Name : Angha Varangaonkar **TR : 1** **Assignment No : 3**

Question 1: Basic Understanding of Users in Linux

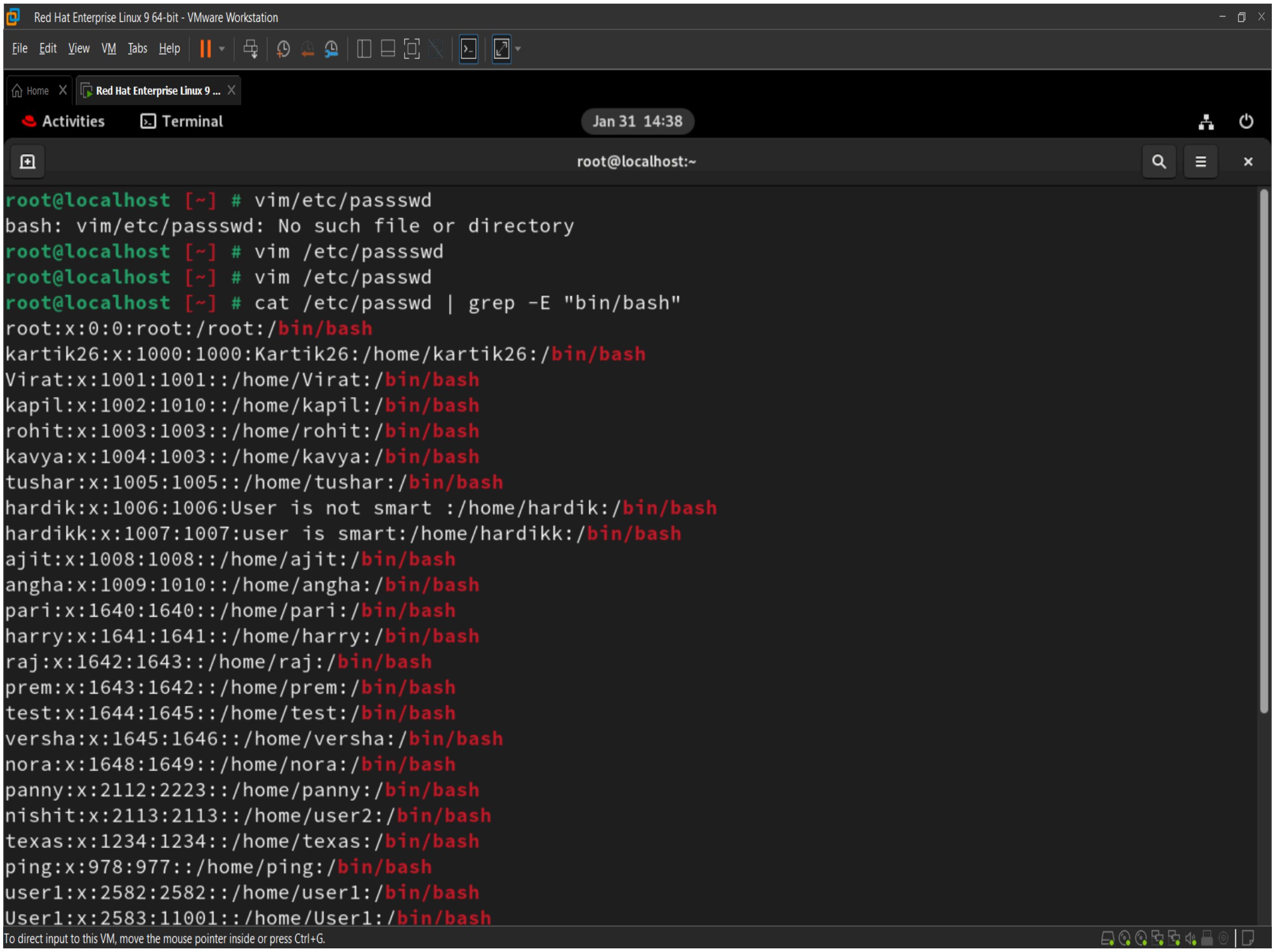
1: How many types of users exist in a Linux system? What is the UID range of it?

There are 3 type of users :

- Root User : The Most Powerful user which has access to perform all operations and UID is 0
- System User : They are Created for system processes and services like daemon etc. They have UID from (1 to 999)
- Normal User : They are the user created by administrators for human users to perform daily tasks. They have UID from (1000 and above)

2: Write a Linux command to check which users have access to the shell for executing commands

Command : cat /etc/passwd | grep -E "/bin/bash"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Activities
Terminal
Jan 31 14:38
root@localhost:~
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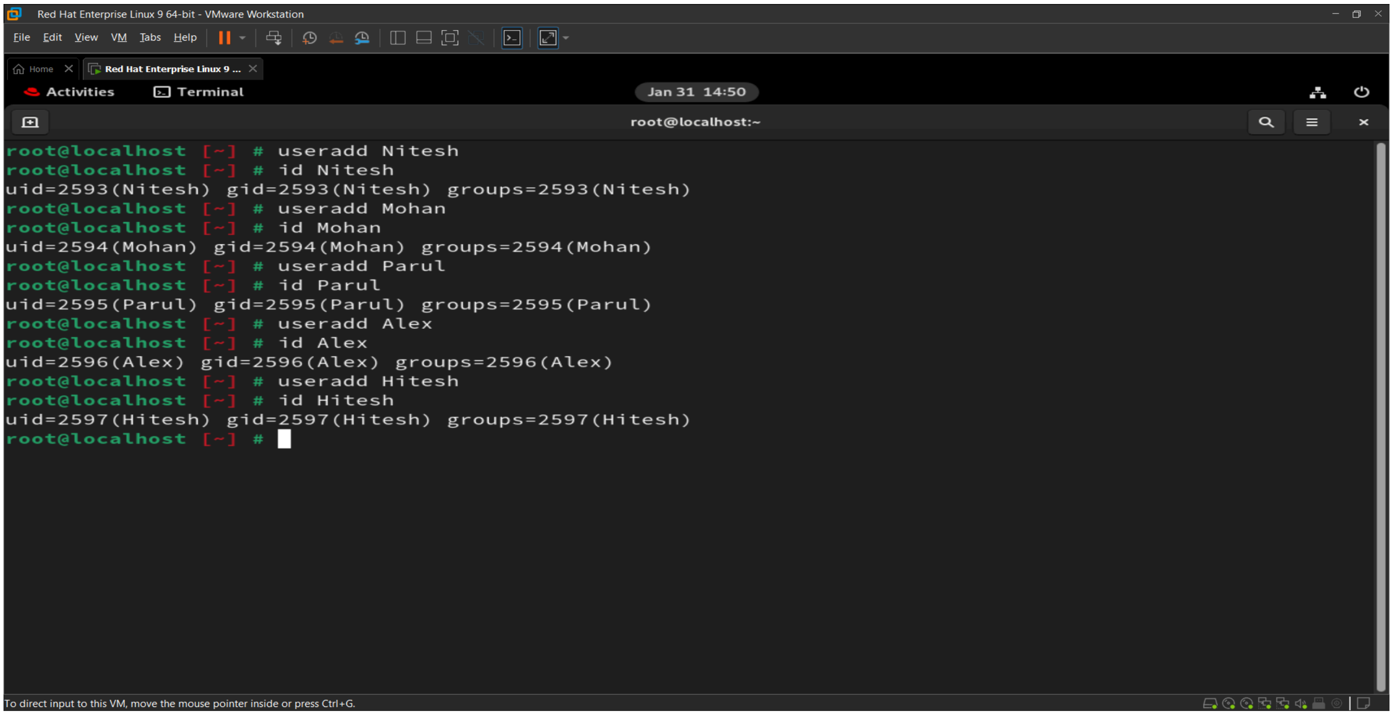
```
root@localhost [~] # vim/etc/passswd
bash: vim/etc/passswd: No such file or directory
root@localhost [~] # vim /etc/passswd
root@localhost [~] # vim /etc/passwd
root@localhost [~] # cat /etc/passwd | grep -E "bin/bash"
root:x:0:0:root:/root:/bin/bash
kartik26:x:1000:1000:Kartik26:/home/kartik26:/bin/bash
Virat:x:1001:1001::/home/Virat:/bin/bash
kapil:x:1002:1010::/home/kapil:/bin/bash
rohit:x:1003:1003::/home/rohit:/bin/bash
kavya:x:1004:1003::/home/kavya:/bin/bash
tushar:x:1005:1005::/home/tushar:/bin/bash
hardik:x:1006:1006:User is not smart :/home/hardik:/bin/bash
hardikk:x:1007:1007:user is smart:/home/hardikk:/bin/bash
ajit:x:1008:1008::/home/ajit:/bin/bash
angha:x:1009:1010::/home/angha:/bin/bash
pari:x:1640:1640::/home/pari:/bin/bash
harry:x:1641:1641::/home/harry:/bin/bash
raj:x:1642:1643::/home/raj:/bin/bash
prem:x:1643:1642::/home/prem:/bin/bash
test:x:1644:1645::/home/test:/bin/bash
versha:x:1645:1646::/home/versha:/bin/bash
nora:x:1648:1649::/home/nora:/bin/bash
panny:x:2112:2223::/home/panny:/bin/bash
nishit:x:2113:2113::/home/user2:/bin/bash
texas:x:1234:1234::/home/texas:/bin/bash
ping:x:978:977::/home/ping:/bin/bash
user1:x:2582:2582::/home/user1:/bin/bash
User1:x:2583:11001::/home/User1:/bin/bash
```

Question 2: An organization “Copex Pvt Ltd” has set up some users and groups for a project. Perform the following tasks step-by-step:

1 : User and Group Creation :

➜ Create the following users and set a common password “pass” for all users: Nitesh, Mohan, Nitesh, Parul, Alex, Hitesh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Terminal
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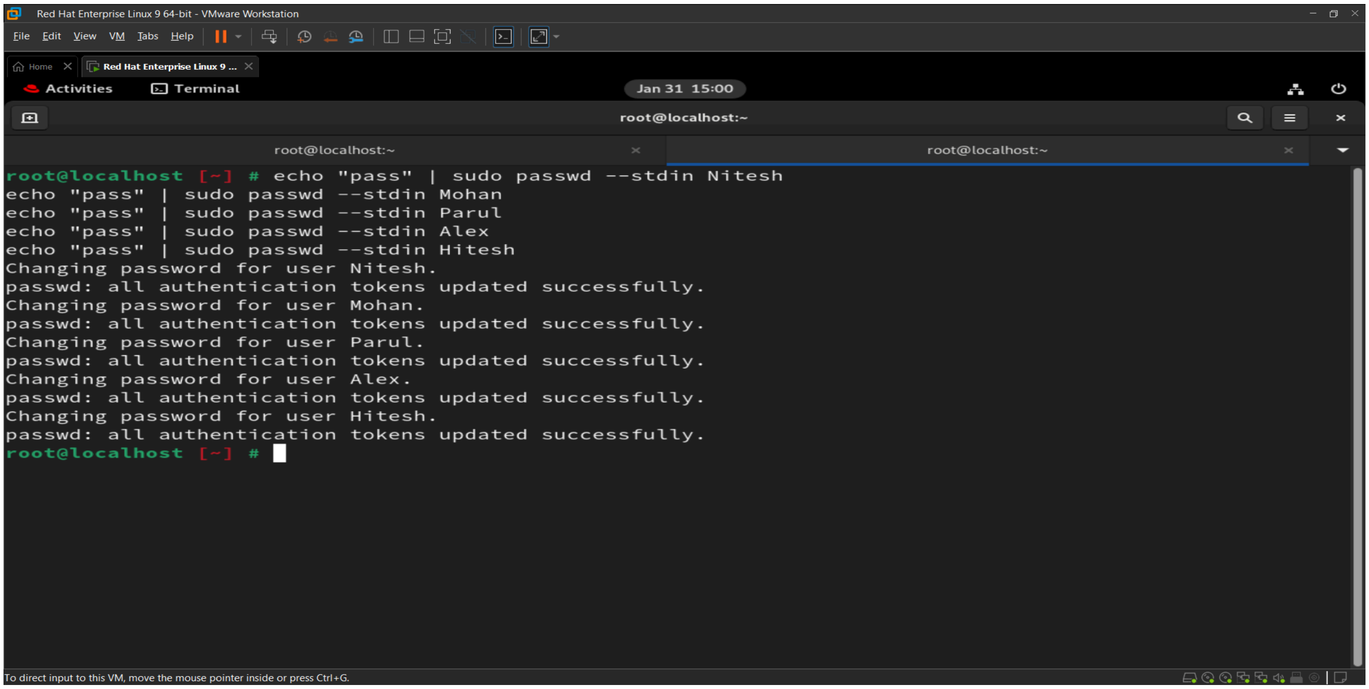
```
root@localhost [~] # useradd Nitesh
root@localhost [~] # id Nitesh
uid=2593(Nitesh) gid=2593(Nitesh) groups=2593(Nitesh)
root@localhost [~] # useradd Mohan
root@localhost [~] # id Mohan
uid=2594(Mohan) gid=2594(Mohan) groups=2594(Mohan)
root@localhost [~] # useradd Parul
root@localhost [~] # id Parul
uid=2595(Parul) gid=2595(Parul) groups=2595(Parul)
root@localhost [~] # useradd Alex
root@localhost [~] # id Alex
uid=2596(Alex) gid=2596(Alex) groups=2596(Alex)
root@localhost [~] # useradd Hitesh
root@localhost [~] # id Hitesh
uid=2597(Hitesh) gid=2597(Hitesh) groups=2597(Hitesh)
root@localhost [~] #
```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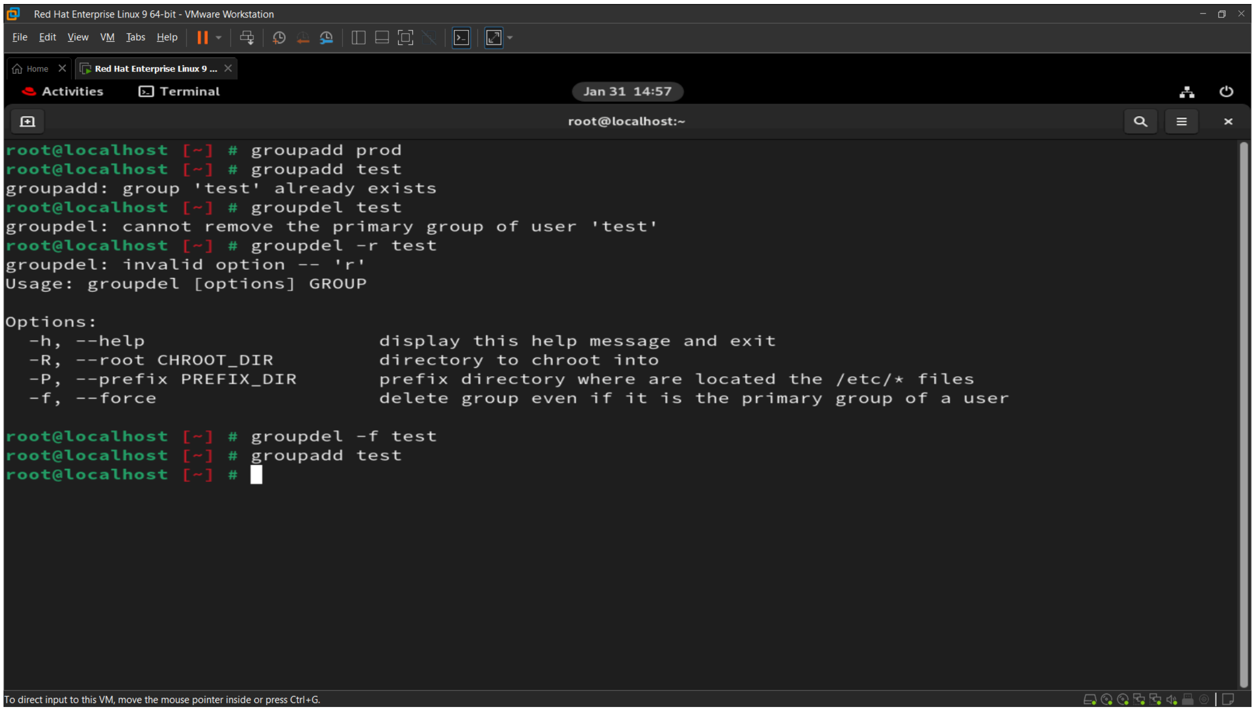
Terminal
Jan 31 15:00
root@localhost:~
root@localhost:~
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # echo "pass" | sudo passwd --stdin Nitesh
echo "pass" | sudo passwd --stdin Mohan
echo "pass" | sudo passwd --stdin Parul
echo "pass" | sudo passwd --stdin Alex
echo "pass" | sudo passwd --stdin Hitesh
Changing password for user Nitesh.
passwd: all authentication tokens updated successfully.
Changing password for user Mohan.
passwd: all authentication tokens updated successfully.
Changing password for user Parul.
passwd: all authentication tokens updated successfully.
Changing password for user Alex.
passwd: all authentication tokens updated successfully.
Changing password for user Hitesh.
passwd: all authentication tokens updated successfully.
root@localhost [~] #
```

➜ Create the following groups for this project: prod, test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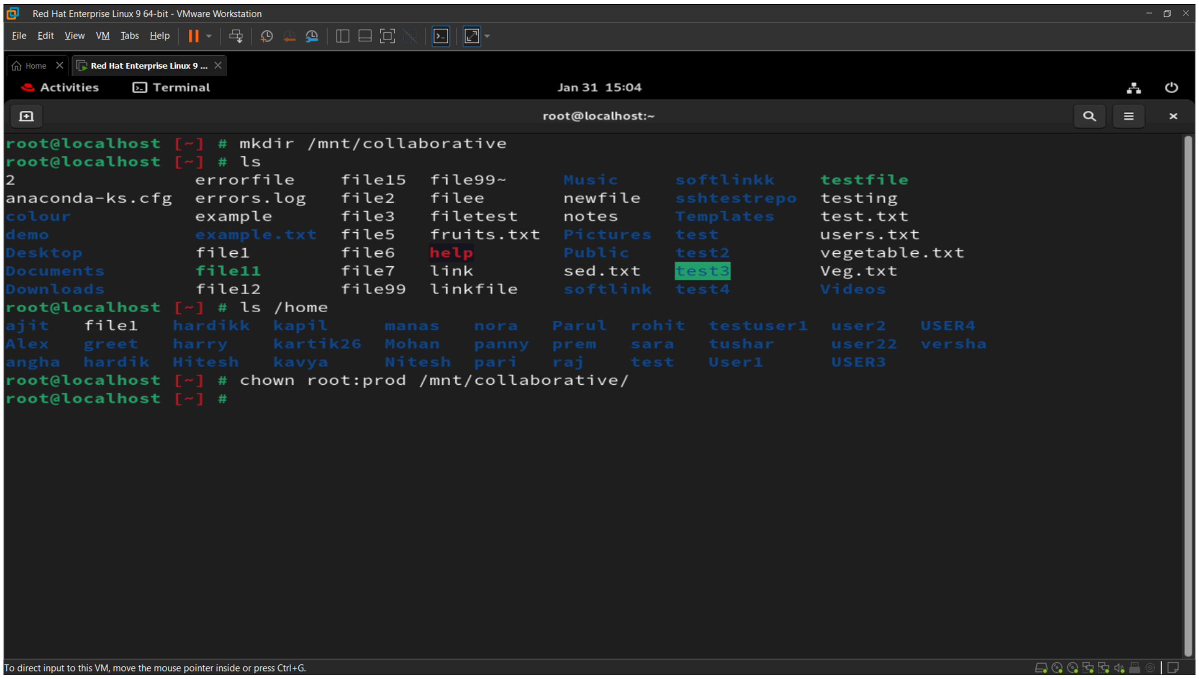
Terminal
Jan 31 14:57
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # groupadd prod
root@localhost [~] # groupadd test
groupadd: group 'test' already exists
root@localhost [~] # groupdel test
groupdel: cannot remove the primary group of user 'test'
root@localhost [~] # groupdel -r test
groupdel: invalid option -- 'r'
Usage: groupdel [options] GROUP

Options:
  -h, --help                    display this help message and exit
  -R, --root CHROOT_DIR         directory to chroot into
  -P, --prefix PREFIX_DIR       prefix directory where are located the /etc/* files
  -f, --force                   delete group even if it is the primary group of a user

root@localhost [~] # groupdel -f test
root@localhost [~] # groupadd test
root@localhost [~] #
```

2: Collaborative Directory Setup

➜ As the root administrator, create a collaborative directory named “collaborative” under “/mnt”.

➜ Write a Linux command to change the owner & group-owner of the /mnt/collaborative directory to the “root & prod” group at a same time.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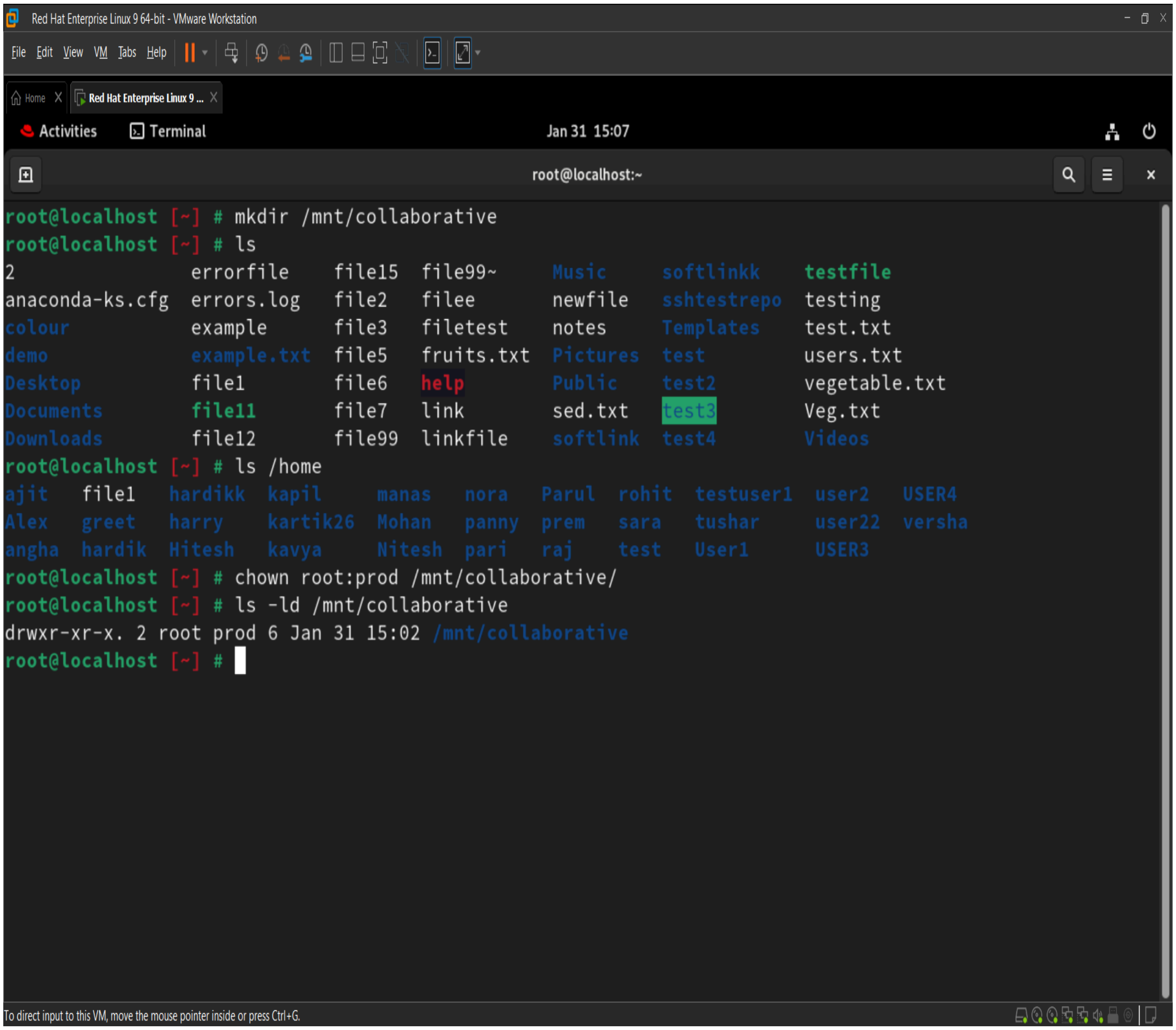
Terminal
Jan 31 15:04
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # mkdir /mnt/collaborative
root@localhost [~] # ls
2                errorfile    file15  file99~     Music     softlinkk    testfile
anaconda-ks.cfg  errors.log   file2   filee       newfile   sshtestrepo  testing
colour           example      file3   filetest    notes     Templates    test.txt
demo             example.txt  file5   fruits.txt  Pictures  test         users.txt
Desktop          file1        file6   help        Public    test2        vegetable.txt
Documents        file11       file7   link        sed.txt   test3        Veg.txt
Downloads        file12       file99  linkfile    softlink  test4        Videos
root@localhost [~] # ls /home
ajit   file1   hardikk  kapil     manas   nora   Parul  rohit  testuser1  user2   USER4
Alex   greet   harry    kartik26  Mohan   panny  prem   sara   tushar     user22  versha
angha  hardik  Hitesh   kavya     Nitesh  pari   raj    test   User1      USER3
root@localhost [~] # chown root:prod /mnt/collaborative/
root@localhost [~] #
```

3 : Answer the following questions

➜ Write a Linux command to check the “default permissions, owner, and group owner” of the directory.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Terminal
Jan 31 15:07
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # mkdir /mnt/collaborative
root@localhost [~] # ls
2                errorfile    file15  file99~     Music     softlinkk    testfile
anaconda-ks.cfg  errors.log   file2   filee       newfile   sshtestrepo  testing
colour           example      file3   filetest    notes     Templates    test.txt
demo             example.txt  file5   fruits.txt  Pictures  test         users.txt
Desktop          file1        file6   help        Public    test2        vegetable.txt
Documents        file11       file7   link        sed.txt   test3        Veg.txt
Downloads        file12       file99  linkfile    softlink  test4        Videos
root@localhost [~] # ls /home
ajit   file1   hardikk  kapil     manas   nora   Parul  rohit  testuser1  user2   USER4
Alex   greet   harry    kartik26  Mohan   panny  prem   sara   tushar     user22  versha
angha  hardik  Hitesh   kavya     Nitesh  pari   raj    test   User1      USER3
root@localhost [~] # chown root:prod /mnt/collaborative/
root@localhost [~] # ls -ld /mnt/collaborative
drwxr-xr-x. 2 root prod 6 Jan 31 15:02 /mnt/collaborative
root@localhost [~] # 
```

➜ Which users in this project fall under the "others" category for this directory?

Ans : Since we have not added any users to the `prod` group, all the users currently fall under the "others" category for the `/mnt/collaborative` directory.Thus, the following users belong to the "others" category: Nitesh, Mohan, Parul, Alex, Hitesh

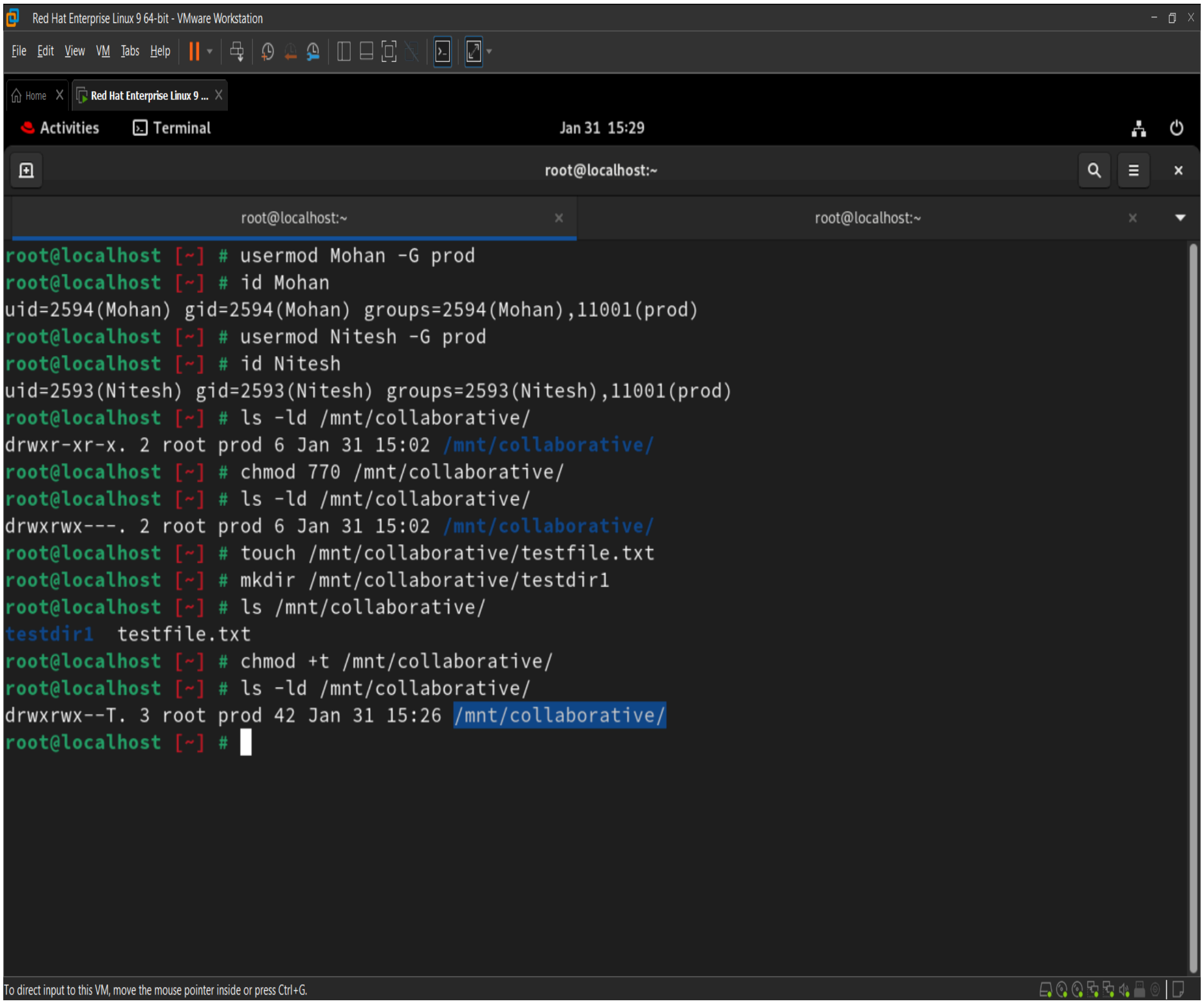
Q3 : Question 3: Advanced Permission Management?

1: Group Membership Assignment :

➜ As the root administrator, add users Mohan and Nitesh to the prod group as secondary group members.

2: Write the Linux commands to Apply the appropriate permissions as the root administrator and concepts to achieve this.

➜ Grant the prod group members permission to create and modify content in the /mnt/collaborative directory.
➜ Restrict "others" from having no permissions in the /mnt/collaborative directory using the symbolic method.
➜ Create some files and directories in /mnt/collaborative and ensure that any new content created in /mnt/collaborative automatically inherits the same group ownership as the parent directory.
➜ Additionally, ensure that no one can delete the files except the creator.



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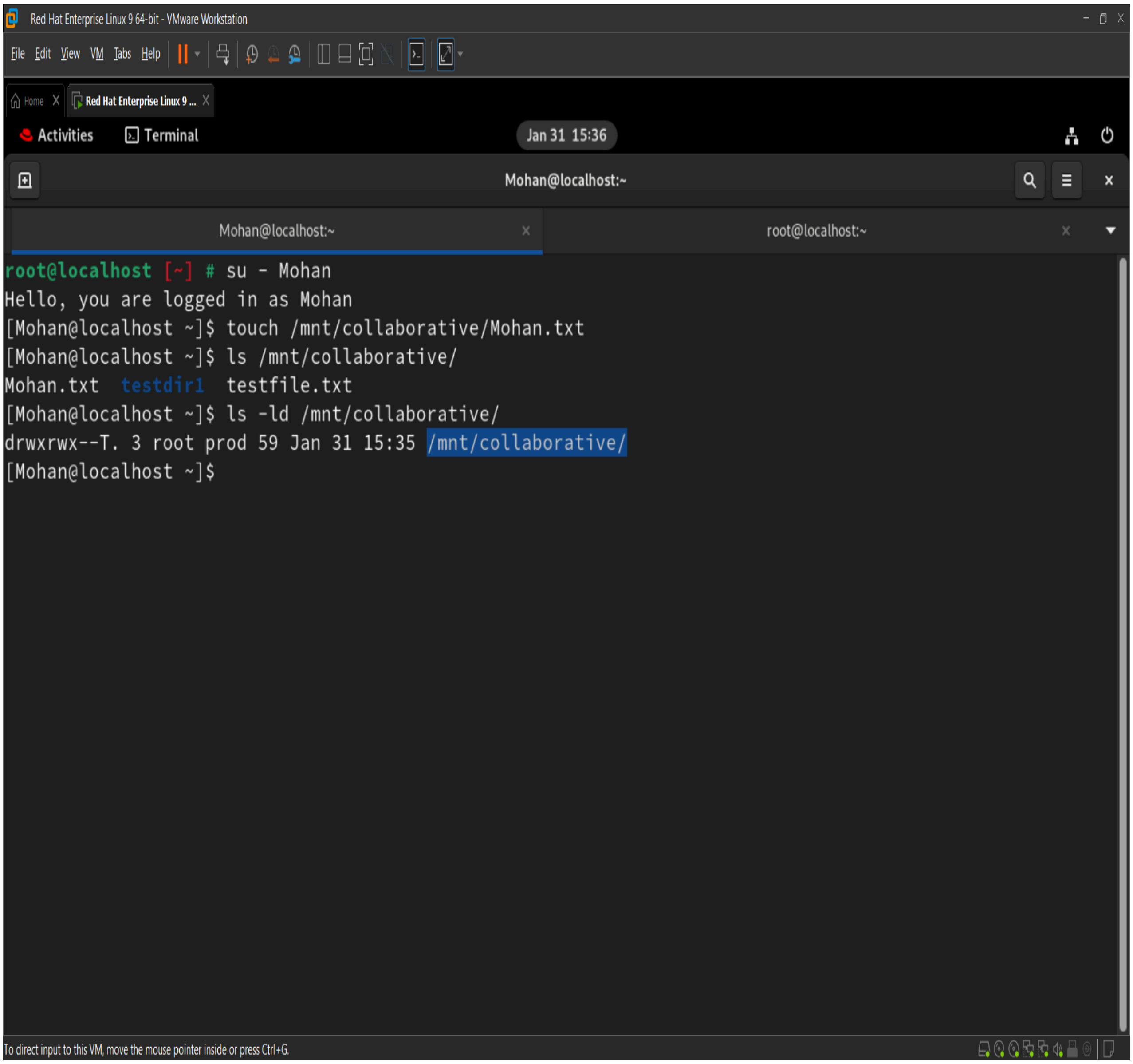
Terminal
Jan 31 15:29
root@localhost:~
root@localhost:~
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # usermod Mohan -G prod
root@localhost [~] # id Mohan
uid=2594(Mohan) gid=2594(Mohan) groups=2594(Mohan),11001(prod)
root@localhost [~] # usermod Nitesh -G prod
root@localhost [~] # id Nitesh
uid=2593(Nitesh) gid=2593(Nitesh) groups=2593(Nitesh),11001(prod)
root@localhost [~] # ls -ld /mnt/collaborative/
drwxr-xr-x. 2 root prod 6 Jan 31 15:02 /mnt/collaborative/
root@localhost [~] # chmod 770 /mnt/collaborative/
root@localhost [~] # ls -ld /mnt/collaborative/
drwxrwx---. 2 root prod 6 Jan 31 15:02 /mnt/collaborative/
root@localhost [~] # touch /mnt/collaborative/testfile.txt
root@localhost [~] # mkdir /mnt/collaborative/testdir1
root@localhost [~] # ls /mnt/collaborative/
testdir1  testfile.txt
root@localhost [~] # chmod +t /mnt/collaborative/
root@localhost [~] # ls -ld /mnt/collaborative/
drwxrwx--T. 3 root prod 42 Jan 31 15:26 /mnt/collaborative/
root@localhost [~] #
```

3: Verification Tasks :

-> Log in as the user “Mohan” and:
➜ Verify that user “Mohan” can create content in the “/mnt/collaborative” directory or not.
➜ Now again what are the permissions for “Owner, Group & Other for ”/mnt/collaborative”, Describe the permission section of especially group & others.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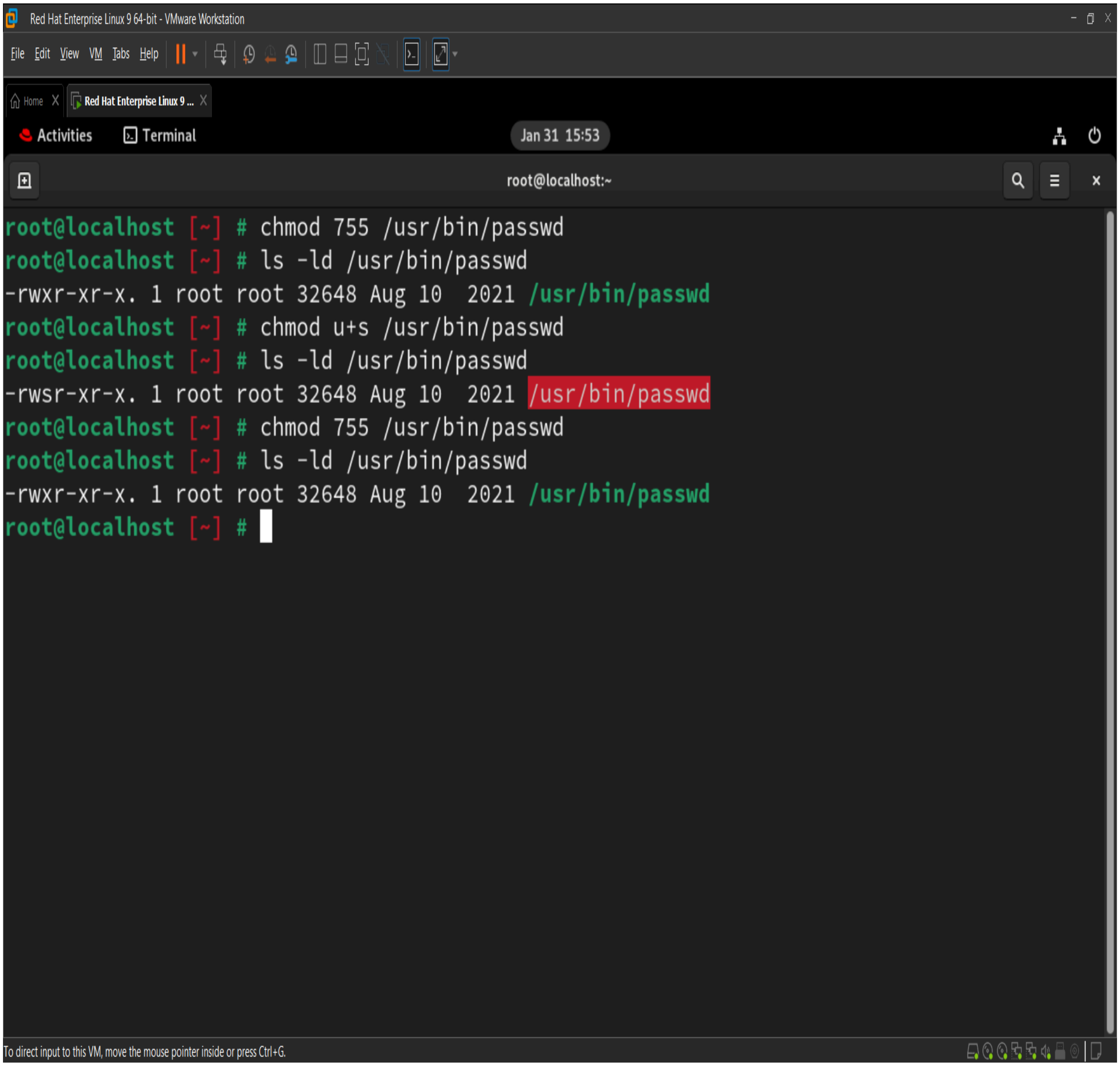
Terminal
Jan 31 15:36
Mohan@localhost:~
Mohan@localhost:~
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # su - Mohan
Hello, you are logged in as Mohan
[Mohan@localhost ~]$ touch /mnt/collaborative/Mohan.txt
[Mohan@localhost ~]$ ls /mnt/collaborative/
Mohan.txt  testdir1  testfile.txt
[Mohan@localhost ~]$ ls -ld /mnt/collaborative/
drwxrwx--T. 3 root prod 59 Jan 31 15:35 /mnt/collaborative/
[Mohan@localhost ~]$
```

Theory : The `prod` group has read (r), write (w), and setgid (s) permissions to ensure new files inherit the group. Others have no permissions, but the sticky bit (t) prevents deletion

Question 4: Write a command to remove the SUID special permission from the file /usr/bin/passwd using the numerical method & explain the impact of this change.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Terminal
Jan 31 15:53
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # chmod 755 /usr/bin/passwd
root@localhost [~] # ls -ld /usr/bin/passwd
-rwxr-xr-x. 1 root root 32648 Aug 10  2021 /usr/bin/passwd
root@localhost [~] # chmod u+s /usr/bin/passwd
root@localhost [~] # ls -ld /usr/bin/passwd
-rwsr-xr-x. 1 root root 32648 Aug 10  2021 /usr/bin/passwd
root@localhost [~] # chmod 755 /usr/bin/passwd
root@localhost [~] # ls -ld /usr/bin/passwd
-rwxr-xr-x. 1 root root 32648 Aug 10  2021 /usr/bin/passwd
root@localhost [~] #
```

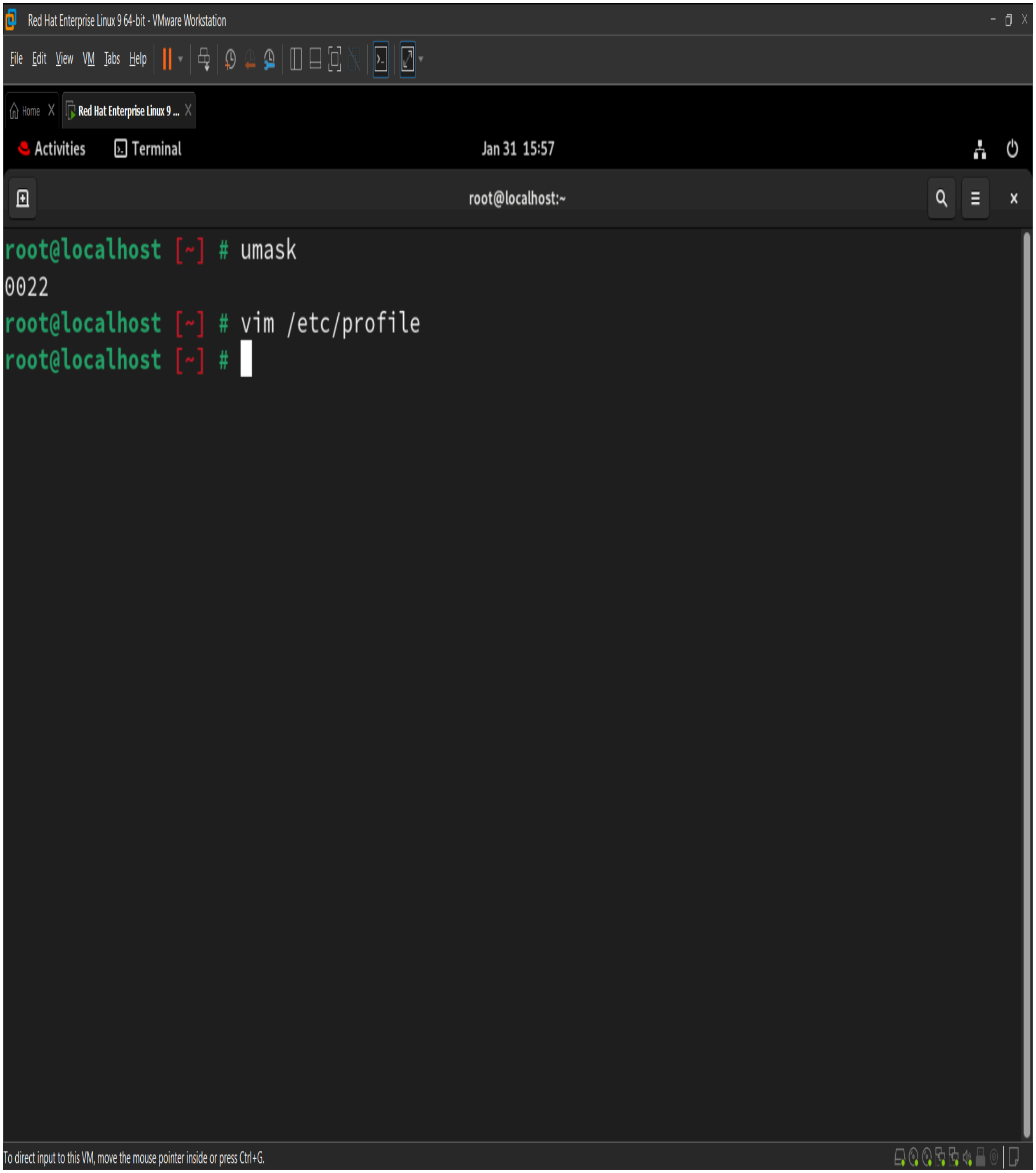
Theory : Before: SUID allows users to run passwd with root privileges to change their passwords.

After: Removing SUID prevents users from using passwd with root privileges, stopping non-root users from changing their passwords.

Question 5: Set the UMASK Value:

➜ Write the Linux command to check the current “umask” value for the user's shell.
➜ How would you change the “umask” setting so that all newly created users on the system have a default “umask” value of `0777`?

Theory : We Will Open the `/etc/profile` file (which is sourced by all users when they log in) and add or modify the `umask` setting to `0777` at the end of the file: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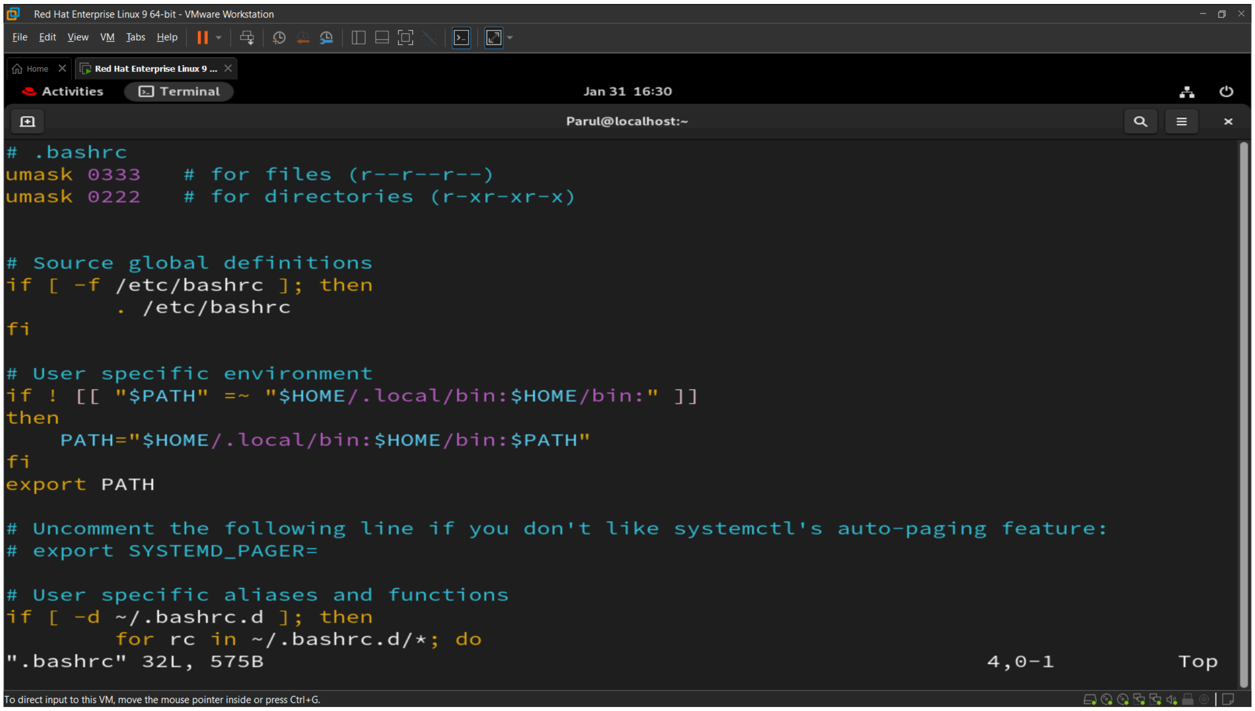
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # umask
0022
root@localhost [~] # vim /etc/profile
root@localhost [~] #
```

Question 6: Set the default permissions for the user Parul on newly created files and directories as follows:

➜ Set the default permissions for all newly created files to r--r--r--.
➜ Set the default permissions for all newly created directories to r-xr-xr-x..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Terminal
Jan 31 16:30
Parul@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

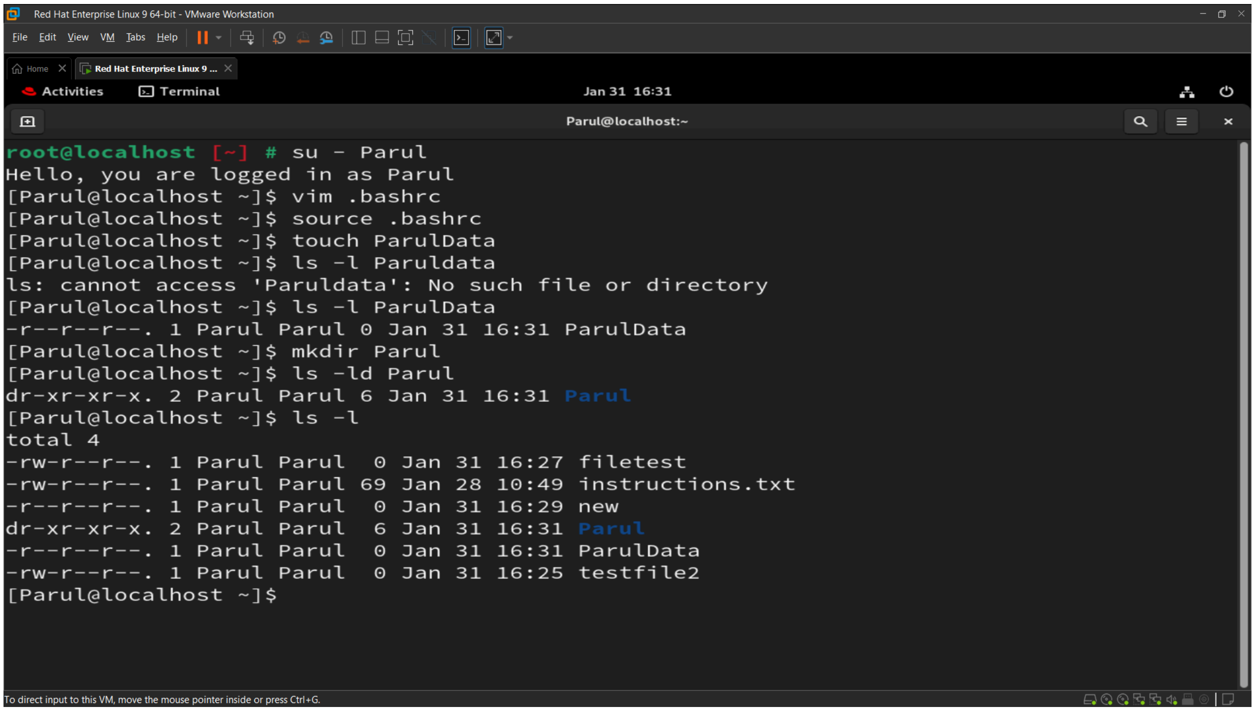
```
# .bashrc
umask 0333   # for files (r--r--r--)
umask 0222   # for directories (r-xr-xr-x)


# Source global definitions
if [ -f /etc/bashrc ]; then
        . /etc/bashrc
fi

# User specific environment
if ! [[ "$PATH" =~ "$HOME/.local/bin:$HOME/bin:" ]]
then
    PATH="$HOME/.local/bin:$HOME/bin:$PATH"
fi
export PATH

# Uncomment the following line if you don't like systemctl's auto-paging feature:
# export SYSTEMD_PAGER=

# User specific aliases and functions
if [ -d ~/.bashrc.d ]; then
        for rc in ~/.bashrc.d/*; do
".bashrc" 32L, 575B                                          4,0-1         Top
```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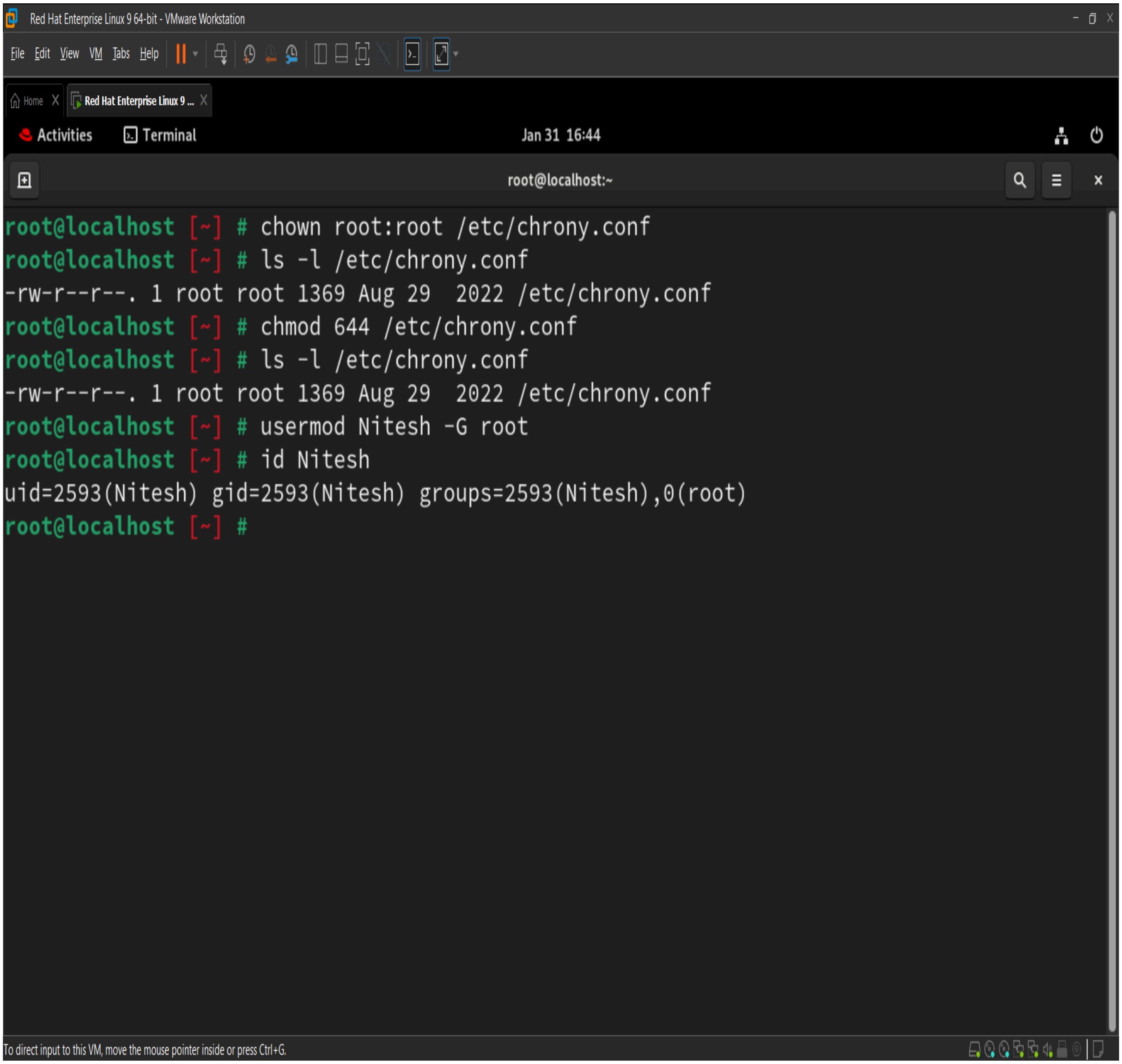
Terminal
Jan 31 16:31
Parul@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # su - Parul
Hello, you are logged in as Parul
[Parul@localhost ~]$ vim .bashrc
[Parul@localhost ~]$ source .bashrc
[Parul@localhost ~]$ touch ParulData
[Parul@localhost ~]$ ls -l Paruldata
ls: cannot access 'Paruldata': No such file or directory
[Parul@localhost ~]$ ls -l ParulData
-r--r--r--. 1 Parul Parul 0 Jan 31 16:31 ParulData
[Parul@localhost ~]$ mkdir Parul
[Parul@localhost ~]$ ls -ld Parul
dr-xr-xr-x. 2 Parul Parul 6 Jan 31 16:31 Parul
[Parul@localhost ~]$ ls -l
total 4
-rw-r--r--. 1 Parul Parul  0 Jan 31 16:27 filetest
-rw-r--r--. 1 Parul Parul 69 Jan 28 10:49 instructions.txt
-r--r--r--. 1 Parul Parul  0 Jan 31 16:29 new
dr-xr-xr-x. 2 Parul Parul  6 Jan 31 16:31 Parul
-r--r--r--. 1 Parul Parul  0 Jan 31 16:31 ParulData
-rw-r--r--. 1 Parul Parul  0 Jan 31 16:25 testfile2
[Parul@localhost ~]$
```

Q7 : As a system administrator, configure the system to ensure that only the user Nitesh and the root user can modify the /etc/chrony.conf file, while all other users should have read-only access to it. Write the commands.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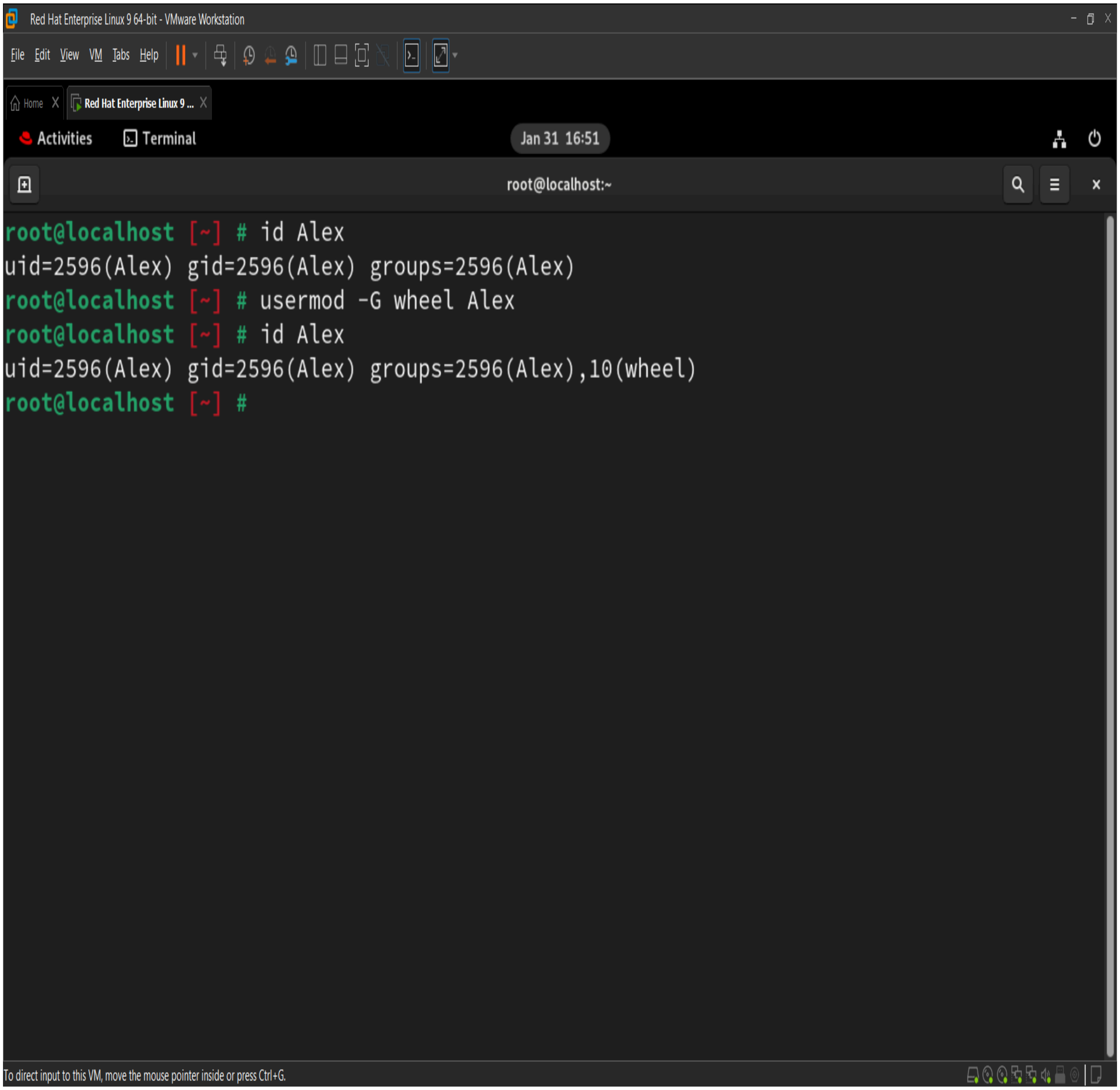
root@localhost:~

```
root@localhost [~] # chown root:root /etc/chrony.conf
root@localhost [~] # ls -l /etc/chrony.conf
-rw-r--r--. 1 root root 1369 Aug 29  2022 /etc/chrony.conf
root@localhost [~] # chmod 644 /etc/chrony.conf
root@localhost [~] # ls -l /etc/chrony.conf
-rw-r--r--. 1 root root 1369 Aug 29  2022 /etc/chrony.conf
root@localhost [~] # usermod Nitesh -G root
root@localhost [~] # id Nitesh
uid=2593(Nitesh) gid=2593(Nitesh) groups=2593(Nitesh),0(root)
root@localhost [~] #
```

To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

Q8 : User Alex needs to be granted administrative privileges equivalent to the root user to manage the system, while ensuring that all other users retain their restricted access based on their roles. Describe how you would implement this configuration. Write the commands

Theory : I have added Alex to the "wheel" group, as the "wheel" group has full administrative privileges similar to sudo. By adding "wheel" as a secondary group for Alex, they now have the ability to perform all administrative tasks.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Terminal
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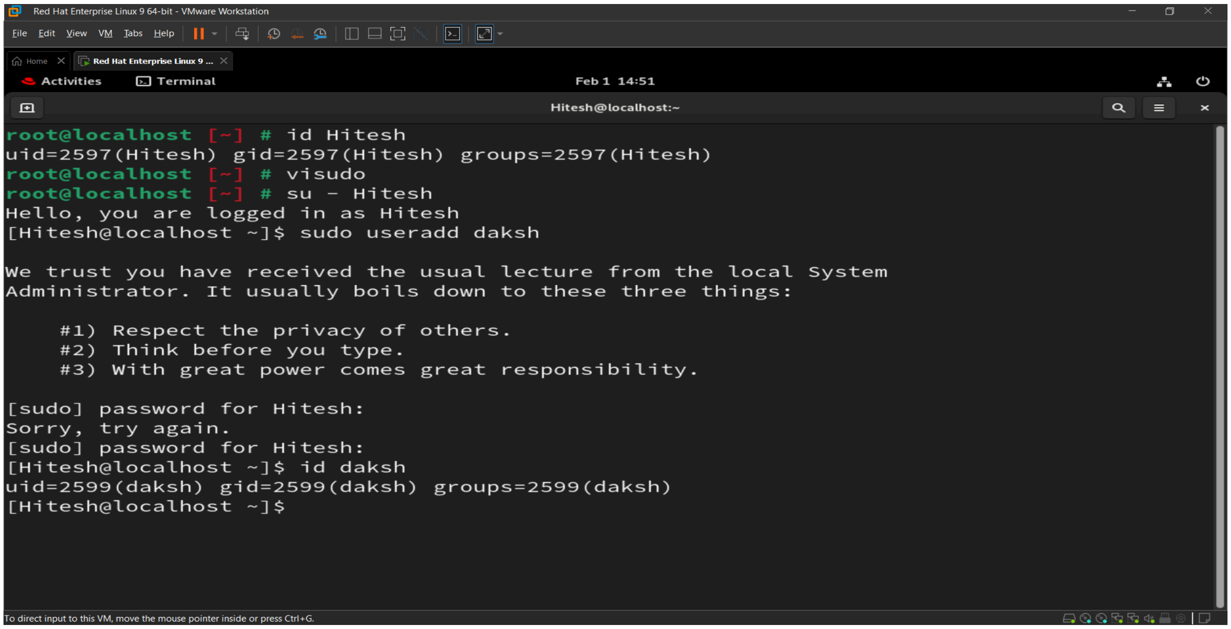
root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # id Alex
uid=2596(Alex) gid=2596(Alex) groups=2596(Alex)
root@localhost [~] # usermod -G wheel Alex
root@localhost [~] # id Alex
uid=2596(Alex) gid=2596(Alex) groups=2596(Alex),10(wheel)
root@localhost [~] #
```

Q9 : User Hitesh, a senior team member, requires full access to the system for daily operations. However, to prevent accidental shutdowns or reboots, configure the system so that Hitesh can execute all commands except poweroff and reboot. Write the commands.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Activities
Terminal
Feb 1 14:51
Hitesh@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

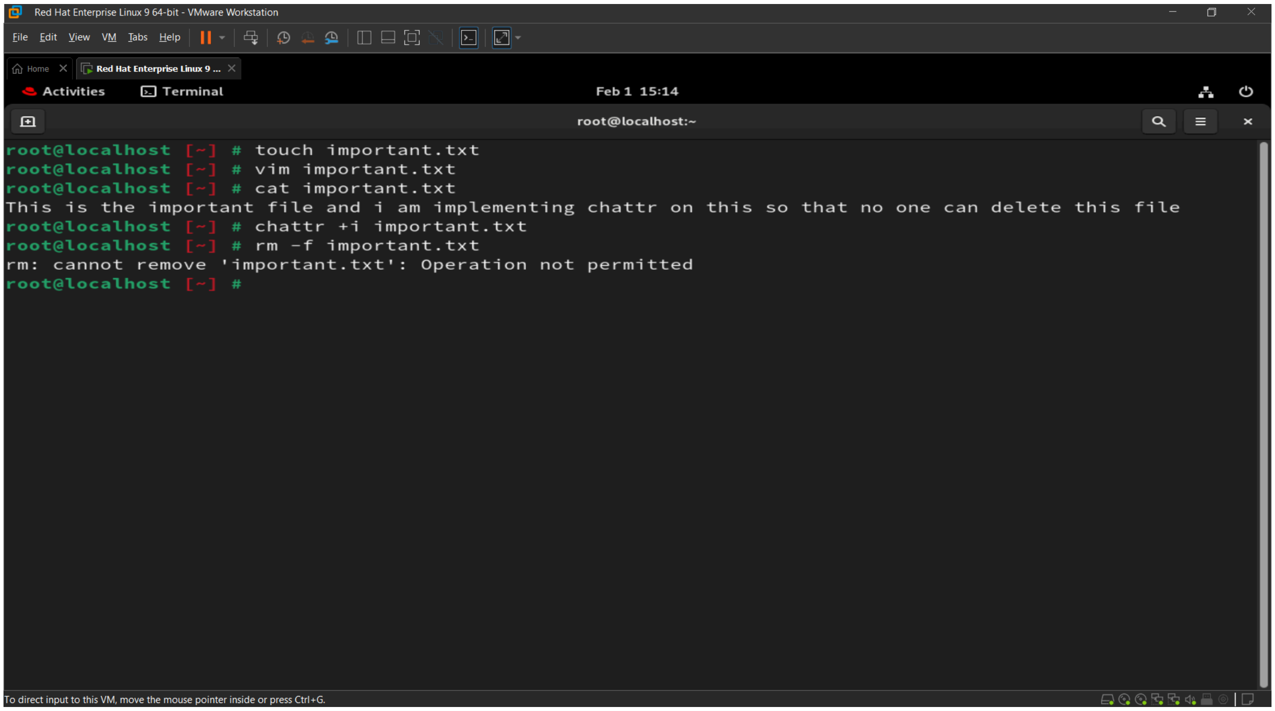
```
root@localhost [~] # id Hitesh
uid=2597(Hitesh) gid=2597(Hitesh) groups=2597(Hitesh)
root@localhost [~] # visudo
root@localhost [~] # su - Hitesh
Hello, you are logged in as Hitesh
[Hitesh@localhost ~]$ sudo useradd daksh

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

[sudo] password for Hitesh:
Sorry, try again.
[sudo] password for Hitesh:
[Hitesh@localhost ~]$ id daksh
uid=2599(daksh) gid=2599(daksh) groups=2599(daksh)
[Hitesh@localhost ~]$
```

Q10 : To safeguard all-important and critical system directories, ensure they cannot be deleted or removed by the root user. Write the commands you would use to implement this protection.


Red Hat Enterprise Linux 9 64-bit - VMware Workstation
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root@localhost:~
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

```
root@localhost [~] # touch important.txt
root@localhost [~] # vim important.txt
root@localhost [~] # cat important.txt
This is the important file and i am implementing chattr on this so that no one can delete this file
root@localhost [~] # chattr +i important.txt
root@localhost [~] # rm -f important.txt
rm: cannot remove 'important.txt': Operation not permitted
root@localhost [~] #
```