD/DVD (IDE) | |
| Network Adapter | |
| USB Controller | |
| Sound Card | |
| Printer | |
| Display | |

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine:    4096 ⯅⯆  MB

m recommended memory

y swapping may

eyond this size.)

nended memory

S recommended minimum

duce the amount of

**Add Hardware Wizard**                                                                    ✕

**Hardware Type**

What type of hardware do you want to install?

Hardware types:

- Hard Disk
- CD/DVD Drive
- Floppy Drive
- Network Adapter
- USB Controller
- Sound Card
- Parallel Port
- Serial Port
- Printer
- Generic SCSI Device
- Trusted Platform Module

Explanation

Add a hard disk.

< Back     Next >     Cancel

Add Hardware Wizard                                              ✕

**Select a Disk Type**
   What kind of disk do you want to create?

Virtual disk type
   ○ IDE
   ○ SCSI      (Recommended)
   ● SATA
   ○ NVMe

   🖳  IDE disks can be added only while the VM is powered off.
   🖳  NVMe disks can be added only while the VM is powered off.


                              < Back        Next >        Cancel


Adding Sata and storing that hard disk with the 5.0GB:


Add Hardware Wizard                                              ✕

   **Specify Disk Capacity**
      How large do you want this disk to be?


Maximum disk size (GB):          5.0  ▲▼

Recommended size for CentOS 8 64-bit: 20 GB


☐ Allocate all disk space now.

   Allocating the full capacity can enhance performance but requires all of the
   physical disk space to be available right now. If you do not allocate all the space
   now, the virtual disk starts small and grows as you add data to it.


● Store virtual disk as a single file
○ Split virtual disk into multiple files

   Splitting the disk makes it easier to move the virtual machine to another computer
   but may reduce performance with very large disks.


                              < Back        Next >        Cancel

Creating an sdb hard disk with the 5.0GB

```
[root@22P31A0538 ~]# lsblk
NAME         MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdb            8:16   0    5G  0 disk
sr0           11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
4
nvme0n1      259:0    0   20G  0 disk
└─nvme0n1p1
             259:1    0    1G  0 part /boot
└─nvme0n1p2
             259:2    0   19G  0 part
  ├─cs-root
             253:0    0   17G  0 lvm  /
  └─cs-swap
             253:1    0    2G  0 lvm  [SWAP]
[root@22P31A0538 ~]#
```

Making an partition(sdb1) 3GB

```
[root@22P31A0538 ~]# lsblk
NAME         MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdb            8:16   0    5G  0 disk
└─sdb1         8:17   0  2.8G  0 part
sr0           11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
4
nvme0n1      259:0    0   20G  0 disk
└─nvme0n1p1
             259:1    0    1G  0 part /boot
└─nvme0n1p2
             259:2    0   19G  0 part
  ├─cs-root
             253:0    0   17G  0 lvm  /
  └─cs-swap
             253:1    0    2G  0 lvm  [SWAP]
```

File system is xfs

```
[root@22P31A0538 ~]# blkid
/dev/mapper/cs-swap: UUID="e346ccdd-afa2-4103-9a58-b6513c65cd25" TYPE="swap"
/dev/nvme0n1p1: UUID="b8ab44a2-f049-4b8e-83f8-67b2b28fca8c" TYPE="xfs" PARTUUID=
"eb7d5f0d-01"
/dev/nvme0n1p2: UUID="isZeGe-HzH5-B9wn-H4UQ-dex5-HxH4-vaoLmT" TYPE="LVM2_member"
 PARTUUID="eb7d5f0d-02"
/dev/sr0: UUID="2023-08-21-03-56-39-00" LABEL="CentOS-Stream-9-BaseOS-x86_64" TY
PE="iso9660" PTUUID="620e451a" PTTYPE="dos"
/dev/mapper/cs-root: UUID="73d99ece-6fdf-48f7-9596-e695b20af401" TYPE="xfs"
/dev/sdb1: PARTUUID="23441121-01"
[root@22P31A0538 ~]# mkfs -t xfs /dev/sdb1
meta-data=/dev/sdb1              isize=512    agcount=4, agsize=183104 blks
         =                       sectsz=512   attr=2, projid32bit=1
         =                       crc=1        finobt=1, sparse=1, rmapbt=0
         =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data     =                       bsize=4096   blocks=732416, imaxpct=25
         =                       sunit=0      swidth=0 blks
naming   =version 2              bsize=4096   ascii-ci=0, ftype=1
log      =internal log           bsize=4096   blocks=16384, version=2
         =                       sectsz=512   sunit=0 blks, lazy-count=1
realtime =none                   extsz=4096   blocks=0, rtextents=0
```

Mounting the partition with the thub

```
[root@22P31A0538 ~]# mkdir /mnt/thub
[root@22P31A0538 ~]# mount /dev/sdb1 /mnt/thub
mount: (hint) your fstab has been modified, but systemd still uses
       the old version; use 'systemctl daemon-reload' to reload.
[root@22P31A0538 ~]# vim /etc/fstab
```

```
#
# /etc/fstab
# Created by anaconda on Thu Aug 24 07:59:12 2023
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
/dev/mapper/cs-root     /                          xfs     defaults       0 0
UUID=b8ab44a2-f049-4b8e-83f8-67b2b28fca8c /boot                xfs     defaul
ts        0 0
/dev/mapper/cs-swap      none                      swap     defaults       0 0
/dev/sda1       swap      swap     defaults        0 0
/dev/sdb1       /mnt/thub       xfs     defaults       0 0
~
~
```

Final output with the partition and the mounting

```
[root@22P31A0538 ~]# vim /etc/fstab
[root@22P31A0538 ~]# mount -a
[root@22P31A0538 ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdb          8:16   0    5G  0 disk
└─sdb1       8:17   0  2.8G  0 part /mnt/thub
sr0         11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
4
nvme0n1    259:0    0   20G  0 disk
├─nvme0n1p1
           259:1    0    1G  0 part /boot
└─nvme0n1p2
           259:2    0   19G  0 part
  ├─cs-root
           253:0    0   17G  0 lvm  /
  └─cs-swap
           253:1    0    2G  0 lvm  [SWAP]
```

**11. Swap Space**

a) Add one more hard disk of type SATA of size 1Gb to your VM

 b) Create a swap partition of size 512Mb

c) Do permanent Mounting

creating an new hard disk sdc

```
[root@22P31A0538 ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdc           8:32   0    1G  0 disk
sr0          11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
4
nvme0n1     259:0    0   20G  0 disk
 ─nvme0n1p1
            259:1    0    1G  0 part /boot
 ─nvme0n1p2
            259:2    0   19G  0 part
  ─cs-root
            253:0    0   17G  0 lvm  /
  ─cs-swap
            253:1    0    2G  0 lvm  [SWAP]
[root@22P31A0538 ~]#
```

Creating an partition sdc1

In this swap method we have save before the partition as the we write the hexacode and then save the swap partition (note : the swap method is same as the partition method only)

```
[root@22P31A0538 ~]# fdisk /dev/sdc

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 0x767df305.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-2097151, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-2097151, default 2097151): +
512 Mb
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-2097151, default 2097151): +
512Mb

Created a new partition 1 of type 'Linux' and of size 488 MiB.
```

```
Command (m for help): t
Selected partition 1
Hex code or alias (type L to list all): L
```

```
Hex code or alias (type L to list all): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'.

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

[root@22P31A0538 ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdc           8:32   0    1G  0 disk
 └─sdc1        8:33   0  488M  0 part
sr0          11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
```

```
            253:1    0    2G   0 lvm  [SWAP]
[root@22P31A0538 ~]# blkid
/dev/mapper/cs-swap: UUID="e346ccdd-afa2-4103-9a58-b6513c65cd25" TYPE="swap"
/dev/nvme0n1p1: UUID="b8ab44a2-f049-4b8e-83f8-67b2b28fca8c" TYPE="xfs" PARTUUID=
"eb7d5f0d-01"
/dev/nvme0n1p2: UUID="isZeGe-HzH5-B9wn-H4UQ-dex5-HxH4-vaoLmT" TYPE="LVM2_member"
 PARTUUID="eb7d5f0d-02"
/dev/sr0: UUID="2023-08-21-03-56-39-00" LABEL="CentOS-Stream-9-BaseOS-x86_64" TY
PE="iso9660" PTUUID="620e451a" PTTYPE="dos"
/dev/mapper/cs-root: UUID="73d99ece-6fdf-48f7-9596-e695b20af401" TYPE="xfs"
/dev/sdc1: PARTUUID="767df305-01"
```

Making swap

```
[root@22P31A0538 ~]# mkswap /dev/sdc1
Setting up swapspace version 1, size = 488 MiB (511700992 bytes)
no label, UUID=afa75c16-d94c-4d85-831c-693c80ddb66a
[root@22P31A0538 ~]# vim /etc/fstab
```

Final output of the swap partition

```
[root@22P31A0538 ~]# vim /etc/fstab
[root@22P31A0538 ~]# swapon -a
[root@22P31A0538 ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sdc           8:32   0   1G  0 disk
└─sdc1        8:33   0 488M  0 part [SWAP]
sr0          11:0    1  9.1G  0 rom  /run/media/root/CentOS-Stream-9-BaseOS-x86_6
4
nvme0n1     259:0    0   20G  0 disk
├─nvme0n1p1
            259:1    0   1G  0 part /boot
└─nvme0n1p2
            259:2    0  19G  0 part
  ├─cs-root
            253:0    0  17G  0 lvm  /
  └─cs-swap
            253:1    0   2G  0 lvm  [SWAP]
[root@22P31A0538 ~]#
```

9. **Create a user account**

a. Create a new user with UID 1326 and user name as Pikachu

```
[root@22P31A0538 ~]# useradd Pikachu
[root@22P31A0538 ~]# usermod -u 1326 Pikachu
[root@22P31A0538 ~]# tail -n1 /etc/passwd
Pikachu:x:1326:1001::/home/Pikachu:/bin/bash
```

b. Set password as Thub@123

```
[root@22P31A0538 ~]# passwd Pikachu
Changing password for user Pikachu.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@22P31A0538 ~]#
```

**8.. Create a collaborative directory /common/admin with the following characteristics**

a) Group ownership of /common/admin is admin.

```
[root@22P31A0538 ~]# mkdir admin
[root@22P31A0538 ~]# ls
admin              Desktop     Downloads   Music      Public   Templates
anaconda-ks.cfg  Documents   krish       Pictures   ram      Videos
```

b) The directory should be readable, writable and accessible to members of admin, but not to any other user.

```
[root@22P31A0538 ~]# chmod 770 admin
[root@22P31A0538 ~]# ls -l
total 4
drwxrwx---.  2 root root     6 Oct 11 12:49 admin
-rw-------.  1 root root 1014 Aug 24 13:57 anaconda-ks.cfg
drwxr-xr-x.  2 root root     6 Oct 11 09:57 Desktop
drwxr-xr-x.  2 root root     6 Oct 11 09:57 Documents
```