



**RAMNIRANJAN JHUNJHUNWALA COLLEGE GHATKOPAR
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DEPARTMENT OF INFORMATION TECHNOLOGY

2022 - 2023

S.Y. B. Sc.(I.T.) SEM V

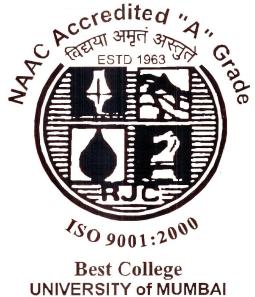
Linux System Administration

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Certificate



This is to certify that Mr./Ms. Riya Manojkumar Sonar Roll No 6408 of TYB.Sc.(I.T.) class has completed the required number of experiments in the subject of Linux System Administration in the Department of Information Technology during the academic year 2023- 2024.

Professor In-Charge

Co-ordinator of IT Department

Prof. Bharati Bhole

Prof. Archana Bhide

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Practical 0. Installation of RHEL 6.X

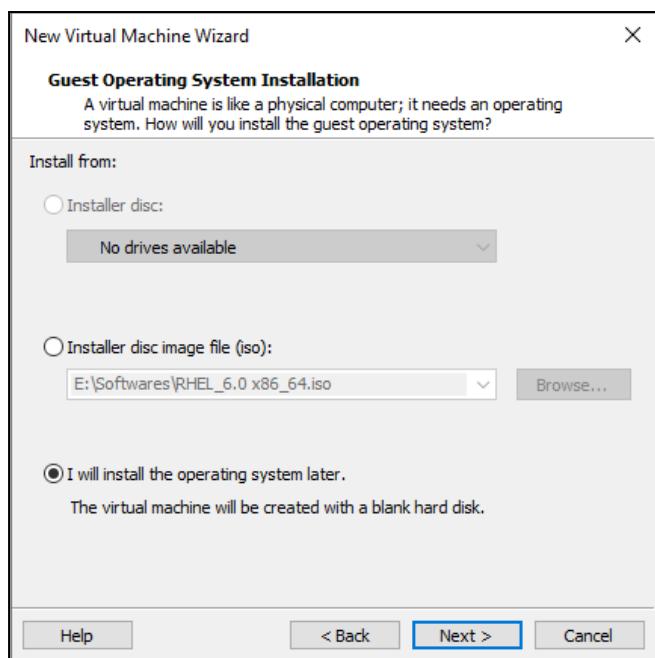
Step 1 : Download the ‘VMware Workstation’ on which we will install Our OS of ‘RHEL 6.X’.

Step 2 : Open ‘VMware Workstation’ and click on the ‘Create New Project’.

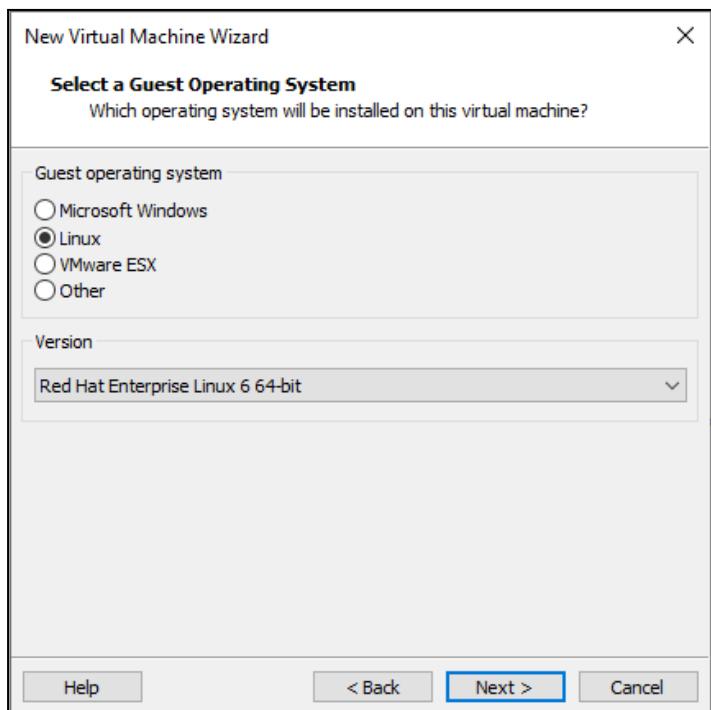
Step 3 : A New Window will open, then select ‘Typical (recommended)’ and then click on “Next >”.



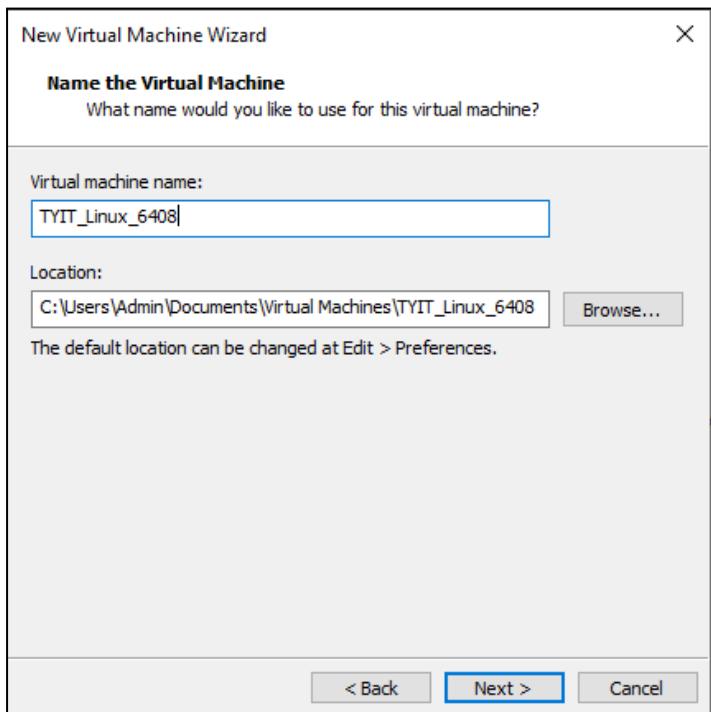
Step 4 : Choose the option “I will install the operating system Later.” Then click on “Next >”.



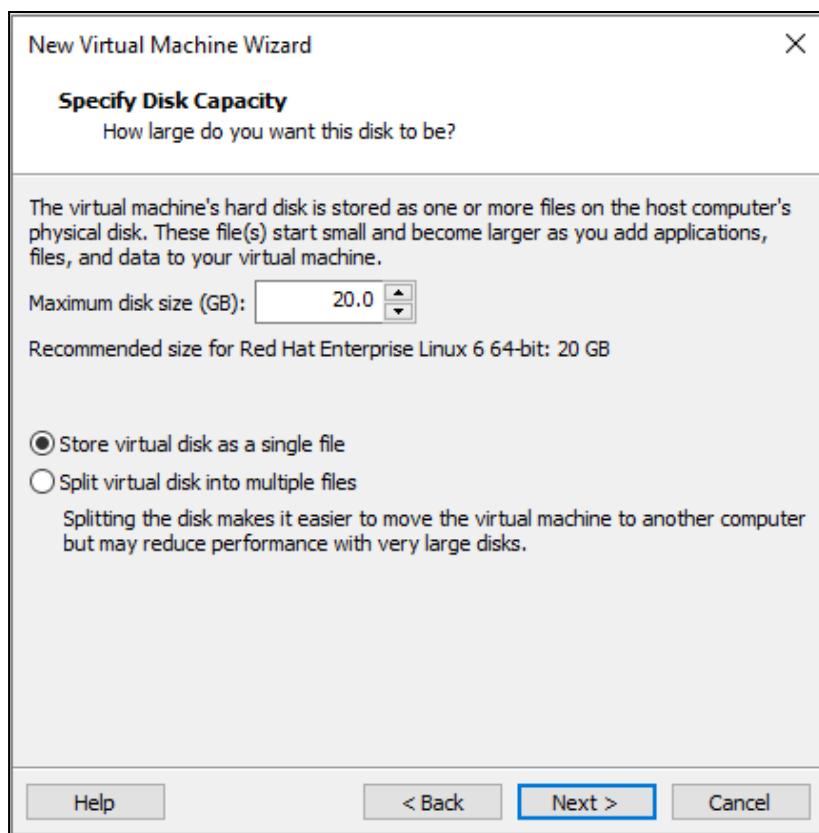
Step 5 : 1. Choose “Linux” from the Guest operating System. 2. In Version choose “Red Hat Enterprise Linux 6 64-bit”.



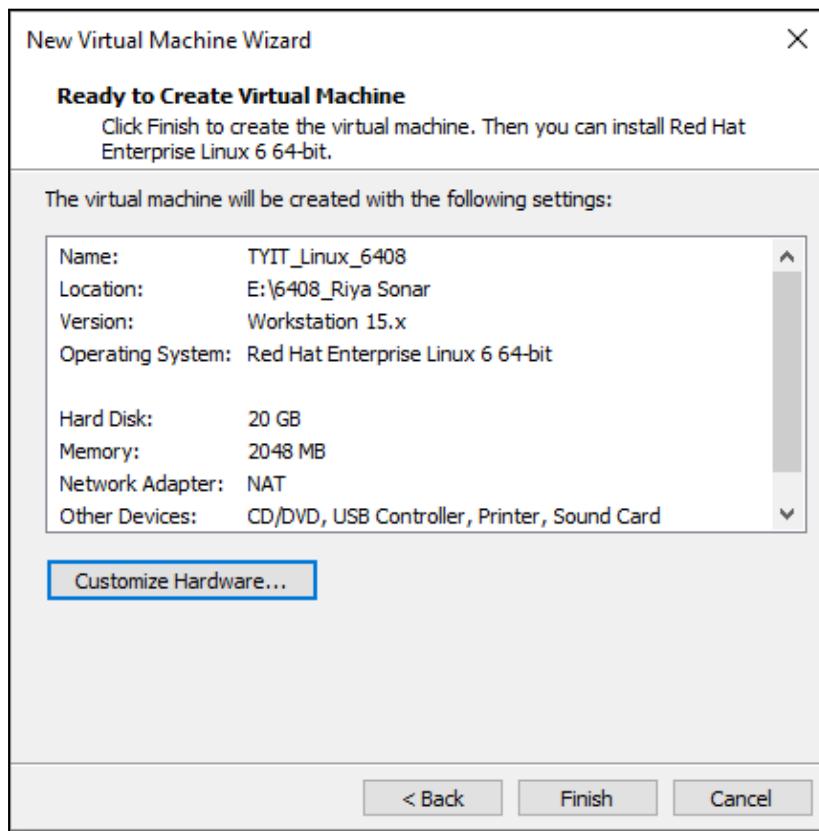
Step 6 : Change the machine's name to TYIT_RollNo. Click on “Next >”



Step 7: Click on “Next >”

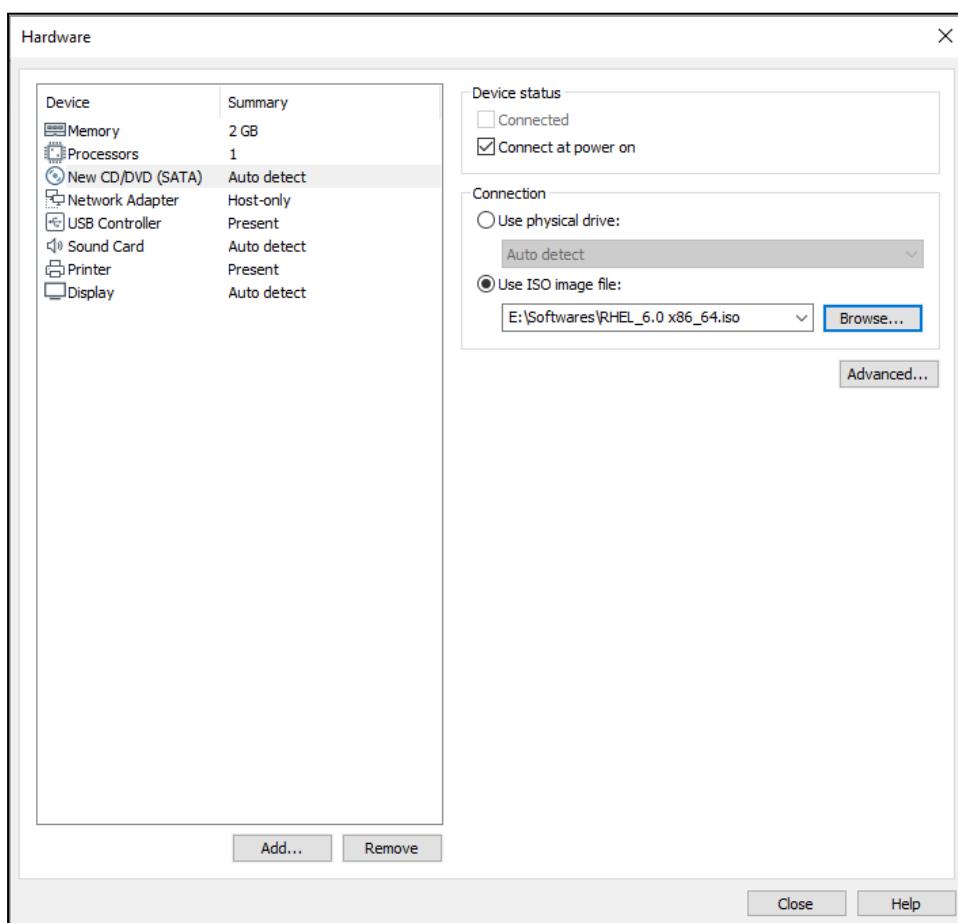
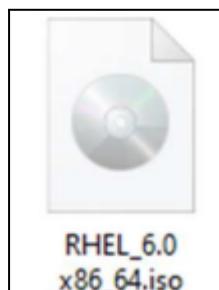


Step 8 : Click on “Customize Now” button to customize some changes

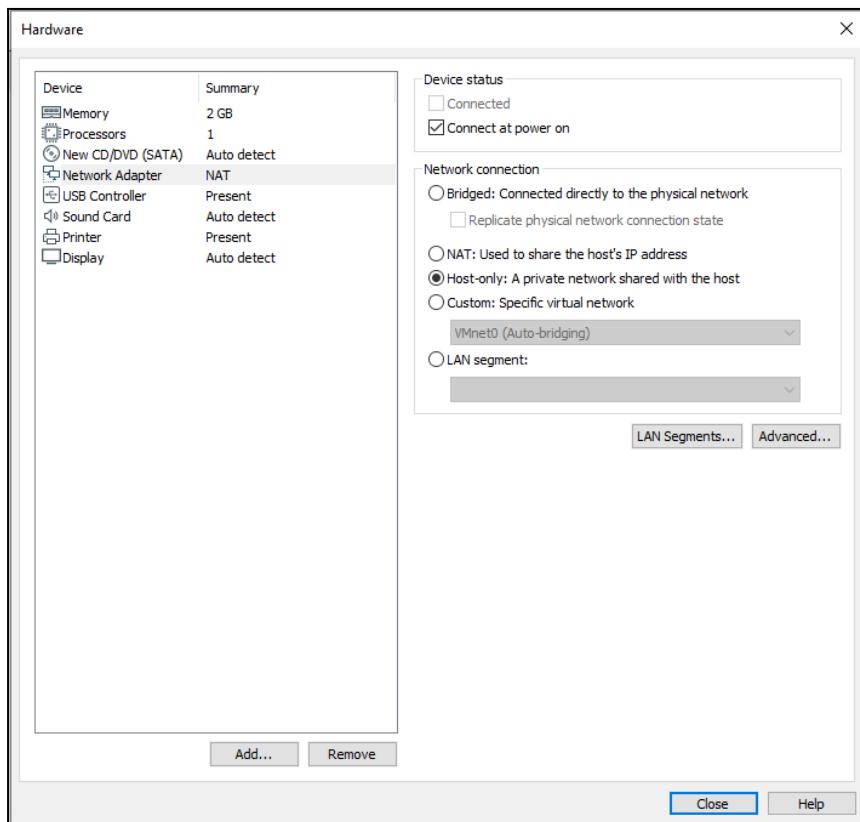


Step 9 :

1st : Select “New CD/DVD” from Device, then select the “Use ISO image file” and then Browse and Select this ISO file:



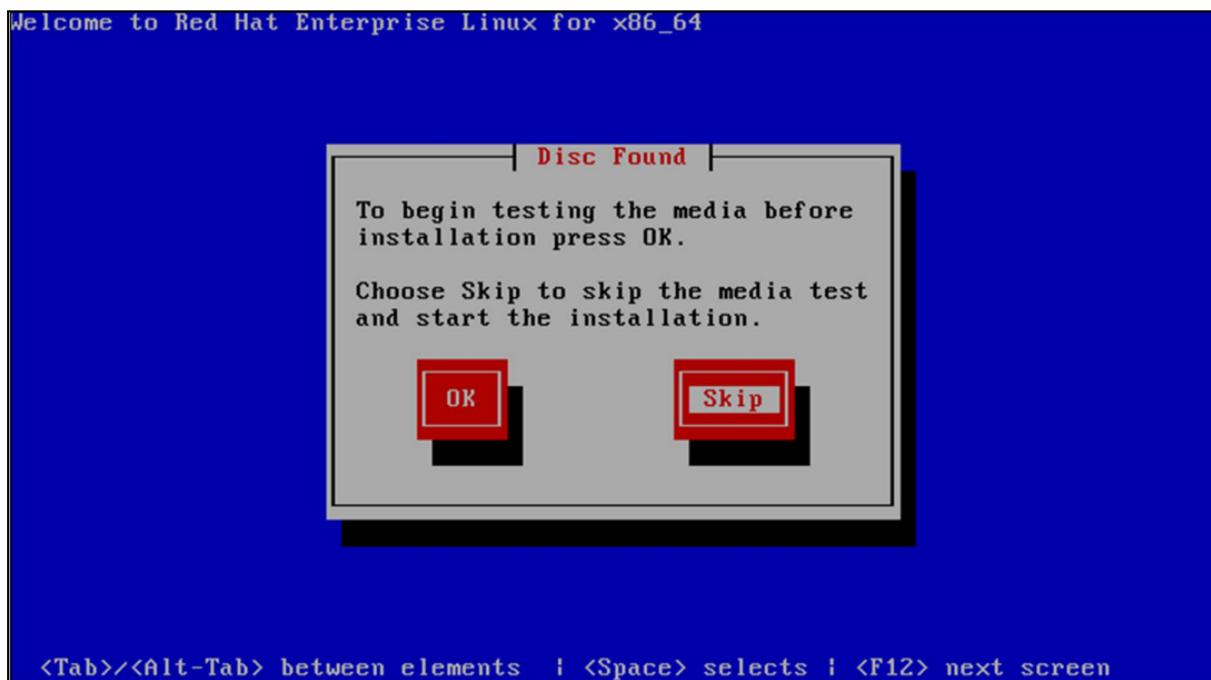
2nd : Then select “Network Adapter” from the device and select “Host-only” then close it. And click on the Finish button.



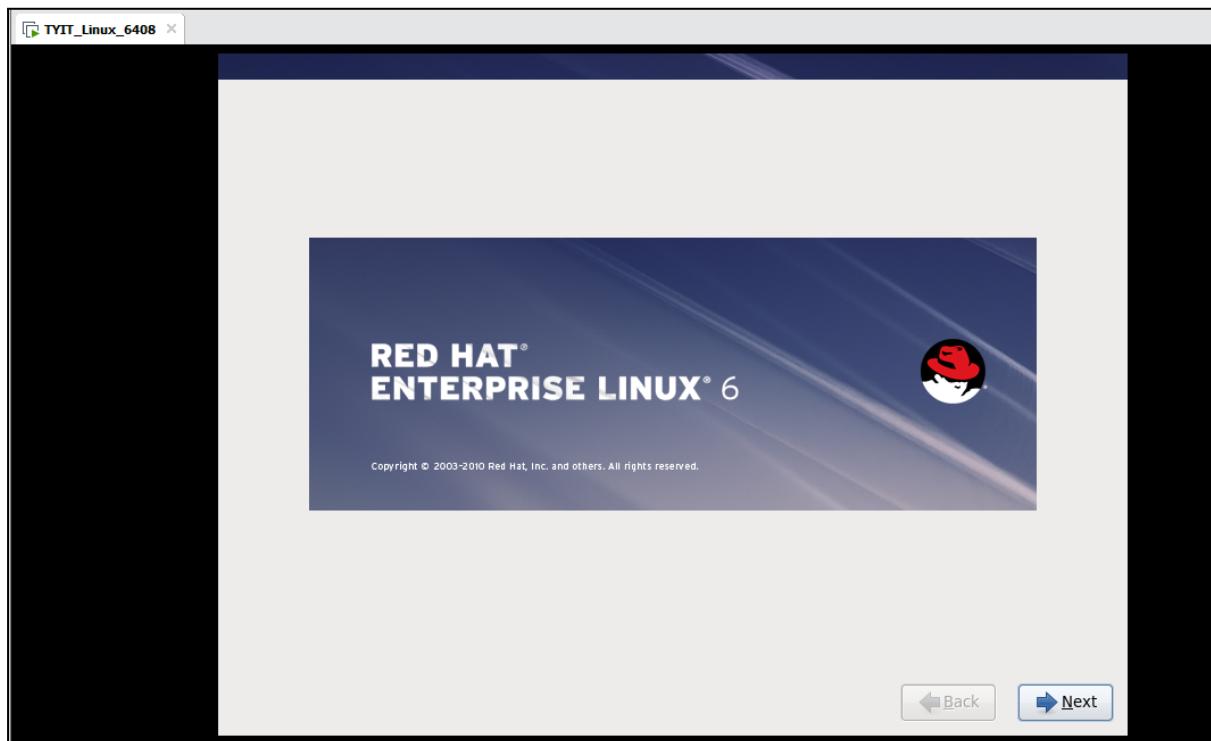
Step 10 : Now you can Power ON your OS and do the Installation of RHEL 6.X. After Power ON, please wait for some time. It will take about 1 minute to setup some settings.



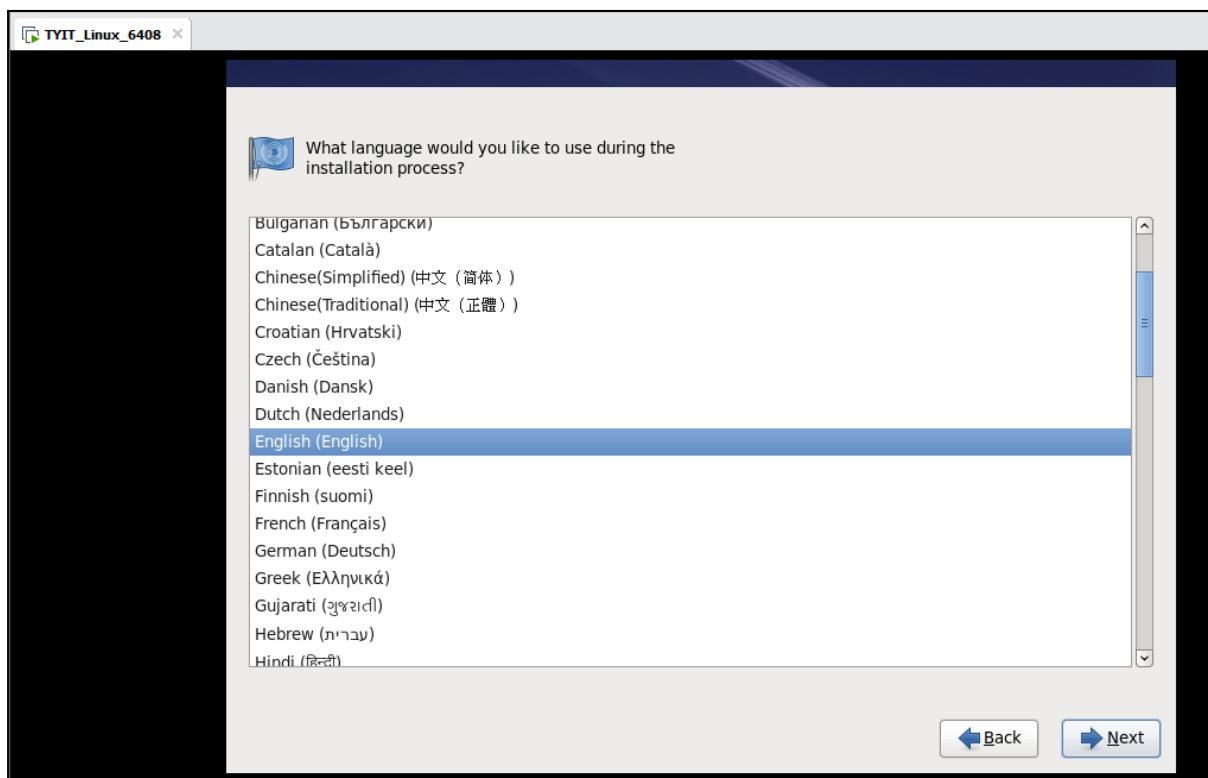
Step 11 : Welcome screen will be displayed, click on “Skip” to proceed further.



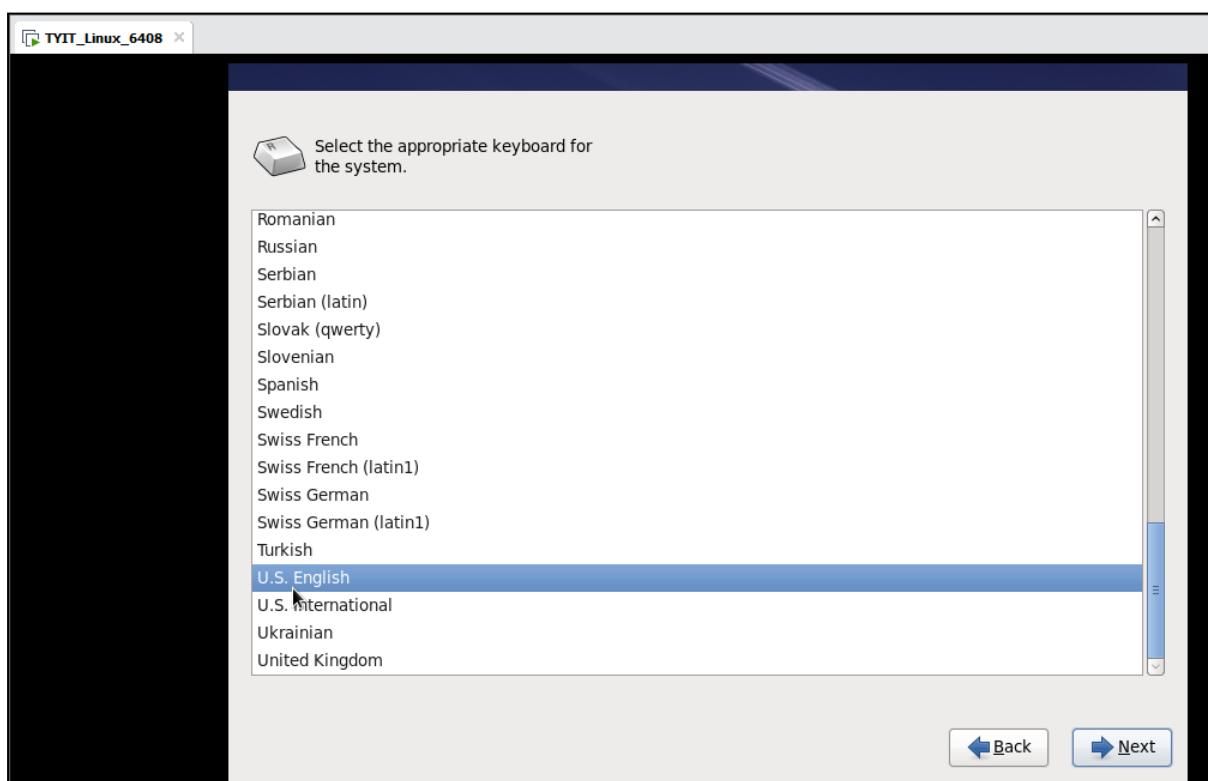
Step 12 : Click on “Next” to proceed with the installation.



Step 13 : Choose the language “English”, which you want during installation then Click on “Next”.



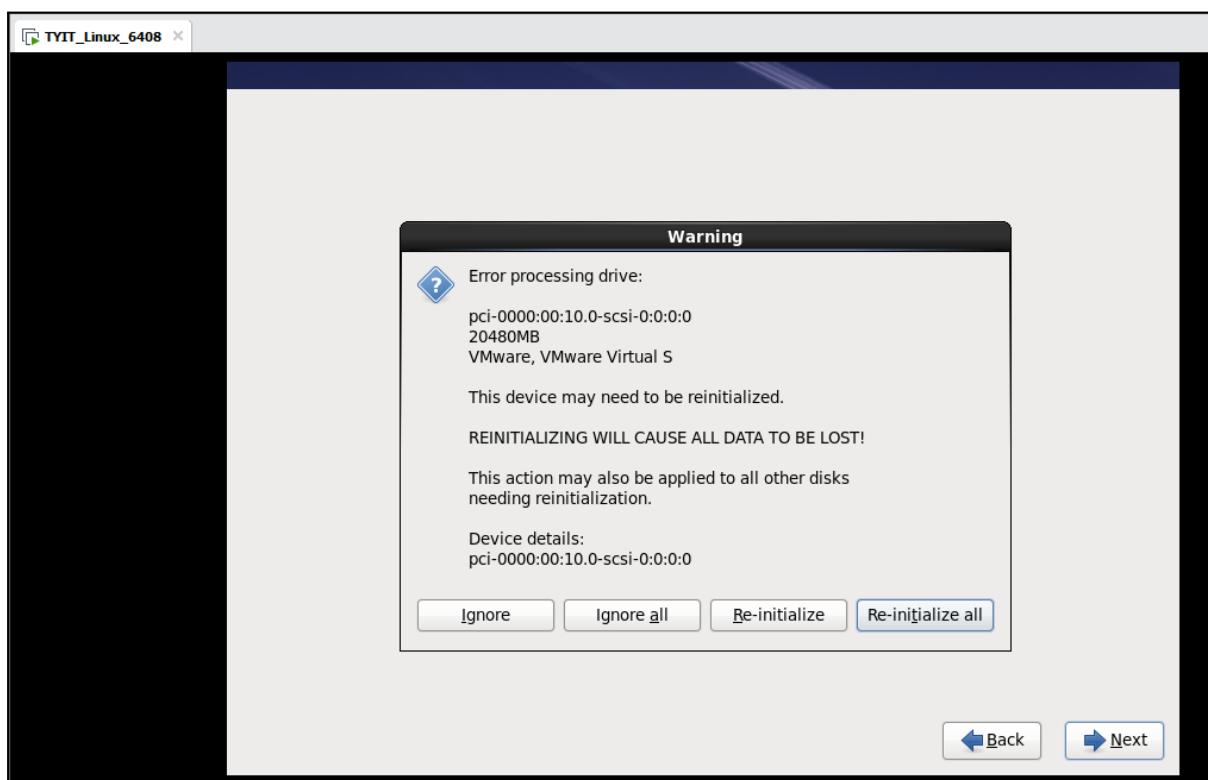
Step 14 : Choose the language “U.S. English” and click on “Next”.



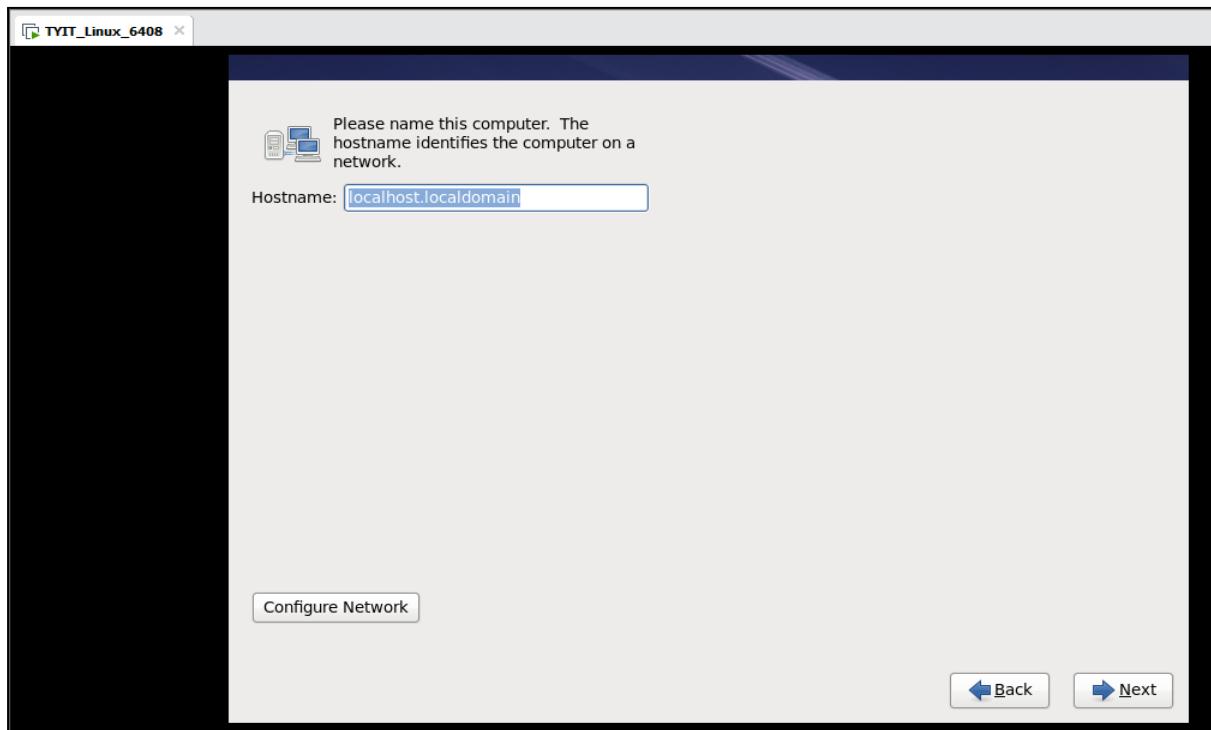
Step 15 : Choose “Basic Storage Devices” and then click on “Next”.



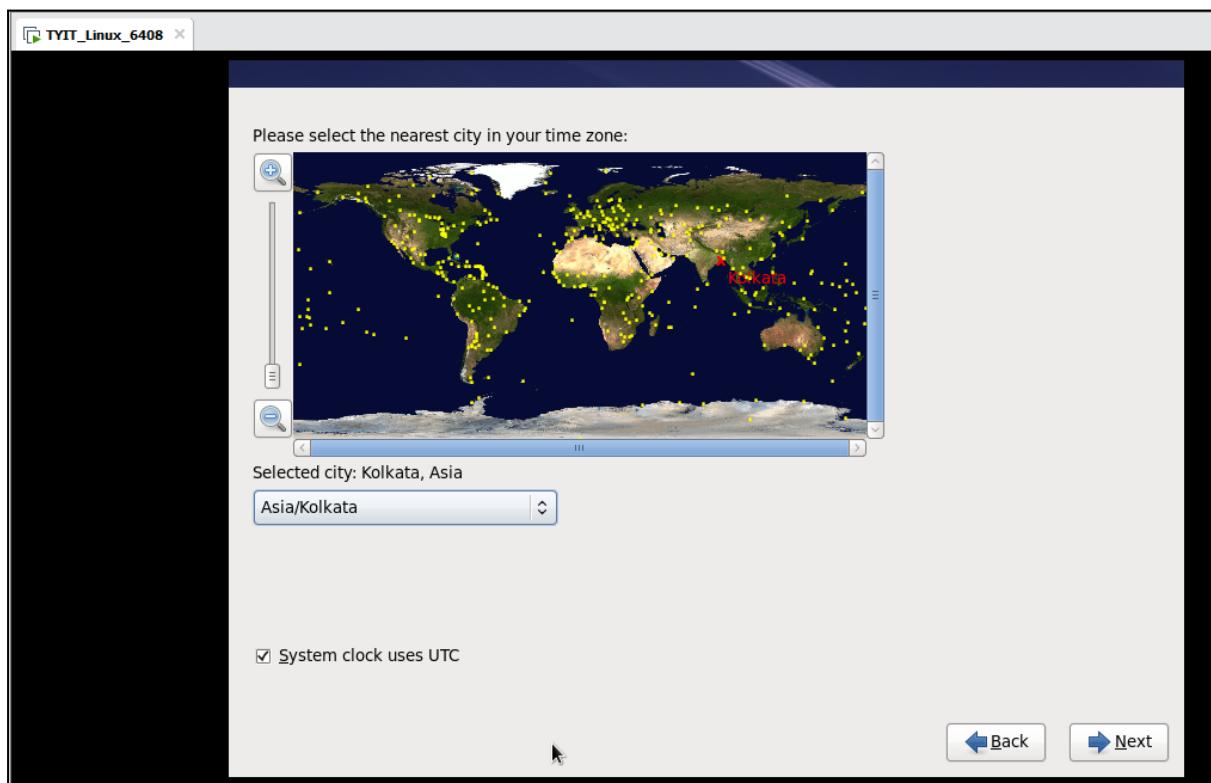
Step 16 : This Warning screen will appear, so Click on “Re-initialize all”.



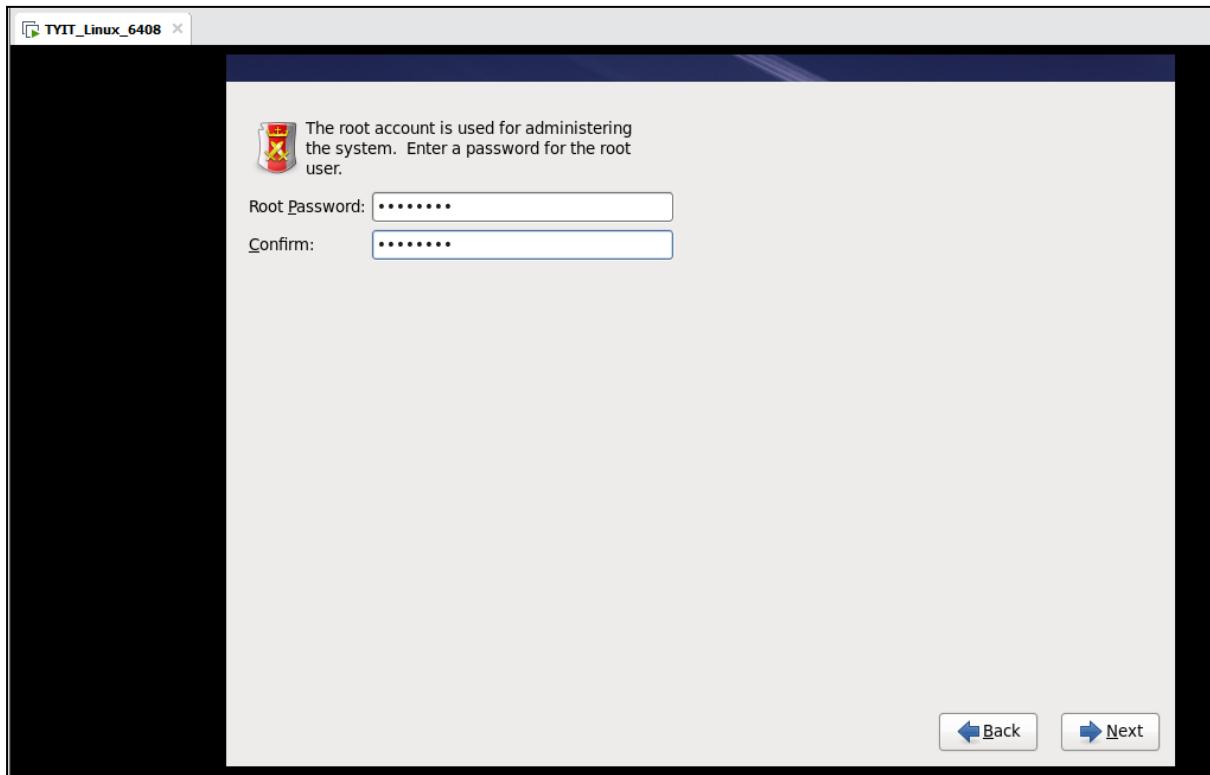
Step 17 : After that you have to type your hostname, as we have kept it as “localhost.localdomain” then click on “Next”.



Step 18 : Select the city “Asia/Kolkata” from the option for System Clock and click on “Next”.



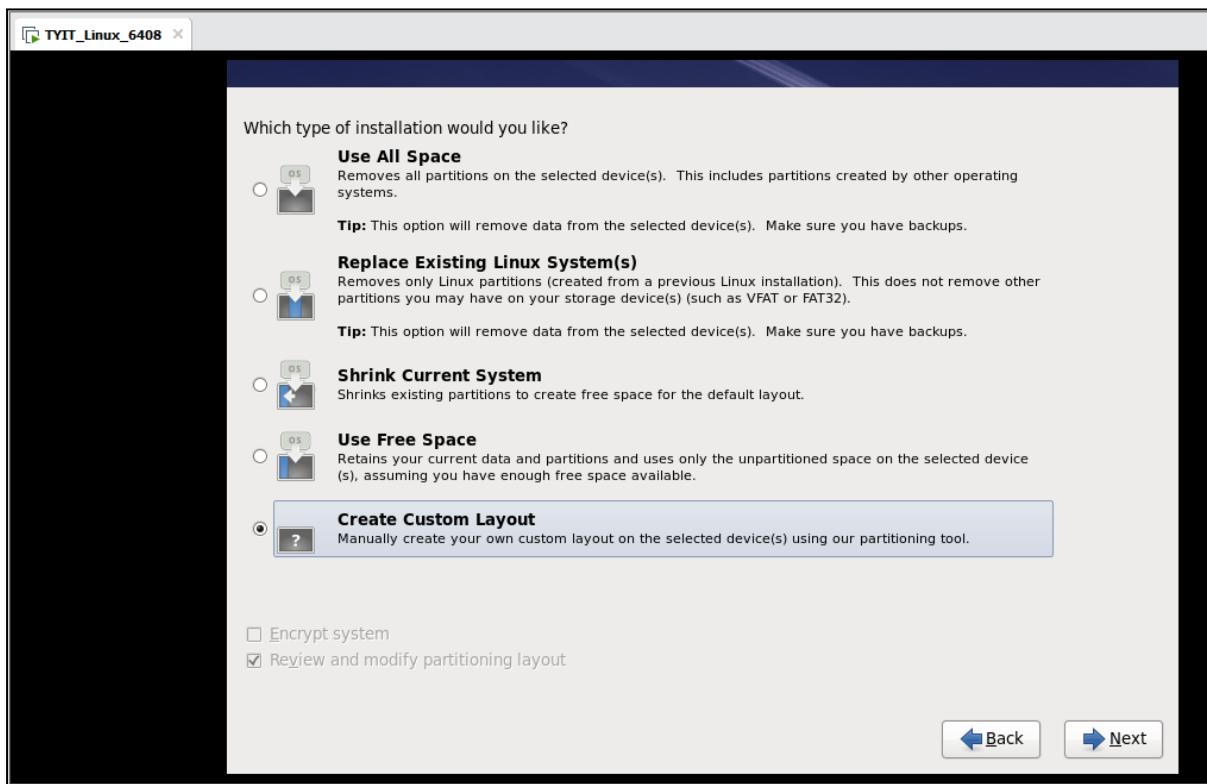
Step 19 : After setting the System clock, Now set the Root password and Again type it in Confirm then click on “Next”. (Root Password : tyituser)



Step 20 : As we have set a weak password so we will click on “Use Anyway” and proceed to further process.

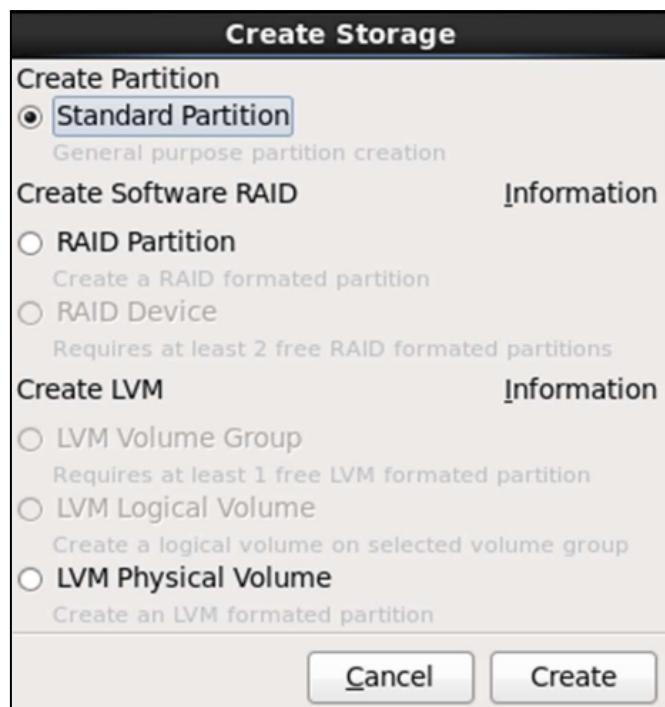


Step 21 : Select the type of installation you want to install, we will click on “Create Custom Layout” and Click on “Next”.

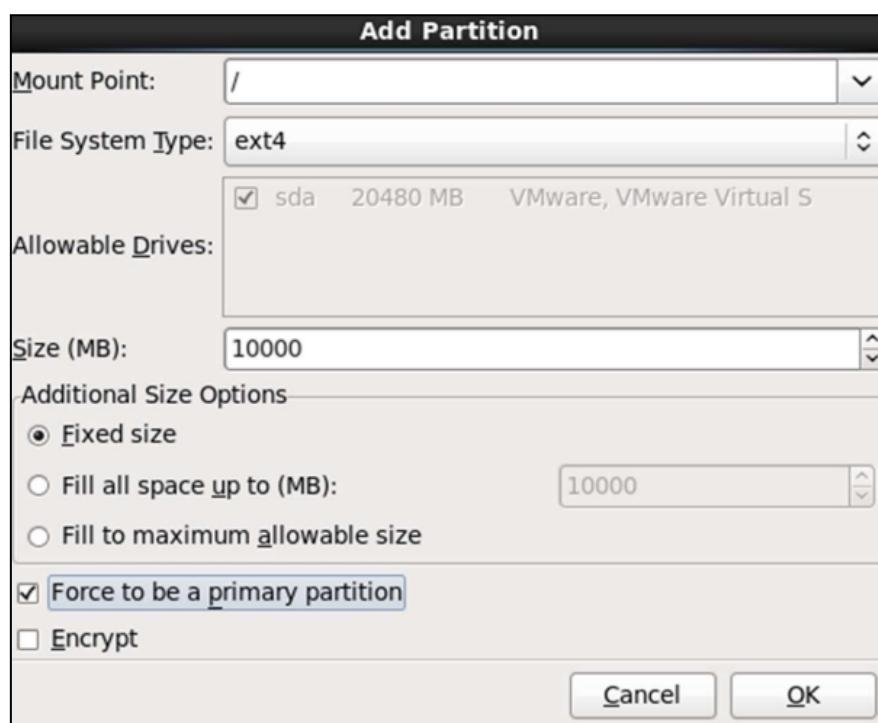


Step 22 : Now we will create partitions for root, boot and swap files.

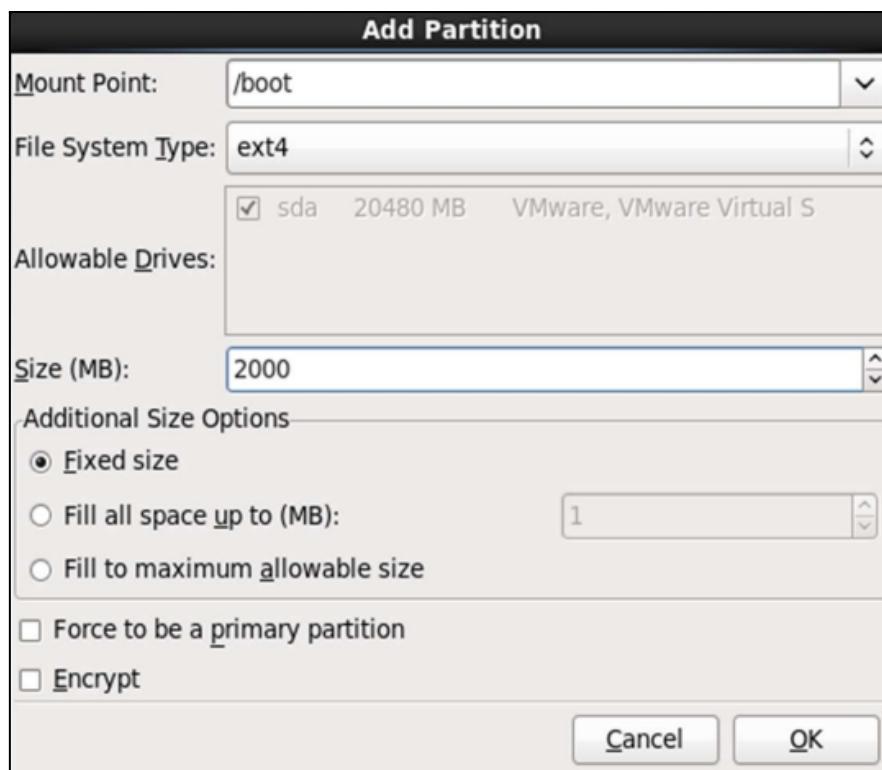




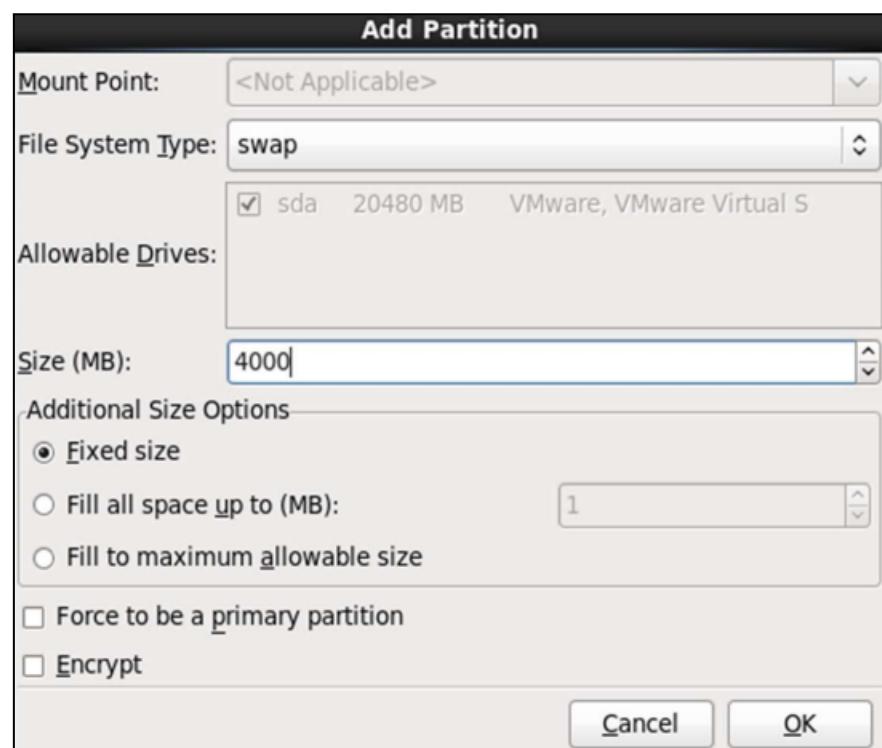
1) / (root) : file type (ext4) : size (10000) : click on Force to be a primary partition then click on OK.



2) /boot : file type (ext4) : size (2000) : then click on OK.

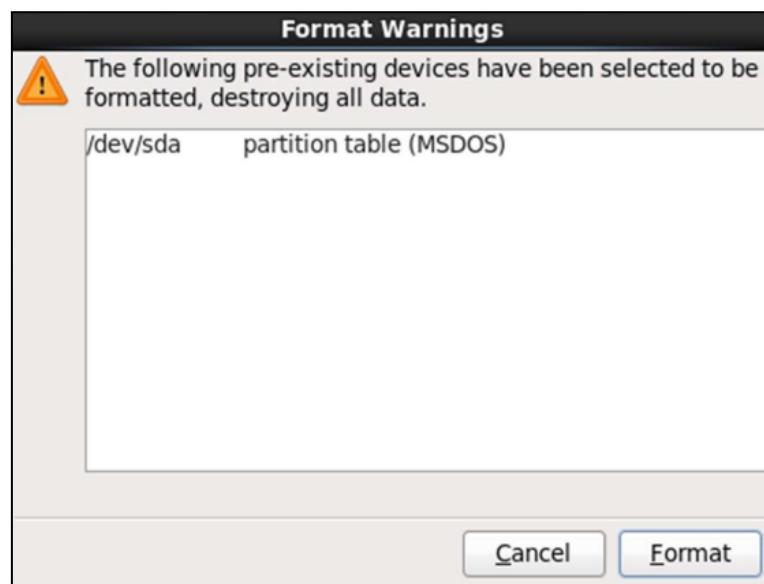


3) file type (swap) : size (4000) : then click on OK.



Device	Size (MB)	Mount Point/ RAID/Volume	Type	Format
▼ Hard Drives				
▼ sda (/dev/sda)				
sda1	2000	/boot	ext4	✓
sda2	10000	/	ext4	✓
sda3	4000		swap	✓
Free	4479			

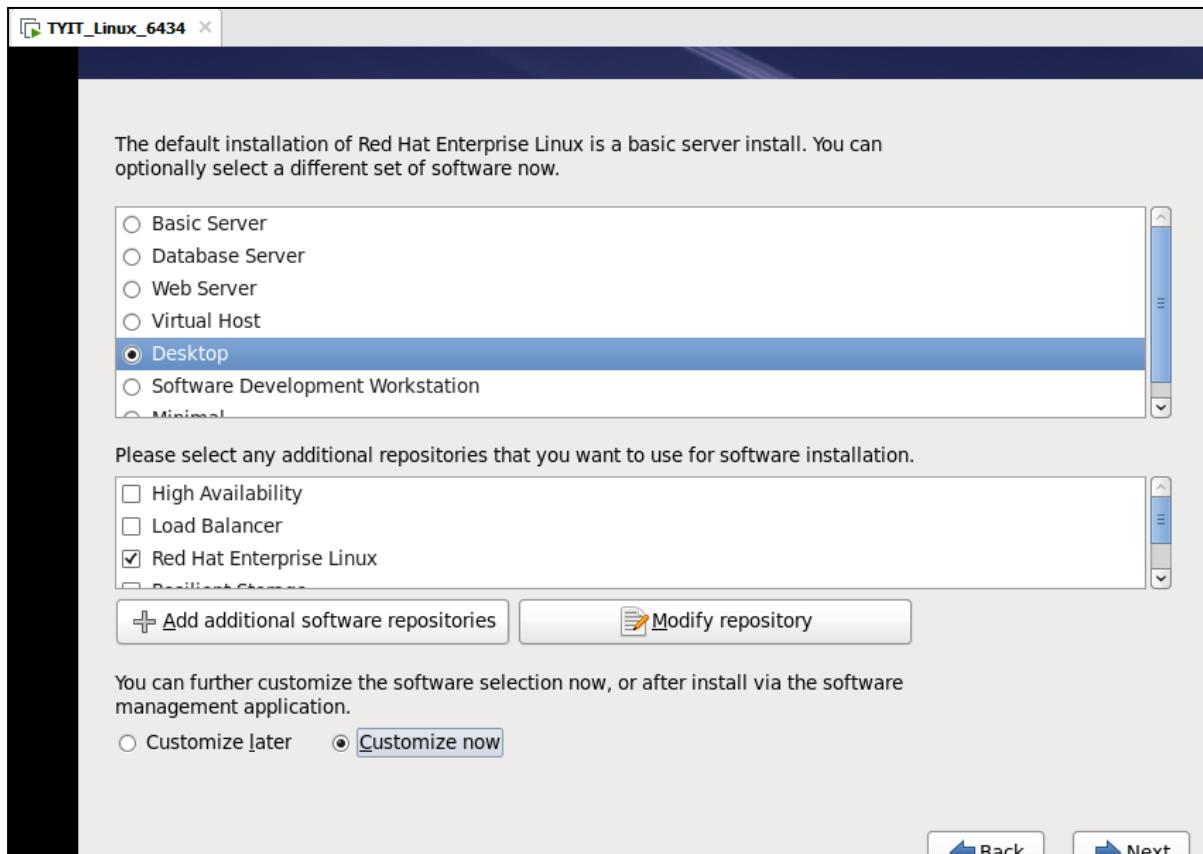
Then Click on “Next” then again a warning window will open, click on “Format”



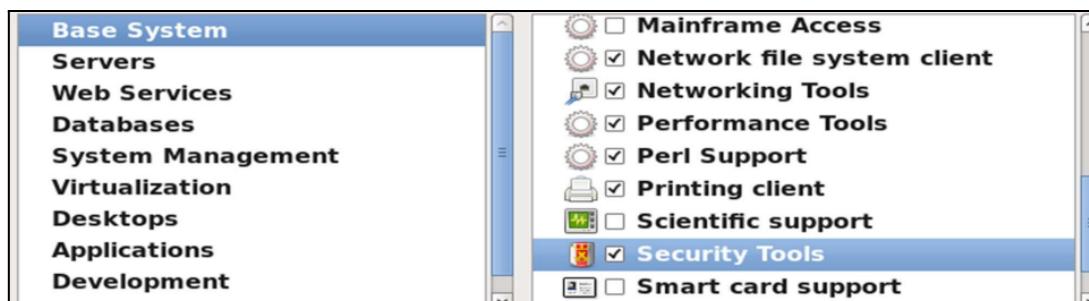
Now click on “Write changes to disk”.



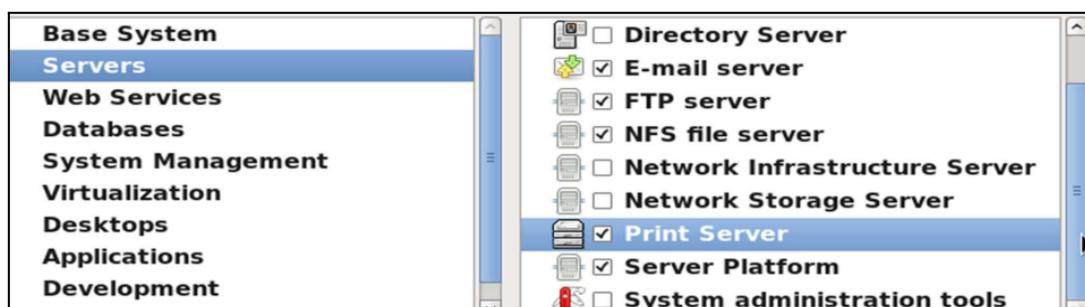
Step 23 : Select “Desktop” and choose “Customize now” then click on “Next”.



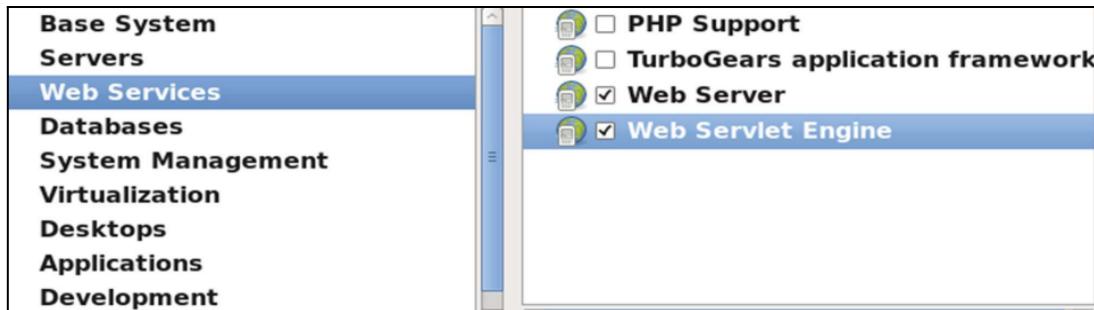
Step 24 : On this window we will select some packages to be installed from several servers. Select from: Base system : Networking Tools, Performance Tools and Security Tools.



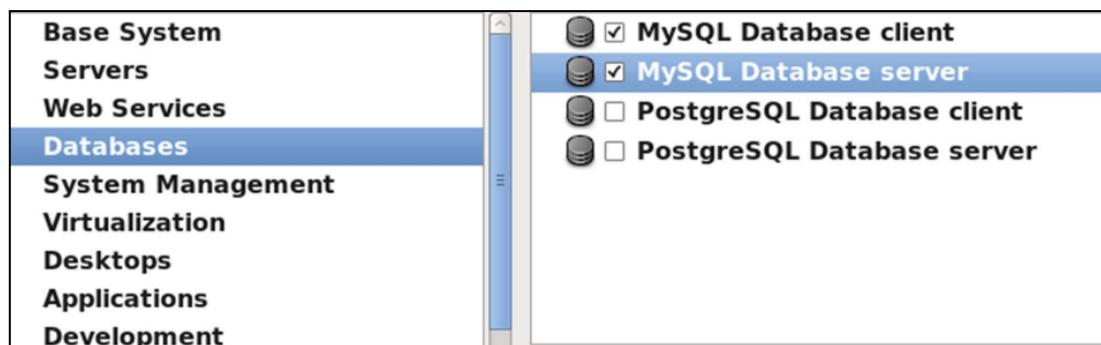
Servers: E-mail server, FTP server, NFS server and Print server.



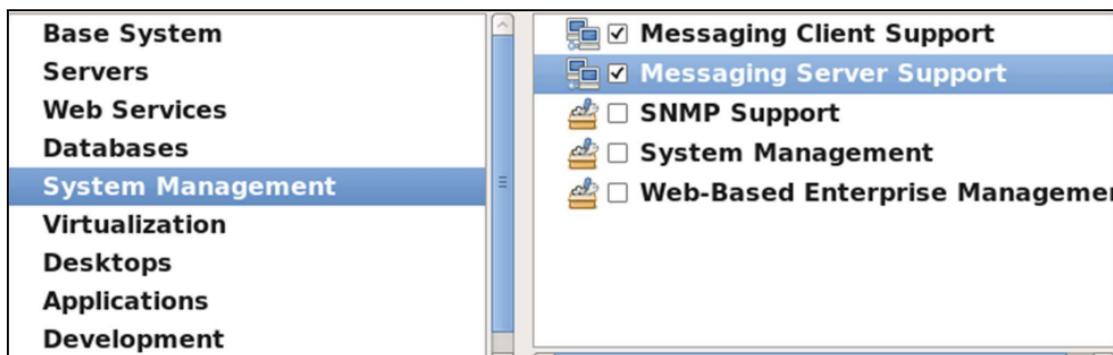
Web Services: Web server and Web Servlet Engine.



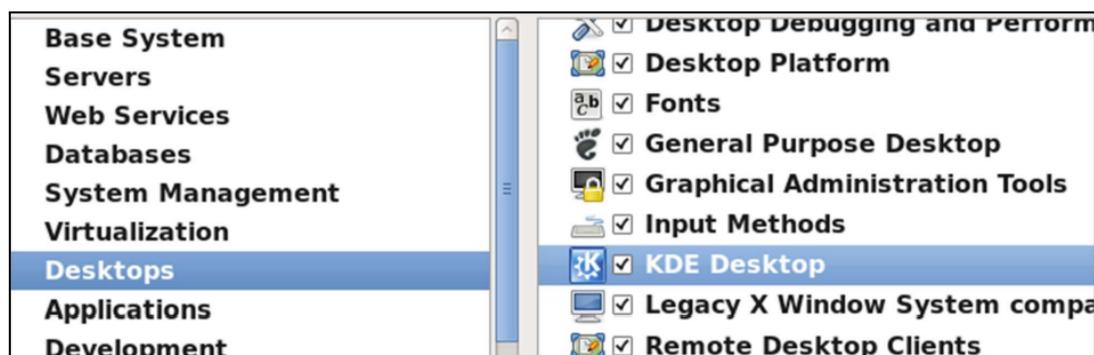
Databases: MySQL Database client and MySQL Database server.



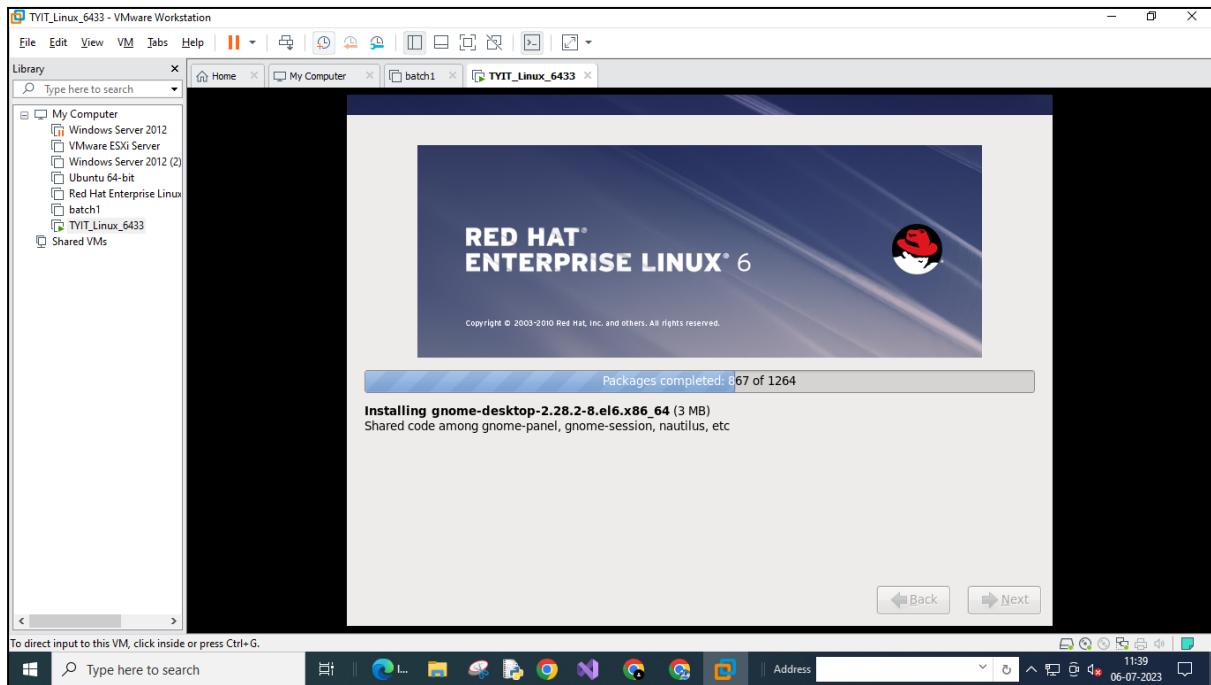
System Management: Messaging Client Support and Messaging Server Support.



Desktops: KDE Desktop



After Clicking on “Next” this type of window will appear and the installation proceeds.

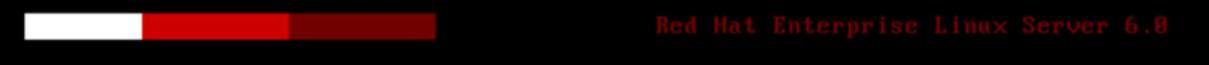


Step 25 : After Completion of installation, this window will show a message that the installation is completed, please reboot the system, simply click on “Reboot”.

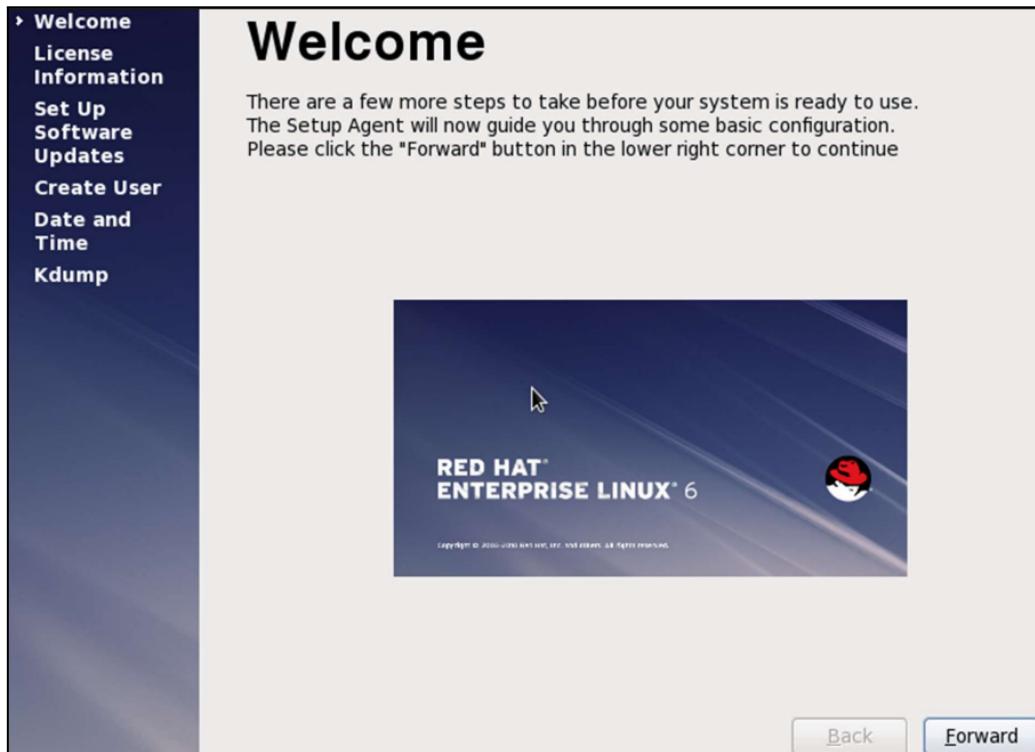


After clicking on reboot, the system will reboot the OS and Start it.

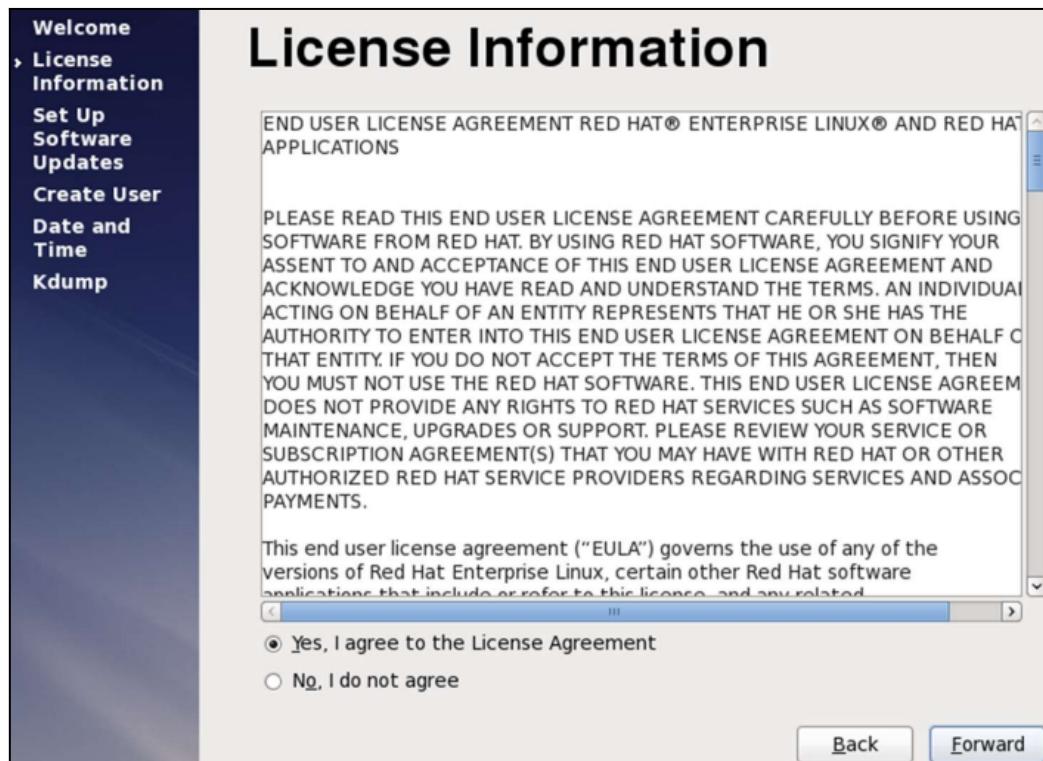
```
Running anaconda 13.21.82, the Red Hat Enterprise Linux system installer - please wait.
14:11:42 Starting graphical installation.
disabling swap...
/dev/sda3
unmounting filesystems...
/mnt/runtime done
disabling /dev/loop0 LOOP_CLR_FD failed: 16
/proc done
/dev/pts done
/sys done
/selinux done
/mnt/sysimage/boot done
/mnt/sysimage/dev/pts done
/mnt/sysimage/dev/shm done
/mnt/sysimage/dev done
/mnt/sysimage/proc/bus/usb done
/mnt/sysimage/proc done
/mnt/sysimage/sys done
/mnt/sysimage/selinux done
/mnt/sysimage done
waiting for mdraid sets to become clean...
Error: mdadm exited with status: 127
sending termination signals...done
```



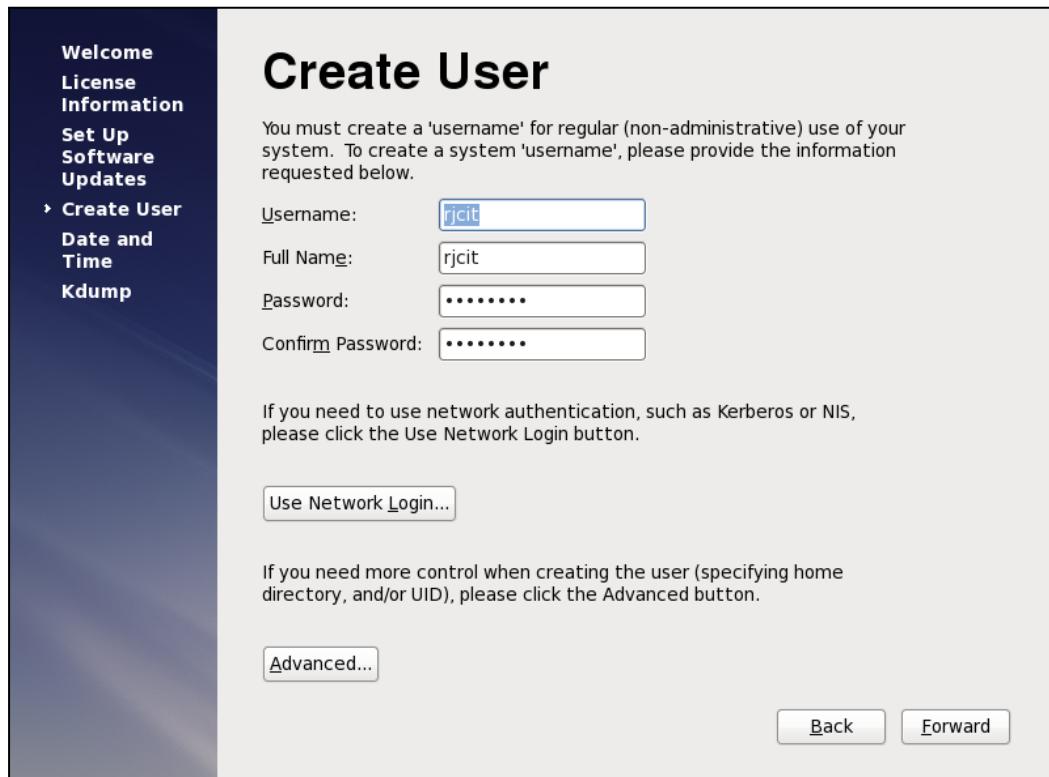
Step 26 : A Welcome screen will appear, just click on “Forward” to start the system.



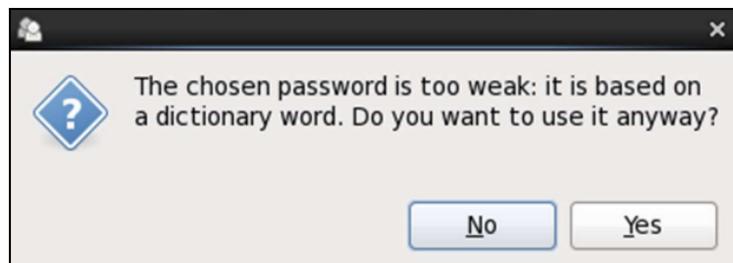
Now they have given the License Information, we can read it and tick on “Yes” after reading the whole document and then click on “Forward”.



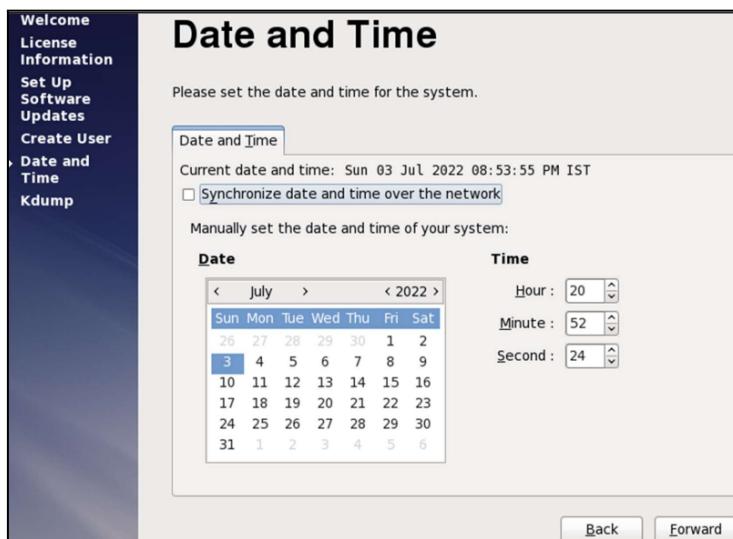
Step 27 : Now Create One User ID by entering the details and click on “Forward”: Username: rjcit Full name: rjcit Password: rjcituser Confirm Password: rjcituser



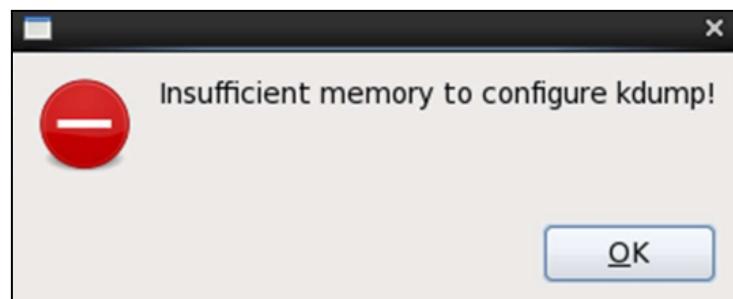
As we have typed a Weak Password so a dialog box will appear if we want to change our password, if not then click on “Yes”.



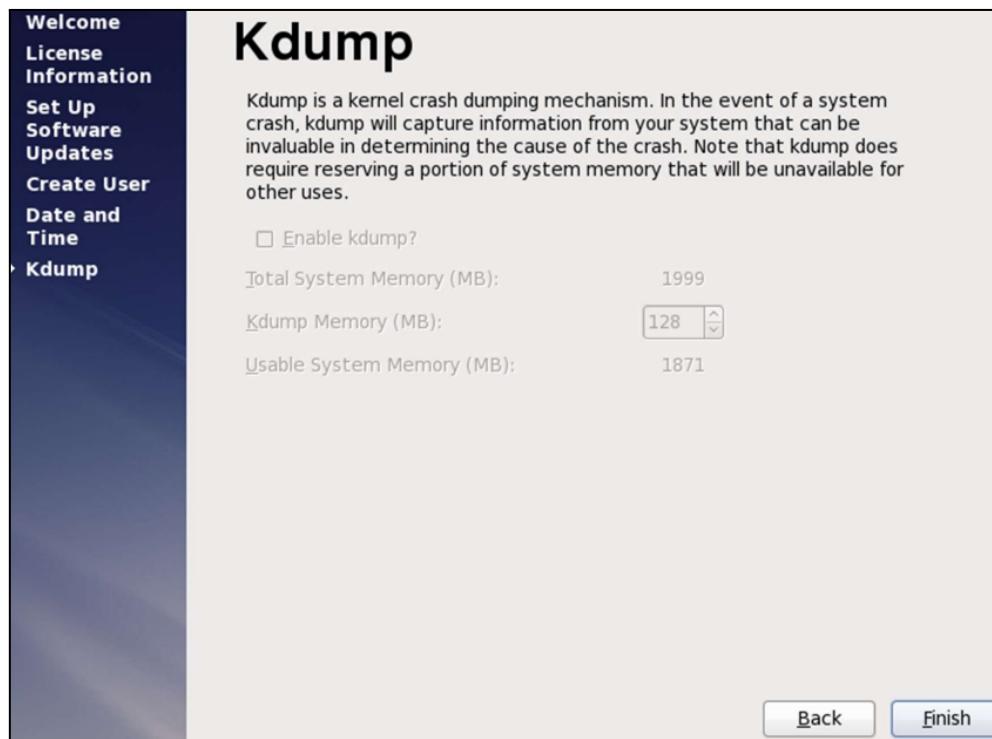
Step 28 : Now set the date time, then click on “Forward”.



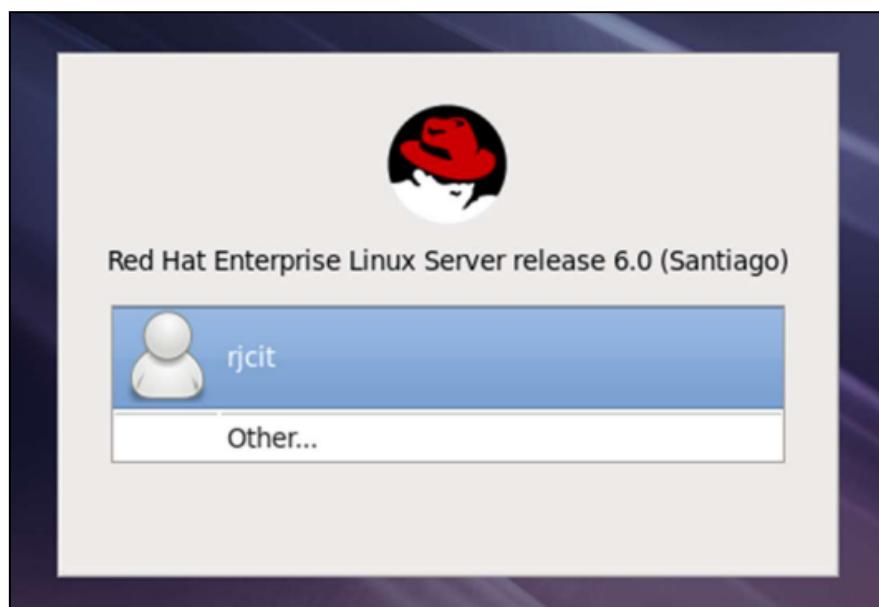
After clicking on “Forward”, A message box will appear, click on “OK”.



Step 29 : A “Kdump” will be created automatically just click on “Finish” to complete the setup.



Now you can login as a user using “rjcit” and enter password “rjcitus”.



That's It. Now you can use the system in any way you want.

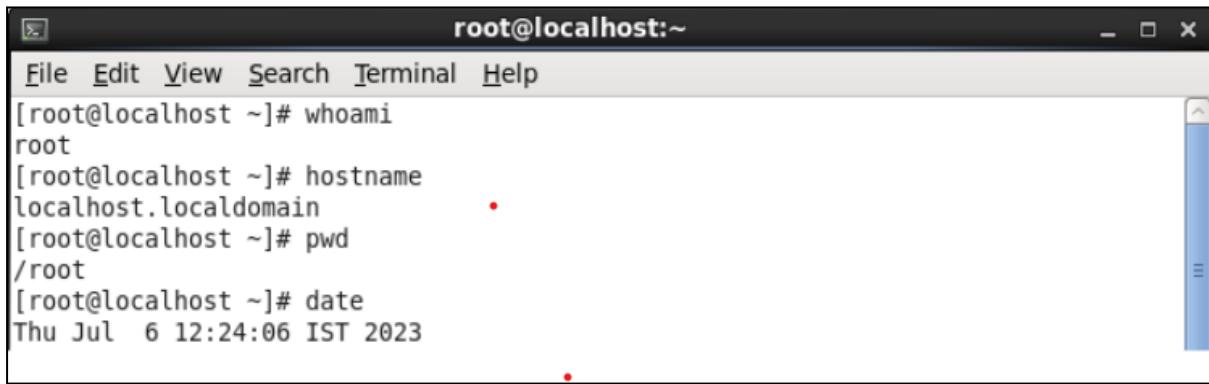
Practical 1. Graphical User Interface and Command Line Interface and Processes

whoami : Displays the username of the current user when this command is invoked.

hostname : Used to obtain the DNS(Domain Name System) name and set the system's hostname or NIS(Network Information System) domain name.

pwd : It prints the path of the working directory, starting from the root.

date : Used to display the system date and time. It is also used to set the date and time of the system.



```
root@localhost:~  
File Edit View Search Terminal Help  
[root@localhost ~]# whoami  
root  
[root@localhost ~]# hostname  
localhost.localdomain  
[root@localhost ~]# pwd  
/root  
[root@localhost ~]# date  
Thu Jul 6 12:24:06 IST 2023
```

mkdir : Allows the user to create directories. This command can create multiple directories at once.

cd : Known as change directory command. It is used to change the current working directory.

cd .. : To navigate to the previous directory (or back)

```
[root@localhost ~]# mkdir rj  
[root@localhost ~]# cd rj  
[root@localhost rj]# pwd  
/root/rj  
[root@localhost rj]# cd ..
```

ls : ls will display the contents of the current directory. By default, 'ls' lists files and directories in alphabetical order.

```
[root@localhost ~]# ls  
a anaconda-ks.cfg Downloads Music Riya rjcollege  
ab Desktop install.log Pictures rj Templates  
abc Documents install.log.syslog Public rjclg Videos
```

ls -a : Represent all files Include hidden files and directories in the listing.

```
[root@localhost ~]# ls -a
.
.. .bashrc .gconf .imsettings.log .pulse-cookie
a .cache .gconfd install.log Riya
a .config .gnome2 install.log.syslog rj
ab .cshrc .gnote .local rjclg
abc .dbus .gnupg Music rjcollege
anaconda-ks.cfg Desktop .gstreamer-0.10 .nautilus .ssh
.bash_history Documents .gtk-bookmarks Pictures .tcshrc
.bash_logout Downloads .gvfs Public Templates
.bash_profile .esd auth .ICEauthority .pulse Videos
```

ls a

ls a*

ls a?

ls a??

```
[root@localhost ~]# ls a
a
[root@localhost ~]# ls a*
a ab abc anaconda-ks.cfg
[root@localhost ~]# ls a?
ab
[root@localhost ~]# ls a??
abc
```

cat : Reads data from file and gives their content as output. It helps us to create, view, and concatenate files.

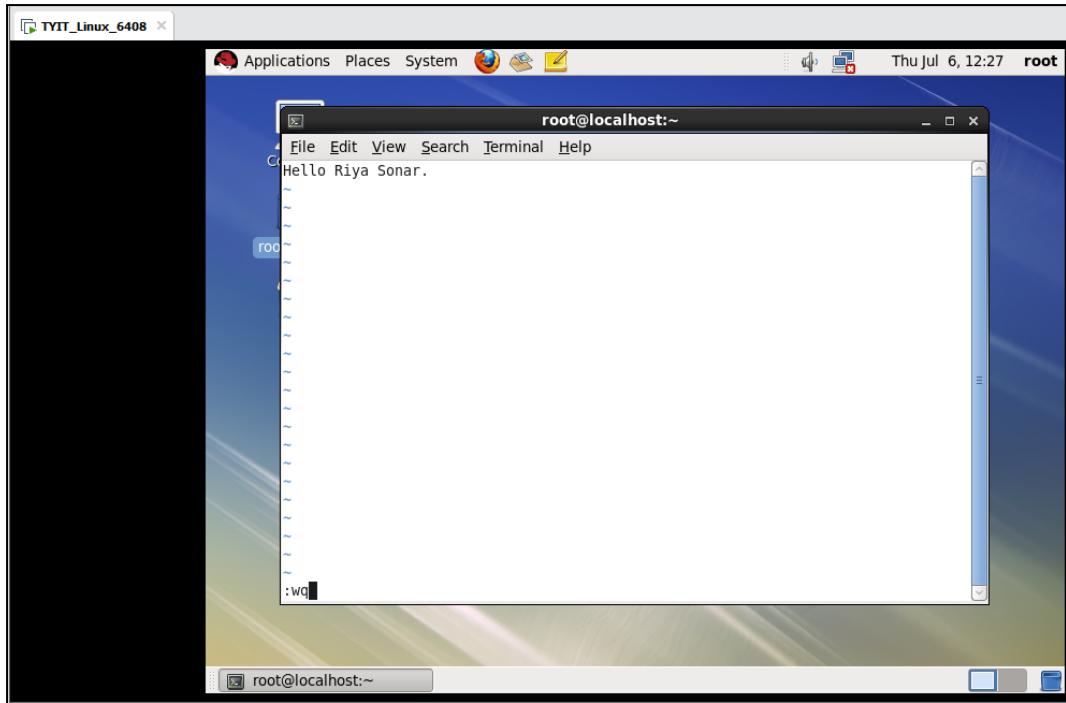
cat > demo1 :

cat demo1 : This command is used to display the content of a file.

```
[root@localhost ~]# cat >demo1
Hello Riya Sonar.
^C
[root@localhost ~]# cat demo1
Hello Riya Sonar.
```

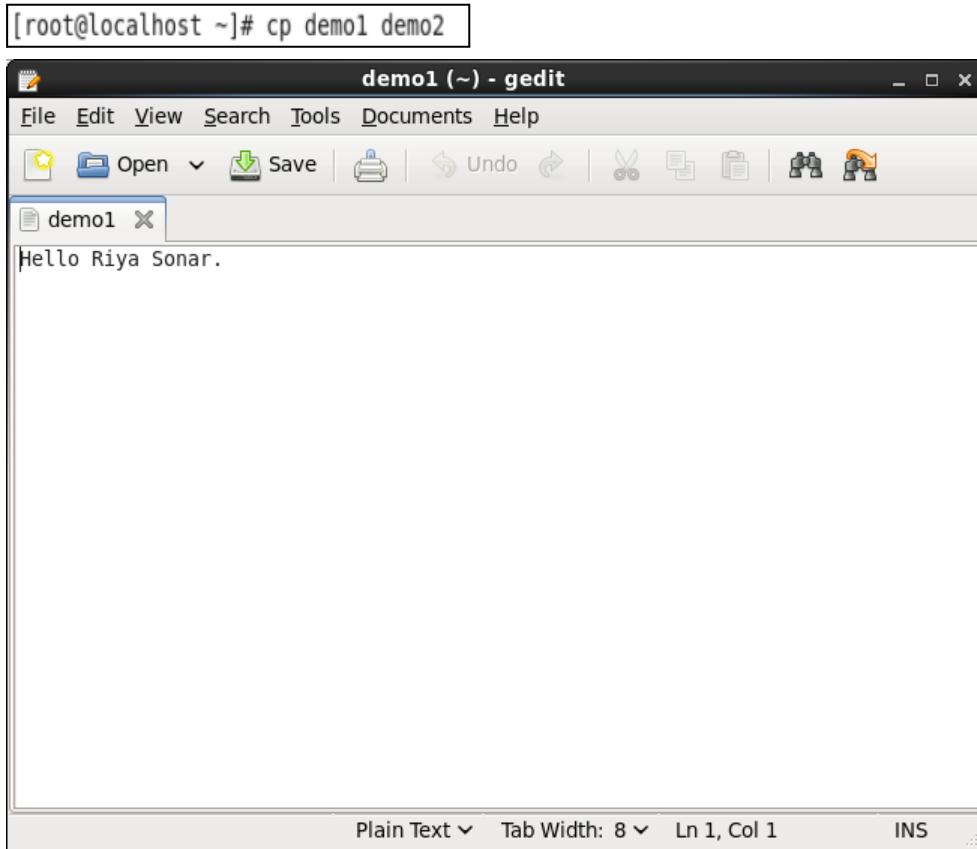
vi demo1 : It is the default editor that comes with the UNIX operating system called visual editor.

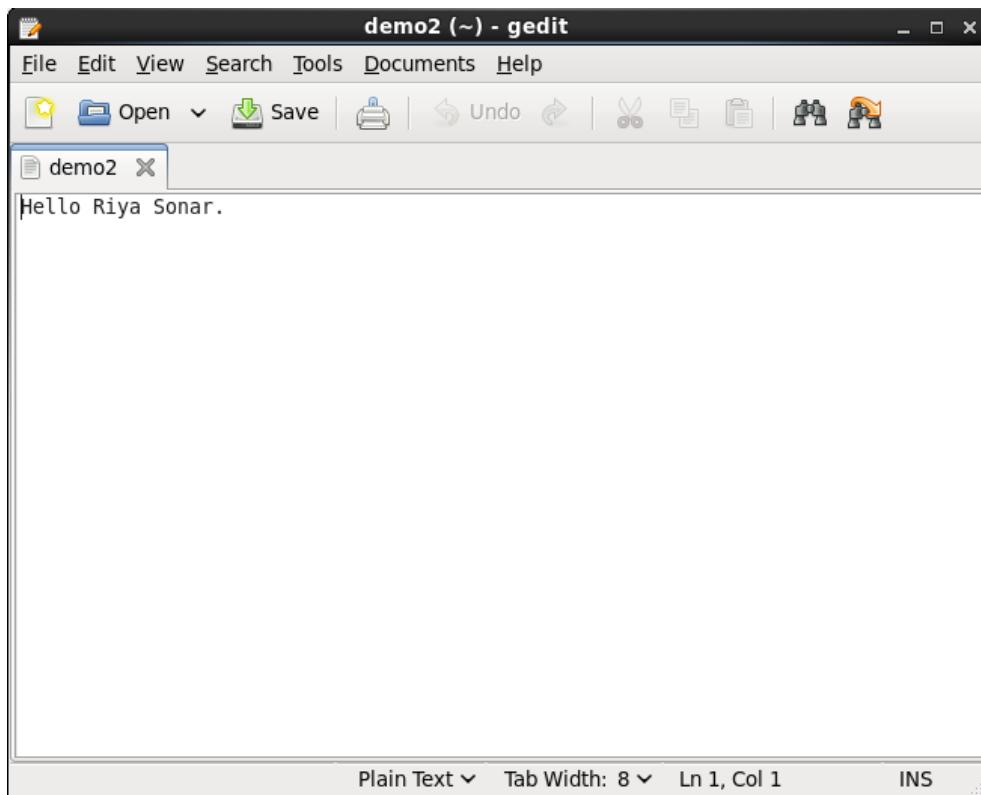
```
[root@localhost ~]# vi demo1
```



:wq : This command is used when vi is opened. After writing into the file through vi, we can use :wq to save and exit the file.

cp : Used to copy files or group of files or directory.





mv : Used to move one or more files or directories from one place to another in file system like LINUX.

```
[root@localhost ~]# mv demo2 demo1
mv: overwrite `demo1'?
```

ps : Used to list the currently running processes and their PIDs along with some other information depends on different options.

```
[root@localhost ~]# ps
 PID TTY      TIME CMD
 2552 pts/0    00:00:00 bash
 28883 pts/0    00:00:00 ps
```

kill : Used to terminate processes manually. kill command sends a signal to a process which terminates the process.

```
[root@localhost ~]# kill 2552
```

top : is used to show the Linux processes provides a dynamic real-time view of the running system.

```

root@localhost:~#
File Edit View Search Terminal Help
[root@localhost ~]# top

top - 12:45:24 up 55 min, 2 users, load average: 0.00, 0.02, 0.05
Tasks: 171 total, 1 running, 170 sleeping, 0 stopped, 0 zombie
Cpu(s): 3.3%us, 0.3%sy, 0.0%ni, 96.0%id, 0.0%wa, 0.0%hi, 0.3%si, 0.0%st
Mem: 2039796k total, 1461328k used, 578468k free, 87772k buffers
Swap: 1023992k total, 0k used, 1023992k free, 948460k cached

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1772 root 20 0 247m 23m 7768 S 3.3 1.2 0:22.28 Xorg
2036 root 20 0 426m 13m 10m S 0.3 0.7 0:00.37 metacity
1 root 20 0 19240 1476 1188 S 0.0 0.1 0:01.30 init
2 root 20 0 0 0 S 0.0 0.0 0:00.00 kthreadd
3 root RT 0 0 0 S 0.0 0.0 0:00.00 migration/0
4 root 20 0 0 0 S 0.0 0.0 0:00.00 ksoftirqd/0
5 root RT 0 0 0 S 0.0 0.0 0:00.00 watchdog/0
6 root 20 0 0 0 S 0.0 0.0 0:00.04 events/0
7 root 20 0 0 0 S 0.0 0.0 0:00.00 cpuset
8 root 20 0 0 0 S 0.0 0.0 0:00.00 khelper
9 root 20 0 0 0 S 0.0 0.0 0:00.00 netns
10 root 20 0 0 0 S 0.0 0.0 0:00.00 async/mgr
11 root 20 0 0 0 S 0.0 0.0 0:00.00 pm
12 root 20 0 0 0 S 0.0 0.0 0:00.00 sync_supers
13 root 20 0 0 0 S 0.0 0.0 0:00.00 bdi-default

```

man : Used to display the user manual of any command that we can run on the terminal

```

[root@localhost ~]# man
What manual page do you want?
[root@localhost ~]# man ls

```

```

root@localhost:~#
File Edit View Search Terminal Help
LS(1) User Commands LS(1)
NAME
ls - list directory contents
SYNOPSIS
ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort.

Mandatory arguments to long options are mandatory for short options
too.

-a, --all
do not ignore entries starting with .

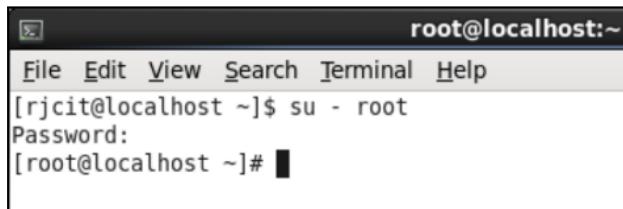
-A, --almost-all
do not list implied . and ..

--author
with -l, print the author of each file
:
```

Practical 2. Storage Devices and Links, Backup and Repository

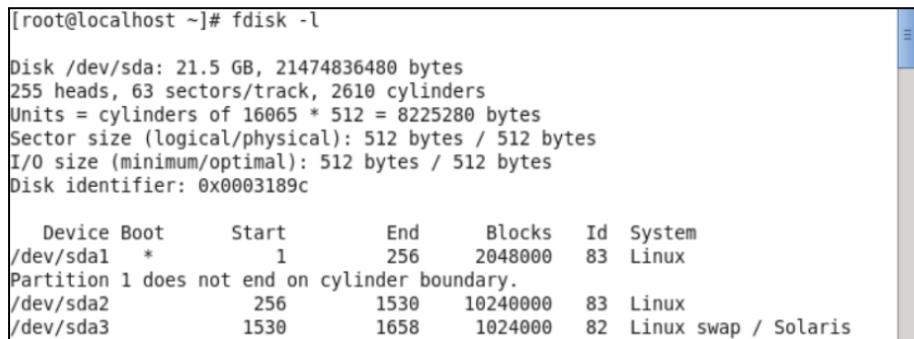
1. Working with directories

su - root : command is used to switch to the root user in a Unix-like operating system.



A terminal window titled "root@localhost:~". The menu bar includes File, Edit, View, Search, Terminal, and Help. The command [rjcit@localhost ~]\$ su - root is entered, followed by a password prompt. The final prompt shows the root shell at [root@localhost ~]#.

fdisk -l : The "fdisk -l" command is used to list information about the disk partitions on a Linux system. When executed with root or superuser privileges, it provides a detailed overview of the available disks and their partitions.

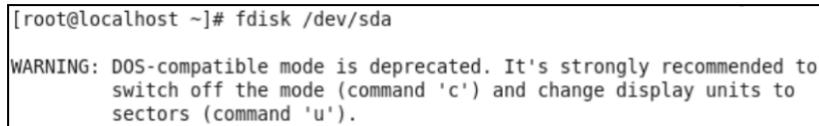


A terminal window showing the output of the fdisk -l command. It lists disk geometry and partition table details for /dev/sda, including three existing partitions (sda1, sda2, sda3) and their characteristics.

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	1	256	2048000	83	Linux
Partition 1 does not end on cylinder boundary.						
/dev/sda2		256	1530	10240000	83	Linux
/dev/sda3		1530	1658	1024000	82	Linux swap / Solaris

➤ To create partition /dev/sda

fdisk /dev/sda : Running the command "fdisk /dev/sda" with root or superuser privileges allows you to interactively manage the partitions on the "/dev/sda" disk. It launches the fdisk utility and opens the specified disk for editing.



A terminal window showing the fdisk /dev/sda command being run. A warning message is displayed about DOS-compatible mode being deprecated.

m : print menu for help

```
Command (m for help): m
Command action
  a  toggle a bootable flag
  b  edit bsd disklabel
  c  toggle the dos compatibility flag
  d  delete a partition
  l  list known partition types
  m  print this menu
  n  add a new partition
  o  create a new empty DOS partition table
  p  print the partition table
  q  quit without saving changes
  s  create a new empty Sun disklabel
  t  change a partition's system id
  u  change display/entry units
  v  verify the partition table
  w  write table to disk and exit
  x  extra functionality (experts only)
```

■ Primary Partition

n : Adds a new partition

```
Command (m for help): n
Command action
  e  extended
  p  primary partition (1-4)
p
Selected partition 4
First cylinder (1658-2610, default 1658):
Using default value 1658
Last cylinder, +cylinders or +size{K,M,G} (1658-2610, default 2610):
Using default value 2610
```

p : primary partition

4 : Partition no.

```
p
Selected partition 4
First cylinder (2040-2610, default 2040):
Using default value 2040
Last cylinder, +cylinders or +size{K,M,G} (2040-2610, default 2610):
Using default value 2610
```

w : Write table to disk and exit

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource
busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

partx -a /dev/sda : The "partx -a /dev/sda" command is used to update the partition table on the "/dev/sda" disk by re-reading the partition information from the disk. It is commonly used after modifying the partition table manually or when changes have been made to the disk's partition layout.

```
[root@localhost ~]# partx -a /dev/sda
BLKPG: Device or resource busy
error adding partition 1
BLKPG: Device or resource busy
error adding partition 2
BLKPG: Device or resource busy
error adding partition 3
```

partx -l /dev/sda : The "partx -l /dev/sda" command is used to list the partitions on the "/dev/sda" disk without modifying the partition table. It provides a summary of the partitions present on the specified disk.

```
[root@localhost ~]# partx -l /dev/sda
# 1:    2048- 4098047 ( 4096000 sectors,   2097 MB)
# 2: 4098048- 24578047 ( 20480000 sectors, 10485 MB)
# 3: 24578048- 32770047 ( 8192000 sectors,   4194 MB)
# 4: 32770048- 41929649 ( 9159602 sectors,   4689 MB)
```

mkfs.ext4 /dev/sda4 : The command "mkfs.ext4 /dev/sda4" is used to create a new ext4 file system on the "/dev/sda4" partition.

```
[root@localhost ~]# mkfs.ext4 /dev/sda4
mke2fs 1.41.12 (17-May-2010)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
286720 inodes, 1144950 blocks
57247 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1174405120
35 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912, 819200, 884736

Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 31 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
[root@localhost ~]#
```

mkdir /filename : used to create a new directory with the name "filename" at the root of the file system.

```
[root@localhost ~]# mkdir /file1
[root@localhost ~]#
```

cd / : command is used to change the current directory to the root directory ("/") of the file system.

```
[root@localhost ~]# cd /
[root@localhost /]#
```

ls : 'ls' will display the contents of the current directory. By default, 'ls' lists files and directories in alphabetical order.

```
[root@localhost /]# ls
bin    dev    home   lost+found  mnt  proc  selinux  [mp]
boot   etc    lib     media      net  root  srv    usr
cgroup file1 lib64  misc       opt  sbin  sys    var
[root@localhost /]#
```

vim /etc/fstab : The command "vim /etc/fstab" is used to open the "/etc/fstab" file for editing in the Vim text editor.

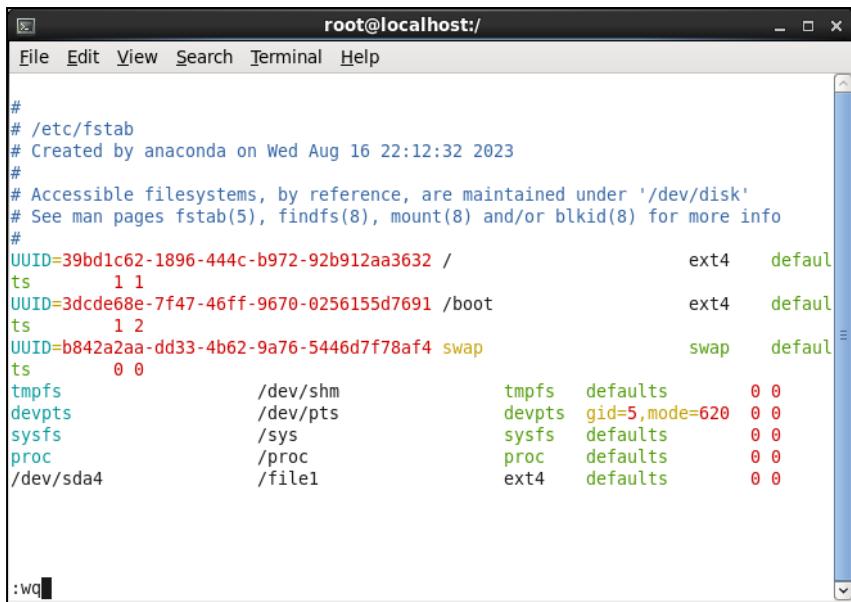
```
[root@localhost /]# vim /etc/fstab
[root@localhost /]#
```

Write the following in vim text-editor:

/dev/sda4	/file1	ext4	defaults	0 0
-----------	--------	------	----------	-----

Save and Exit :

The specific commands for saving and exiting Vim can be found within the editor itself (e.g., ":w" to save, ":q" to quit, etc.).



```
# /etc/fstab
# Created by anaconda on Wed Aug 16 22:12:32 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
#
UUID=39bd1c62-1896-444c-b972-92b912aa3632 /          ext4  defaults
ts      1 1
UUID=3dcde68e-7f47-46ff-9670-0256155d7691 /boot        ext4  defaults
ts      1 2
UUID=b842a2aa-dd33-4b62-9a76-5446d7f78af4 swap        swap  defaults
ts      0 0
tmpfs            /dev/shm          tmpfs  defaults  0 0
devpts           /dev/pts          devpts  gid=5,mode=620 0 0
sysfs            /sys              sysfs  defaults  0 0
proc              /proc             proc   defaults  0 0
/dev/sda4         /file1           ext4  defaults  0 0

:wq
```

mount -a : The "mount -a" command is used to mount all file systems listed in the "/etc/fstab" files that are not currently mounted. It instructs the system to mount all file systems with the "auto" option specified in the configuration file.

```
[root@localhost ~]# mount -a
```

df : Used to display information related to file systems about total space and available space.

```
[root@localhost ~]# df
Filesystem      1K-blocks   Used Available Use% Mounted on
/dev/sda2        10079084  3499952   6067132  37% /
tmpfs            1019896     264   1019632   1% /dev/shm
/dev/sda1        2015824    55892   1857532   3% /boot
/dev/sr0          3351190   3351190           0 100% /media/RHEL_6.0_x86_64_D
isc 1
/dev/sda4        7531604   147908   7001108   3% /file1
```

df -hT : The "df -hT" command is used to display disk space usage information in a human-readable format, showing the total, used, and available space on mounted file systems.

```
[root@localhost ~]# df -hT
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda2    ext4  9.7G  3.4G  5.8G  37% /
tmpfs       tmpfs  996M  264K  996M  1% /dev/shm
/dev/sda1    ext4  2.0G  55M   1.8G  3% /boot
/dev/sr0     iso9660 3.2G  3.2G   0 100% /media/RHEL_6.0_x86_64_Disc 1
/dev/sda4    ext4  7.2G  145M  6.7G  3% /file1
```

umount : This command unmounts a previously mounted device, directory, file, or file system.

```
[root@localhost ~]# umount /dev/sda4
[root@localhost ~]#
```

vim /etc/fstab : Remove the line which we have added before.

After removing the line save and exit from vim /etc/fstab.

```
[root@localhost ~]# vim /etc/fstab
```



```
# /etc/fstab
# Created by anaconda on Wed Aug 16 22:12:32 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
#
UUID=39bd1c62-1896-444c-b972-92b912aa3632 /          ext4  default
ts      1 1
UUID=3dcde68e-7f47-46ff-9670-0256155d7691 /boot        ext4  default
ts      1 2
UUID=b842a2aa-dd33-4b62-9a76-5446d7f78af4 swap         swap  default
ts      0 0
tmpfs      /dev/shm          tmpfs  defaults  0 0
devpts     /dev/pts          devpts  gid=5,mode=620  0 0
sysfs      /sys              sysfs  defaults  0 0
proc       /proc              proc   defaults  0 0

-- INSERT --
```

rmdir : This command is used to remove empty directories from the filesystem in Linux. The rmdir command removes each and every directory specified in the command line only if these directories are empty. So if the specified directory has some directories or files in it then this cannot be removed by rmdir command.

rmdir /file1 : Remove the directory named “/file1” which has been created earlier.

```
[root@localhost /]# rmdir /file1
```

Now, Remove the partition “/dev/sda4” by command fdisk /dev/sda

```
[root@localhost /]# fdisk /dev/sda
WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').
```

➤ Press **d**: To delete a partition.

```
Command (m for help): d
```

➤ Give the partition number: **4** and press Enter.

```
Partition number (1-4): 4
```

➤ Press **w**: To save and exit from the disk partition.

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource
busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

Checking the deletion of partition by command fdisk /dev/sda:

Also checking the partition by partx command:

```
[root@localhost /]# partx -a /dev/sda
BLKPG: Device or resource busy
error adding partition 1
BLKPG: Device or resource busy
error adding partition 2
BLKPG: Device or resource busy
error adding partition 3
```

Checking the disk space that was occupied by /dev/sda4 is free or not by command df -h

```
[root@localhost /]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2        9.7G  3.4G  5.8G  37% /
tmpfs           996M  444K  996M   1% /dev/shm
/dev/sdal       2.0G   55M  1.8G   3% /boot
/dev/sr1        3.2G  3.2G     0 100% /media/RHEL_6.0_x86_64 Disc 1
```

```
[root@localhost /]# df -hT
Filesystem  Type      Size  Used Avail Use% Mounted on
/dev/sda2    ext4      9.7G  3.4G  5.8G  37% /
tmpfs       tmpfs     996M  444K  996M   1% /dev/shm
/dev/sdal    ext4      2.0G   55M  1.8G   3% /boot
/dev/sr1     iso9660  3.2G  3.2G     0 100% /media/RHEL_6.0_x86_64 Disc 1
```

crontab : The crontab is a list of commands that you want to run on a regular schedule, and also the name of the command used to manage that list. Crontab stands for “cron table,” because it uses the job scheduler cron to execute tasks; cron itself is named after “chronos,” the Greek word for time. cron is the system process which will automatically perform tasks for you according to a set schedule. The schedule is called the crontab, which is also the name of the program used to edit that schedule.

crontab -e : To schedule a process and install a new crontab.

```
[rjcit@localhost /]$ crontab -e
no crontab for rjcit - using an empty one
```

Process : */5 * * * * mail -s "Hello root this is Riya user." root <



```
rjcit@localhost:/
File Edit View Search Terminal Help
*/5 * * * * mail -s "Hello root this is Riya user." root <
-- INSERT --
```

```
crontab: installing new crontab
[rjcit@localhost /]$
```

mail : This command is used to show the Cron Daemon.

```
[rjcit@localhost /]$ mail  
Heirloom Mail version 12.4 7/29/08. Type ? for help.  
"/var/spool/mail/rjcit": 1 message 1 new  
>N 1 Cron Daemon Thu Aug 17 01:00 22/897 "Cron <rjcit@localhost>  
&
```

➤ **Links:** Create a file and write something into it using the “**vi**” command.

Create a file using vi

```
[rjcit@localhost ~]$ vi file1
```

cat : see the Content of File

```
[rjcit@localhost ~]$ cat file1  
Hello  
Riya Sonar  
LA Practical
```

HardFile : A Hard Link is a copy of the original file that serves as a pointer to the same file, allowing it to be accessed even if the original file is deleted or relocated. “ln file_name hard_link_file_name” is used to create a hard link.

In : In command is used to create links between files

cat Hardfile : Display the content of Hardfile

```
[rjcit@localhost ~]$ ln file1 HardFile  
[rjcit@localhost ~]$ cat HardFile  
Hello  
Riya Sonar  
LA Practical
```

SoftFile : The soft link serves as a pointer to another file without the file's actual contents. It allows the users to delete the soft links without affecting the original file's contents.

ln -s : Used to create a SoftLink

cat Softfile : Display the content of Softlink

```
[rjcit@localhost ~]$ ln -s file1 SoftFile
You have new mail in /var/spool/mail/rjcit
[rjcit@localhost ~]$ cat SoftFile
Hello
Riya Sonar
LA Practical
```

➤ LVM Partition:

Create one physical volume /dev/sda5 and one volume group tybscit-A then create one logical volume user1 and finally mount this volume to directory /user1. First, We need to create one extended partition.

```
[rjcit@localhost ~]$ su - root
Password:
```

First, We need to create one extended partition.

fdisk /dev/sda

```
[root@localhost ~]# fdisk /dev/sda
WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').
```

1) Press n : add new partition

Press e : Extended Partition

Type 4 : Partition No.

Press enter Twice : To create a new partition.

```
Command (m for help): n
Command action
  e   extended
  p   primary partition (1-4)
e
Selected partition 4
First cylinder (2040-2610, default 2040):
Using default value 2040
Last cylinder, +cylinders or +size{K,M,G} (2040-2610, default 2610):
Using default value 2610
```

2) As we will press n and press enter, we could not make any other partition greater 4.

```
Command (m for help): n
First cylinder (2040-2610, default 2040):
Using default value 2040
Last cylinder, +cylinders or +size{K,M,G} (2040-2610, default 2610):
Using default value 2610
```

3) Press p and press enter: To print the partition table.

```
Command (m for help): p

Disk /dev/sda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0002c9a8

   Device Boot      Start        End      Blocks   Id  System
/dev/sd1   *         1       256     2048000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2        256      1530    10240000   83  Linux
/dev/sda3      1530      2040    4096000   82  Linux swap / Solaris
/dev/sda4      2040      2610    4579801    5  Extended
```

4) Press t and press enter: To change the partition's system id.

```
Command (m for help): t
Partition number (1-5): 5
Hex code (type L to list codes): 8e
Changed system type of partition 5 to 8e (Linux LVM)
```

5) Press p: print partition table

```
Command (m for help): p

Disk /dev/sda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00098eeb

   Device Boot      Start        End      Blocks   Id  System
/dev/sd1   *         1       256     2048000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2        256      1530    10240000   83  Linux
/dev/sda3      1530      2040    4096000   82  Linux swap / Solaris
/dev/sda4      2040      2610    4579801    5  Extended
/dev/sda5      2040      2610    4579769+   8e  Linux LVM
```

6) Press w and press enter: To save and exit from fdisk command.

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource
busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

partx -a /dev/sda

```
[root@localhost ~]# partx -a /dev/sda
BLKPG: Device or resource busy
error adding partition 1
BLKPG: Device or resource busy
error adding partition 2
BLKPG: Device or resource busy
error adding partition 3
```

```
[root@localhost ~]# w
03:39:10 up 20 min, 2 users, load average: 0.00, 0.00, 0.04
USER     TTY      FROM          LOGIN@   IDLE    JCPU   PCPU WHAT
root     tty1     :0          03:19   20:42   4.54s  4.54s /usr/bin/Xorg :
root     pts/0    :0.0        03:19    0.00s  0.09s  0.09s w
```

i) Physical volume: It is any physical storage device, such as a Hard Disk Drive (HDD), Solid State Drive (SSD), or partition, that has been initialized as a physical volume with LVM.

Create a physical volume (pvcreate): This initializes a Physical Volume (PV) on a device so the device is recognized as belonging to LVM. This allows the PV to be used in a Volume Group (VG).

pvcreate /dev/sda5: creates a physical volume .

```
[root@localhost ~]# pvcreate /dev/sda5
Physical volume "/dev/sda5" successfully created
```

pvs: It provides physical volume information in a configurable form, displaying one line per physical volume.

```
[root@localhost ~]# pvs
PV      VG  Fmt Attr PSize PFree
/dev/sda5  lvm2 a-  4.37g 4.37g
```

ii) Volume group: To create a volume group from one or more physical volumes, use the vgcreate command. The vgcreate command creates a new volume group by name and adds at least one physical volume to it.

vgcreate tybscit-A /dev/sda5: This command creates a new volume group by name and adds at least one physical volume to it.

```
[root@localhost ~]# vgcreate tybscit-A /dev/sda5
Volume group "tybscit-A" successfully created
[root@localhost ~]#
```

vgs: It provides volume group information in a configurable form, displaying one line per volume group.

```
[root@localhost ~]# vgs
VG      #PV #LV #SN Attr   VSize VFree
tybscit-A  1   0   0 wz--n- 4.36g 4.36g
[root@localhost ~]#
```

iii) Logical volume: The logical volume is carved from a volume group using the free extents on the physical volumes that make up the volume group. Normally logical volumes use up any space available on the underlying physical volumes on a next-free basis. Modifying the logical volume frees and reallocates space in the physical volumes.

lvcreate -n user1 -L +2GB tybscit-A: This command is used to create logical volume. If you do not specify a name for the logical volume, the default name “lvol#” is used where # is the internal number of the logical volume.

```
[root@localhost ~]# lvcreate -n user1 -L +2GB tybscit-A
Logical volume "user1" created
[root@localhost ~]#
```

lvs: It provides logical volume information in a configurable form, displaying one line per logical volume.

```
[root@localhost ~]# lvs
  LV   VG      Attr  LSize Origin Snap%  Move Log Copy%  Convert
  user1 tybscit-A -wi-a- 2.00g
[root@localhost ~]#
```

/dev/mapper: It is a framework provided by the Linux kernel for mapping physical block devices onto higher-level virtual block devices. It forms the foundation of the logical volume manager (LVM), software RAIDs and dm-crypt disk encryption, and offers additional features such as file system snapshots.

cd /dev/mapper: Changes directory to /dev/mapper.

```
[root@localhost ~]# cd /dev/mapper
[root@localhost mapper]#
```

mkfs: makes a new file system on a specified device. mkfs.ext4

mkfs.ext4 /dev/mapper/tybscit—A-user1: It will create an ext4 file system on /dev/mapper/tybscit—A-user1 from disk partitions.

```
[root@localhost mapper]# mkfs.ext4 /dev/mapper/tybscit--A-user1
mke2fs 1.41.12 (17-May-2010)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
131072 inodes, 524288 blocks
26214 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=536870912
16 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912

Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 32 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
[root@localhost mapper]#
```

mkdir /user1: It will make a /user1 directory.

```
[root@localhost mapper]# mkdir /user1_6408  
[root@localhost mapper]#
```

mount /dev/mapper/tybscit--A-user1 /user1: It will mount the /dev/mapper/tybscit--A-user1 on /user1.

```
[root@localhost mapper]# mount /dev/mapper/tybscit--A-user1 /user1_6408  
[root@localhost mapper]#
```

df -h: It is an inbuilt utility that will find the available and disk usage space on Linux servers.

```
[root@localhost mapper]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
/dev/sda2        9.7G  2.4G  6.9G  26% /  
tmpfs           996M  264K  996M   1% /dev/shm  
/dev/sda1        2.0G   55M  1.8G   3% /boot  
/dev/mapper/tybscit--A-user1  
                  2.0G   67M  1.9G   4% /user1_6408  
[root@localhost mapper]#
```

Now, we will unmount the device and remove the partitions we have made earlier.

umount /dev/mapper//tybscit--A-user1: It will unmount the previously mounted device.

```
[root@localhost mapper]# umount /dev/mapper//tybscit--A-user1  
[root@localhost mapper]#
```

lvremove: It is used to delete the logical volume.

```
[root@localhost mapper]# lvremove /dev/mapper/tybscit--A-user1  
Do you really want to remove active logical volume user1? [y/n]: y  
Logical volume "user1" successfully removed
```

vgremove: It is used to delete the volume group.

```
[root@localhost mapper]# vgremove tybscit-A  
Volume group "tybscit-A" successfully removed  
[root@localhost mapper]#
```

pvremove: It is used to delete the physical volume.

```
[root@localhost mapper]# pvremove /dev/sda5  
Labels on physical volume "/dev/sda5" successfully wiped  
[root@localhost mapper]#
```

df -h: It is an inbuilt utility that will find the available and disk usage space on Linux servers/storage.

```
[root@localhost mapper]# df -h  
Filesystem      Size  Used Avail Use% Mounted on  
/dev/sda2        9.7G  6.5G  2.7G  71% /  
tmpfs           996M  260K  996M   1% /dev/shm  
/dev/sda1        2.0G   55M  1.8G   3% /boot  
/dev/sr0         3.2G  3.2G     0 100% /media/RHEL_6.0_x86_64 Disc 1  
[root@localhost mapper]#
```

➤ **Creating a Repository:**

cd /dev/mapper

```
[root@localhost ~]# cd /dev/mapper
```

cd /media: Change the directory to /media to install some packages to create a repository.

```
[root@localhost mapper]# cd /media  
[root@localhost media]#
```

ls: To list out the files and directories in that current directory.

```
[root@localhost media]# ls  
RHEL_6.0_x86_64_Disc_1  
[root@localhost media]#
```

cd RHEL_6.0\ x86_64\ Disc\ 1/: To change the directory to “RHEL_6.0\ x86_64\ Disc\ 1/”.

```
[root@localhost media]# cd RHEL_6.0\ x86_64\ Disc\ 1/  
[root@localhost RHEL_6.0_x86_64_Disc_1]#
```

```
[root@localhost RHEL_6.0_x86_64_Disc_1]# ls  
EFI  
EULA  
GPL  
HighAvailability  
images  
isolinux  
LoadBalancer  
media.repo  
Packages  
README  
RELEASE-NOTES-as-IN.html  
RELEASE-NOTES-bn-IN.html  
RELEASE-NOTES-de-DE.html  
RELEASE-NOTES-en-US.html  
RELEASE-NOTES-es-ES.html  
RELEASE-NOTES-fr-FR.html  
RELEASE-NOTES-gu-IN.html  
RELEASE-NOTES-hi-IN.html  
RELEASE-NOTES-it-IT.html  
RELEASE-NOTES-ja-JP.html  
RELEASE-NOTES-kn-IN.html  
RELEASE-NOTES-ko-KR.html  
RELEASE-NOTES-ml-IN.html  
RELEASE-NOTES-mr-IN.html  
RELEASE-NOTES-or-IN.html  
RELEASE-NOTES-pa-IN.html  
RELEASE-NOTES-pt-BR.html  
RELEASE-NOTES-ru-RU.html  
RELEASE-NOTES-si-LK.html  
RELEASE-NOTES-ta-IN.html  
RELEASE-NOTES-te-IN.html  
RELEASE-NOTES-zh-CN.html  
RELEASE-NOTES-zh-TW.html  
repodata  
ResilientStorage  
RPM-GPG-KEY-redhat-beta  
RPM-GPG-KEY-redhat-release  
ScalableFileSystem  
Server  
TRANS.TBL  
[root@localhost RHEL_6.0_x86_64_Disc_1]#
```

cd /: Change the directory to root to make a new directory.

```
[root@localhost RHEL_6.0_x86_64_Disc_1]# cd /  
[root@localhost /]#
```

cd /RHEL6: Change the directory to “/RHEL6”.

```
[root@localhost /]# mkdir /RHEL6  
[root@localhost /]#
```

```
[root@localhost /]# cd /RHEL6  
[root@localhost RHEL6]#
```

cp -vr /media/RHEL_6.0\ x86_64\ Disc\ 1/* /RHEL6/: Copy the all the files of “/media/rhel_6.0\ x86_64\ Disc\ 1/” to “/RHEL6”

```
[root@localhost RHEL6]# cd /
[root@localhost /]# ls
bin    dev    lib      media   net    RHEL6  selinux  tmp      var
boot   etc    lib64    misc    opt    root   srv     user1_6408
cgroup home  lost+found mnt    proc   sbin   sys     usr
[root@localhost /]#
```

cp -vr /media/RHEL_6.0\ x86_64\ Disc\ 1/* /RHEL6/: Copy the all the files of “/media/rhel_6.0\ x86_64\ Disc\ 1/” to “/RHEL6”

```
[root@localhost /]# cp -vr /media/RHEL_6.0\ x86_64\ Disc\ 1/* /RHEL6/
```

```
/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-aliases-1.1.26-11.el6.noarch.rpm' -> `/RHEL6/P
ackages/yum-plugin-aliases-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-changelog-1.1.26-11.el6.noarch.rpm' -> `/RHEL6
/Packages/yum-plugin-changelog-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-downloadonly-1.1.26-11.el6.noarch.rpm' -> `/RH
EL6/Packages/yum-plugin-downloadonly-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-protect-packages-1.1.26-11.el6.noarch.rpm' ->
`/RHEL6/Packages/yum-plugin-protect-packages-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-security-1.1.26-11.el6.noarch.rpm' -> `/RHEL6/
Packages/yum-plugin-security-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-tmprepo-1.1.26-11.el6.noarch.rpm' -> `/RHEL6/P
ackages/yum-plugin-tmprepo-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-verify-1.1.26-11.el6.noarch.rpm' -> `/RHEL6/Pa
ckages/yum-plugin-verify-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-plugin-versionlock-1.1.26-11.el6.noarch.rpm' -> `/RHE
L6/Packages/yum-plugin-versionlock-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-presto-0.6.2-1.el6.noarch.rpm' -> `/RHEL6/Packages/yu
m-presto-0.6.2-1.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-rhn-plugin-0.9.1-5.el6.noarch.rpm' -> `/RHEL6/Package
s/yum-rhn-plugin-0.9.1-5.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/yum-utils-1.1.26-11.el6.noarch.rpm' -> `/RHEL6/Packages/y
um-utils-1.1.26-11.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/zd1211-firmware-1.4-4.el6.noarch.rpm' -> `/RHEL6/Packages/
zd1211-firmware-1.4-4.el6.noarch.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/zenity-2.28.0-1.el6.x86_64.rpm' -> `/RHEL6/Packages/zenit
y-2.28.0-1.el6.x86_64.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/zip-3.0-1.el6.x86_64.rpm' -> `/RHEL6/Packages/zip-3.0-1.e
l6.x86_64.rpm'
`/media/RHEL_6.0 x86_64 Disc 1/Packages/zlib-1.2.3-25.el6.i686.rpm' -> `/RHEL6/Packages/zlib-1.2.
```

cd /media/RHEL_6.0\ x86_64\ Disc\ 1/Packages : To change the directory to “RHEL_6.0\ x86_64\ Disc\ 1/”.

```
[root@localhost RHEL6]# cd /media
[root@localhost media]# cd /media/RHEL_6.0\ x86_64\ Disc\ 1/Packages
```

rpm : It is a command-line utility for managing packages on Unix/Linux systems. It allows you to install, query, update, verify and remove RPM packages. It is the default package manager for Red Hat based systems and only works with the .rpm format.

rpm -ivh createrepo-0.9.8-4.el6.noarch.rpm : -ivh is used to install the package with printing 50 hash marks as a package archive is unpacked with verbose for nicer display.

It will not create a repo as the following dependencies are not installed which is necessary to create a repo.

So we will, install that dependencies also:

rpm -ivh deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm : To install the deltarpm dependency.

```
[root@localhost Packages]# rpm -ivh deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm
warning: deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm: Header V3 RSA/S...SHA256 Signature, key ID fd431d51: NOKEY
Preparing...                                           #### [100%]
 1:deltarpm                                         #### [100%]
```

rpm -ivh python-deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm : To install the python-deltarpm dependency.

```
[root@localhost Packages]# rpm -ivh python-deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm
warning: python-deltarpm-3.5-0.5.20090913git.el6.x86_64.rpm: Header V3 RSA/S...SHA256 Signature, key ID fd431d51: NOKEY
Preparing...                                           #### [100%]
 1:python-deltarpm                                #### [100%]
```

Now, we will run the command “**rpm -ivh createrepo -0.9.8 -4.el6. noarch .rpm**” to create a repository.

```
[root@localhost Packages]# rpm -ivh createrepo-0.9.8-4.el6.noarch.rpm
warning: createrepo-0.9.8-4.el6.noarch.rpm: Header V3 RSA/S...SHA256 Signature, key ID fd431d51: NOKEY
Preparing...                                           #### [100%]
 1:createrepo                                       #### [100%]
```

Now checking, if the packages are installed or not by simply running the rpm installation command.

```
[root@localhost Packages]# rpm -ivh createrepo-0.9.8-4.el6.noarch.rpm
warning: createrepo-0.9.8-4.el6.noarch.rpm: Header V3 RSA/S...SHA256 Signature, key ID fd431d51: NOKEY
Preparing...                                           #### [100%]
  package createrepo-0.9.8-4.el6.noarch is already installed
```

createrepo : It is a program that creates a repomd (xml-based rpm metadata) repository from a set of rpms.

createrepo /myrepo : This will create a repository in “/myrepo_6408” directory.

```
[root@localhost Packages]# createrepo /myrepo_6408
Directory /myrepo_6408 must exist
```

Since, there is no directory name “/myrepo_6408”, so we will create it in another directory

cd /etc/yum/pluginconf.d/: To change its directory from “Packages” to “/etc/yum/pluginconf.d/”.

```
[root@localhost Packages]# cd /etc/yum/pluginconf.d/
[root@localhost pluginconf.d]#
```

createrepo --database /RHEL6/Packages : This creates the necessary metadata for your yum repository, as well as the sqlite database for speeding up yum operations in the directory /RHEL6/Packages.

```
[root@localhost pluginconf.d]# createrepo --database /RHEL6/Packages/
1705/3431 - kde-i18n-Turkish-3.5.10-11.el6.noarch.rpm
iso-8859-1 encoding on Ville Skyttö <ville.skytta@iki.fi> - 2.8.2-2

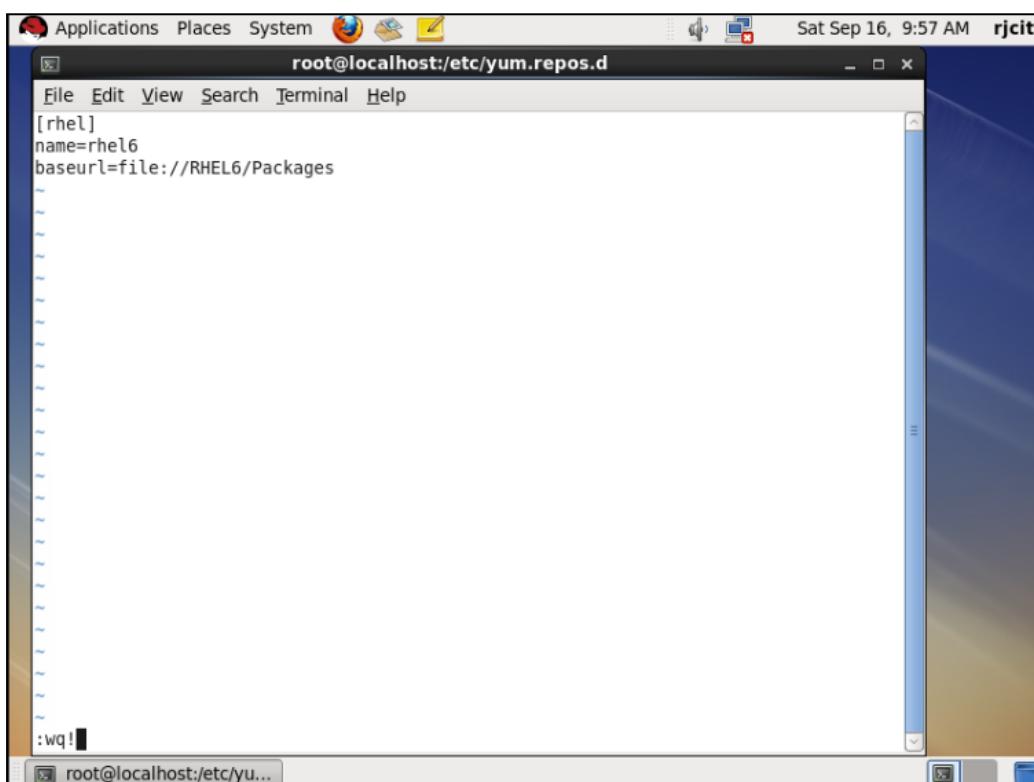
3431/3431 - rsyslog-gnutls-4.6.2-2.el6.x86_64.rpm
Saving Primary metadata
Saving file lists metadata
Saving other metadata
Generating sqlite DBs
Sqlite DBs complete
[root@localhost pluginconf.d]#
```

cd /etc/yum.repos.d : Changing directory to “/etc/yum.repos.d”.

```
[root@localhost pluginconf.d]# cd /etc/yum.repos.d
[root@localhost yum.repos.d]#
```

vi rhel.repo: opening an vi editor.

```
[root@localhost yum.repos.d]# vi rhel.repo
```



➤ **Yum:**

yum repolist: Lists all enabled repositories.

```
[root@localhost yum.repos.d]# vi rhel.repo
[root@localhost yum.repos.d]# yum repolist
Loaded plugins: refresh-packagekit, rhnplugin
This system is not registered with RHN.
RHN support will be disabled.
rhel
rhel/primary_db
repo id          repo name      status
rhel              rhel6          1,677
repolist: 1,677
```

nmap: The nmap command line utility is used for port scanning and finding out all the ways a computer communicates with other computers on a network.

yum search nmap: It will search the nmap.

```
[root@localhost yum.repos.d]# yum search nmap
Loaded plugins: refresh-packagekit, rhnplugin
This system is not registered with RHN.
RHN support will be disabled.
=====
Matched: nmap =====
nmap.x86_64 : Network exploration tool and security scanner
```

yum install dhcp: It will install the dhcp package and will also install it.

```
root@localhost:/etc/yum.repos.d
File Edit View Search Terminal Help
[root@localhost yum.repos.d]# yum install dhcp
Loaded plugins: refresh-packagekit, rhnplugin
This system is not registered with RHN.
RHN support will be disabled.
Setting up Install Process
Resolving Dependencies
--> Running transaction check
--> Package dhcp.x86_64 12:4.1.1-12.P1.el6 set to be updated
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package      Arch      Version       Repository      Size
=====
Installing:
dhcp        x86_64    12:4.1.1-12.P1.el6    rhel      820 k

Transaction Summary
=====
Install      1 Package(s)
Upgrade     0 Package(s)

Total download size: 820 k
Installed size: 2.0 M
Is this ok [y/N]: y
Downloading Packages:
warning: rpmts_HdrFromFdno: Header V3 RSA/SHA256 Signature, key ID fd431d51: NOKEY

Public key for dhcp-4.1.1-12.P1.el6.x86_64.rpm is not installed
```

Practical 3. Working with RPM Storage and Networking

➤ Connecting to the Network

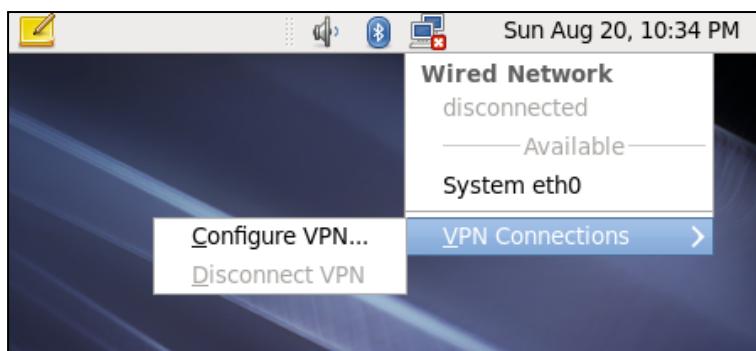
ifconfig: It is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary.

```
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet HWaddr 00:0C:29:CE:A9:C7
          inet addr:192.168.1.3 Bcast:192.168.1.255 Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fece:a9c7/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                  RX packets:76 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:25 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:6512 (6.3 KiB) TX bytes:3918 (3.8 KiB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING MTU:16436 Metric:1
                  RX packets:8 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:0
                  RX bytes:480 (480.0 b) TX bytes:480 (480.0 b)

[root@localhost ~]#
```

Now, we will graphically change the ipaddress: Click on the computer icon, then hover on the “VPN Connections” and click “Configure VPN...”

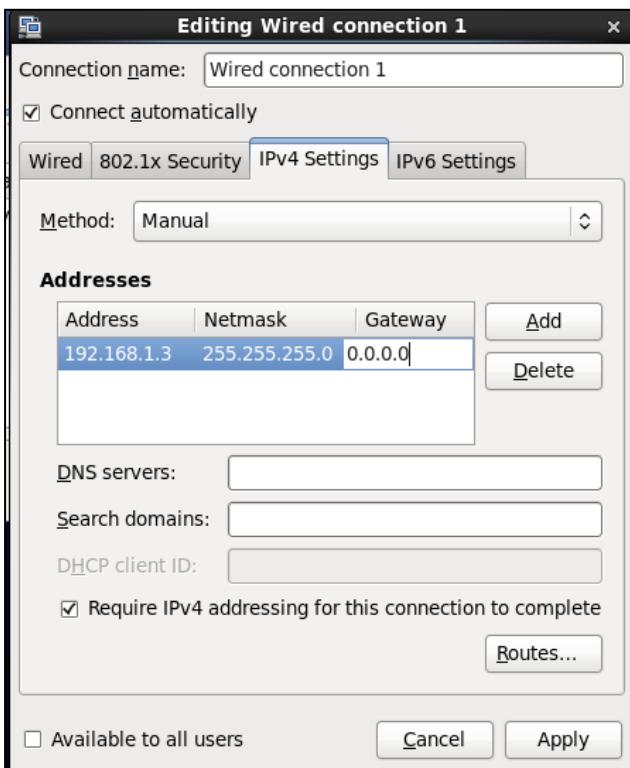


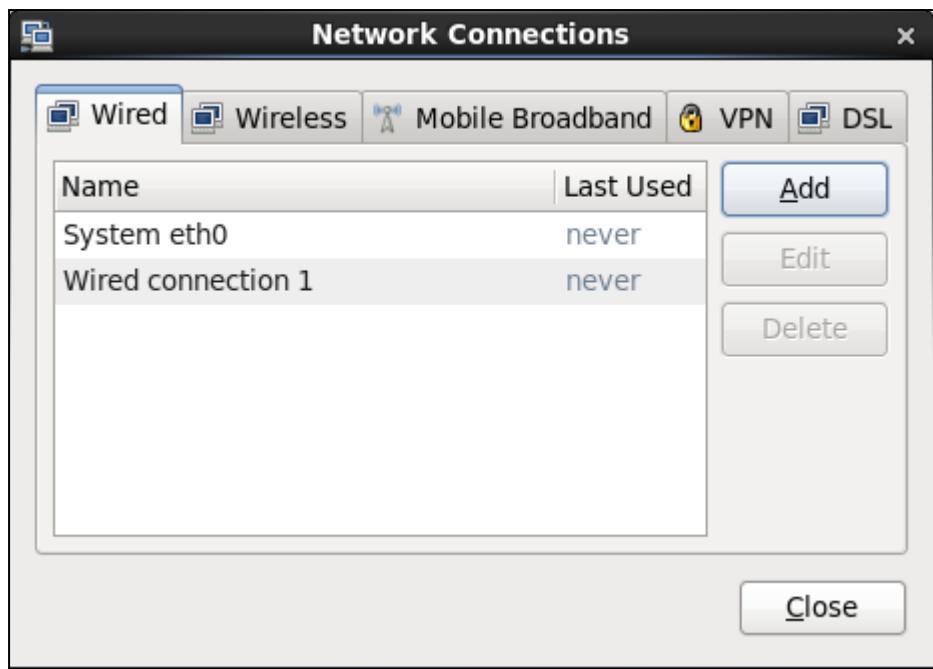
Go to Wired tab and click on System eth0 and Edit it:



Then go to IPv4(IP version 4) Settings: and take the method as “Manual” and add an address manually. Click on Add button and write the following details and then click on Apply: **Address** **Netmask** **Gateway**

192.168.1.3 255.255.255.0 0.0.0.0





After configuring the ipaddress again type the command “ifconfig” to check the address has been set.

Note: You should restart the network so it could configure it and show you the ipaddress which you have set now.

service network restart : restart the network

```
[root@localhost ~]# service network restart
Shutting down interface eth0: [ OK ]
Shutting down loopback interface: [ OK ]
Bringing up loopback interface: [ OK ]
```

ip route: It can be used to show and manage routes on your server.

ip route show: It is used to display the current routing configuration.

ping: This command is used to check the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message “PING” and get a response from the server/host this time is recorded which is called latency.

```
[root@localhost ~]# ip route show
192.168.1.0/24 dev eth0 proto kernel scope link src 192.168.1.3 metric 1
[root@localhost ~]# ping 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 56(84) bytes of data.
64 bytes from 192.168.1.3: icmp_seq=1 ttl=64 time=0.026 ms
64 bytes from 192.168.1.3: icmp_seq=2 ttl=64 time=0.052 ms
64 bytes from 192.168.1.3: icmp_seq=3 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=4 ttl=64 time=0.083 ms
64 bytes from 192.168.1.3: icmp_seq=5 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=6 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=7 ttl=64 time=0.061 ms
64 bytes from 192.168.1.3: icmp_seq=8 ttl=64 time=0.079 ms
64 bytes from 192.168.1.3: icmp_seq=9 ttl=64 time=0.079 ms
64 bytes from 192.168.1.3: icmp_seq=10 ttl=64 time=0.106 ms
64 bytes from 192.168.1.3: icmp_seq=11 ttl=64 time=0.058 ms
64 bytes from 192.168.1.3: icmp_seq=12 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=13 ttl=64 time=0.090 ms
64 bytes from 192.168.1.3: icmp_seq=14 ttl=64 time=0.105 ms
64 bytes from 192.168.1.3: icmp_seq=15 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=16 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=17 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=18 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=19 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=20 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=21 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=22 ttl=64 time=0.062 ms
```

```
64 bytes from 192.168.1.3: icmp_seq=62 ttl=64 time=0.061 ms
64 bytes from 192.168.1.3: icmp_seq=63 ttl=64 time=0.091 ms
64 bytes from 192.168.1.3: icmp_seq=64 ttl=64 time=0.061 ms
64 bytes from 192.168.1.3: icmp_seq=65 ttl=64 time=0.079 ms
64 bytes from 192.168.1.3: icmp_seq=66 ttl=64 time=0.096 ms
64 bytes from 192.168.1.3: icmp_seq=67 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=68 ttl=64 time=0.063 ms
64 bytes from 192.168.1.3: icmp_seq=69 ttl=64 time=0.064 ms
64 bytes from 192.168.1.3: icmp_seq=70 ttl=64 time=0.062 ms
64 bytes from 192.168.1.3: icmp_seq=71 ttl=64 time=0.092 ms
^Z
[1]+ Stopped ping 192.168.1.3
```

ip addr add dev eth0 192.168.10.10/24: To add new ip Address in network

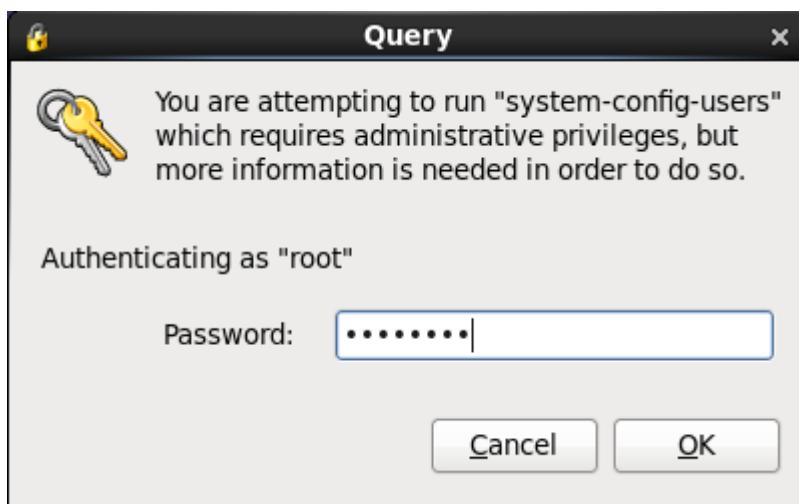
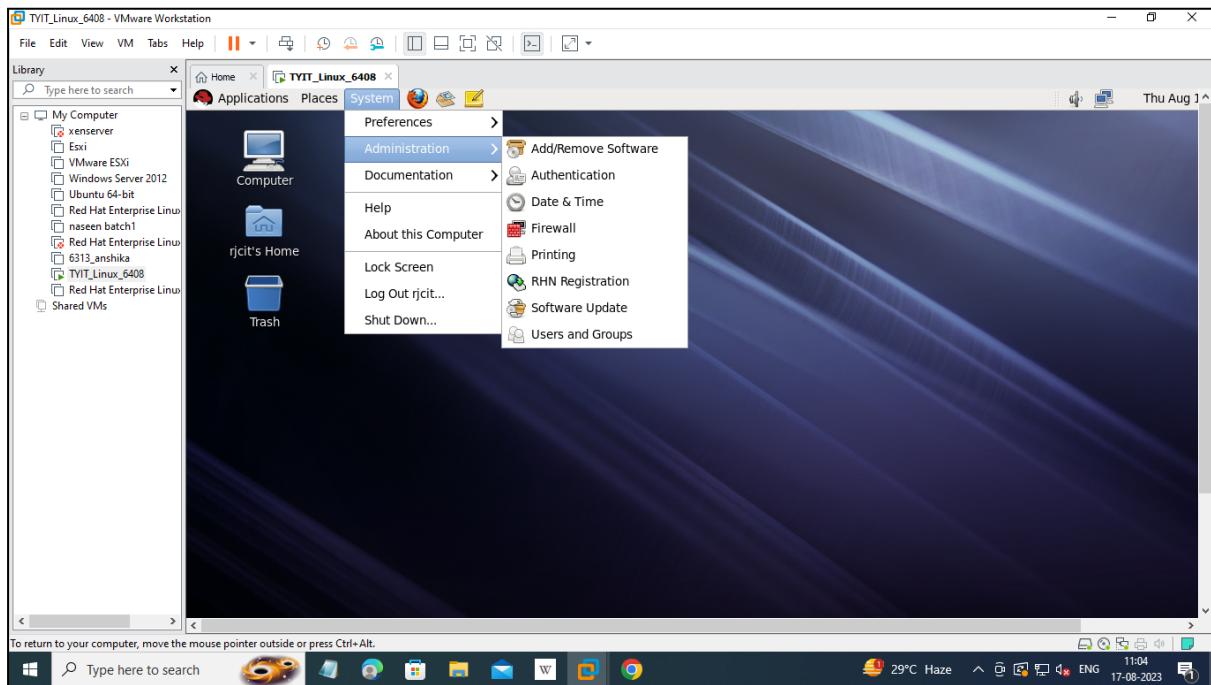
ip route show: To show whether the above command has successfully added an ip address.

```
[root@localhost ~]# ip addr add dev eth0 192.168.10.10/24
[root@localhost ~]# ip route show
192.168.1.0/24 dev eth0 proto kernel scope link src 192.168.1.3 metric 1
192.168.10.0/24 dev eth0 proto kernel scope link src 192.168.10.10
You have new mail in /var/spool/mail/root
[root@localhost ~]#
```

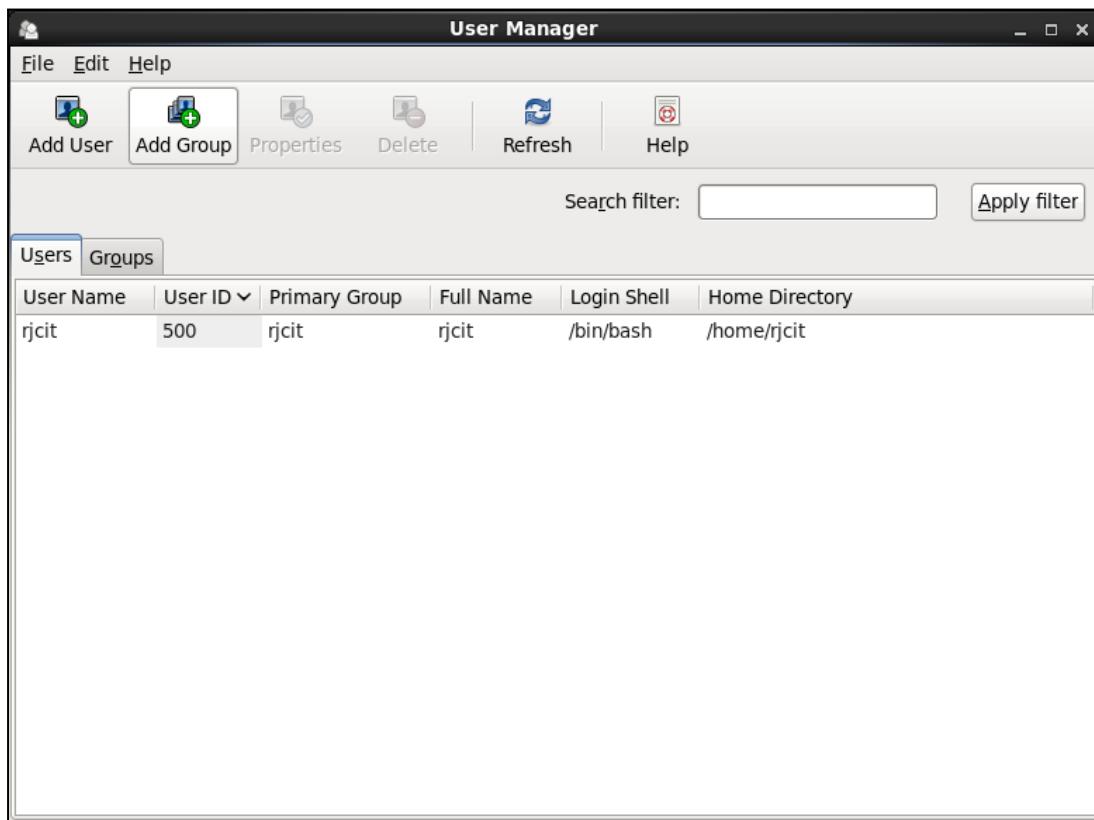
Practical 4. Working with Users, Groups, and Permissions

Graphically Add Users And Groups:

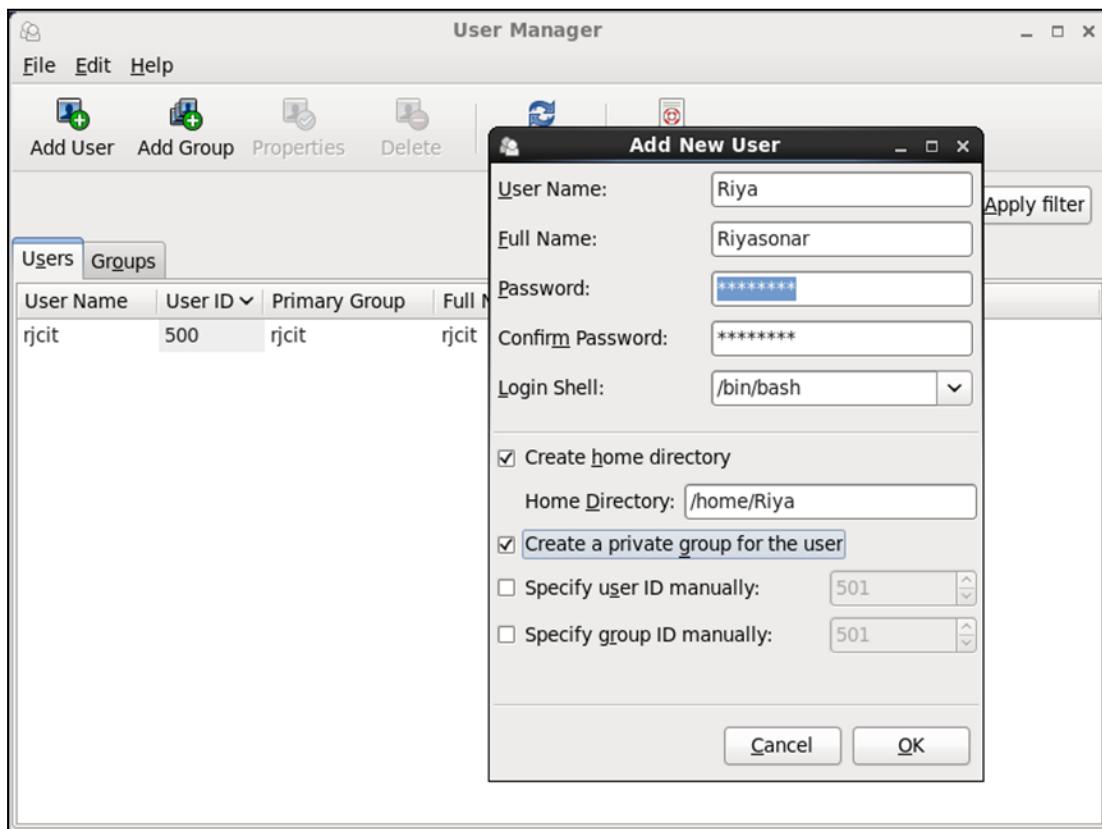
System ->Administration -> Users and Groups

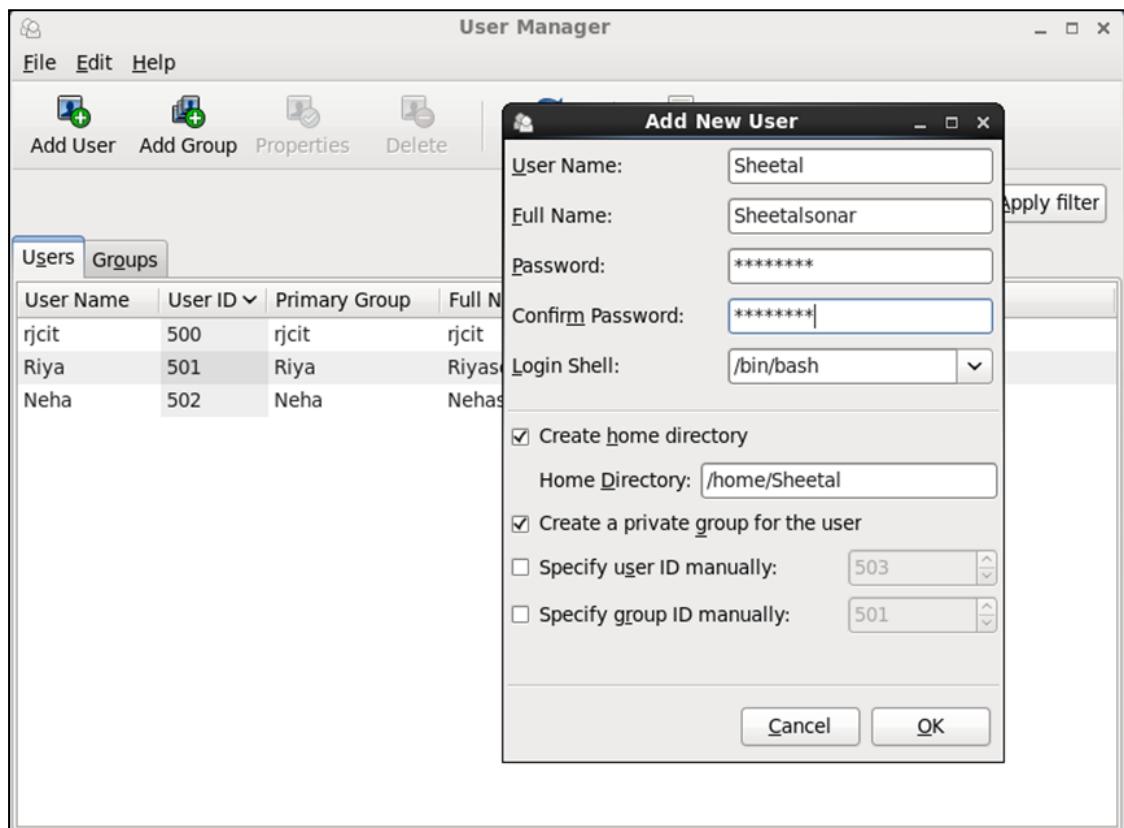
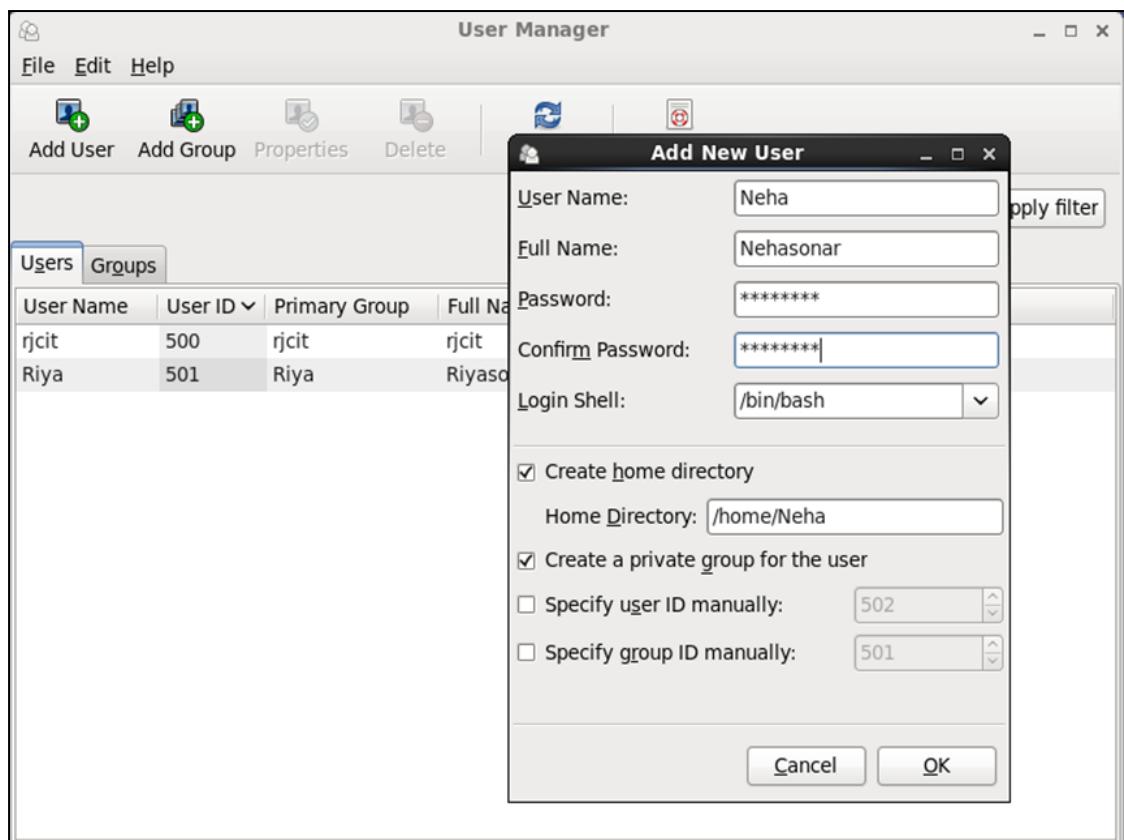


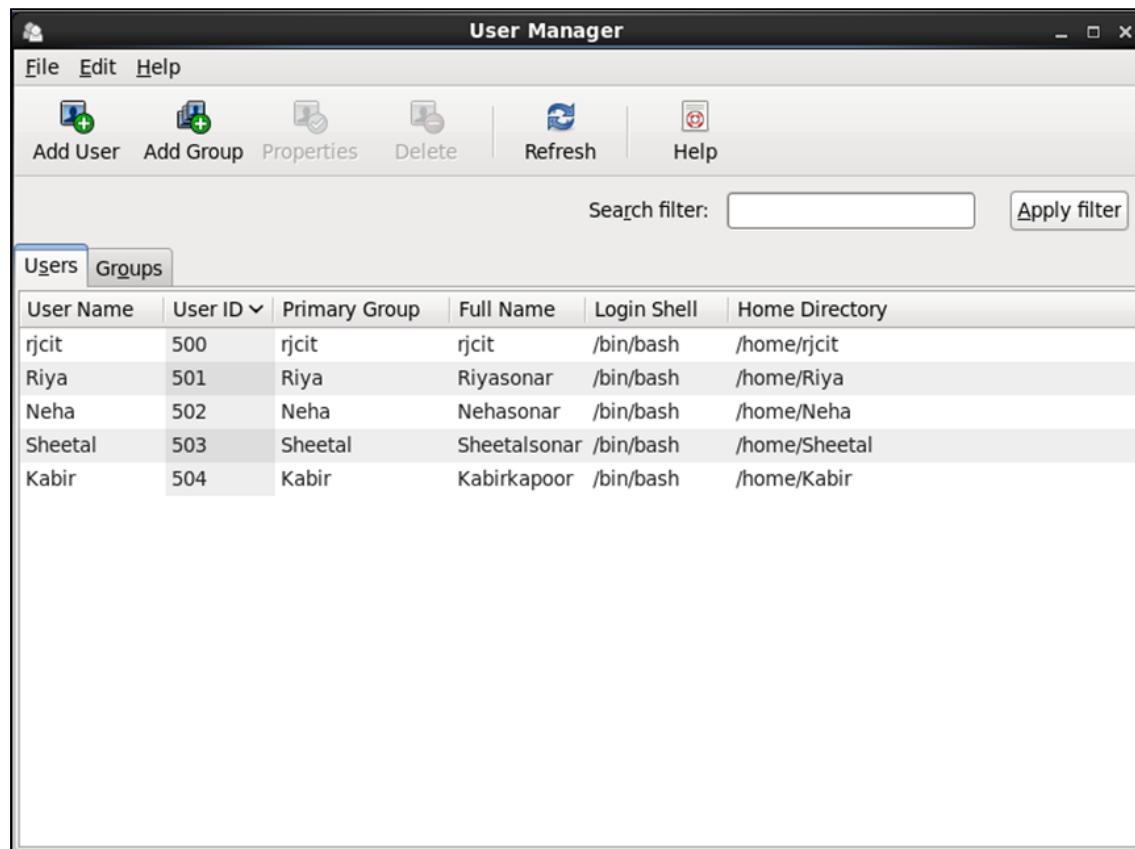
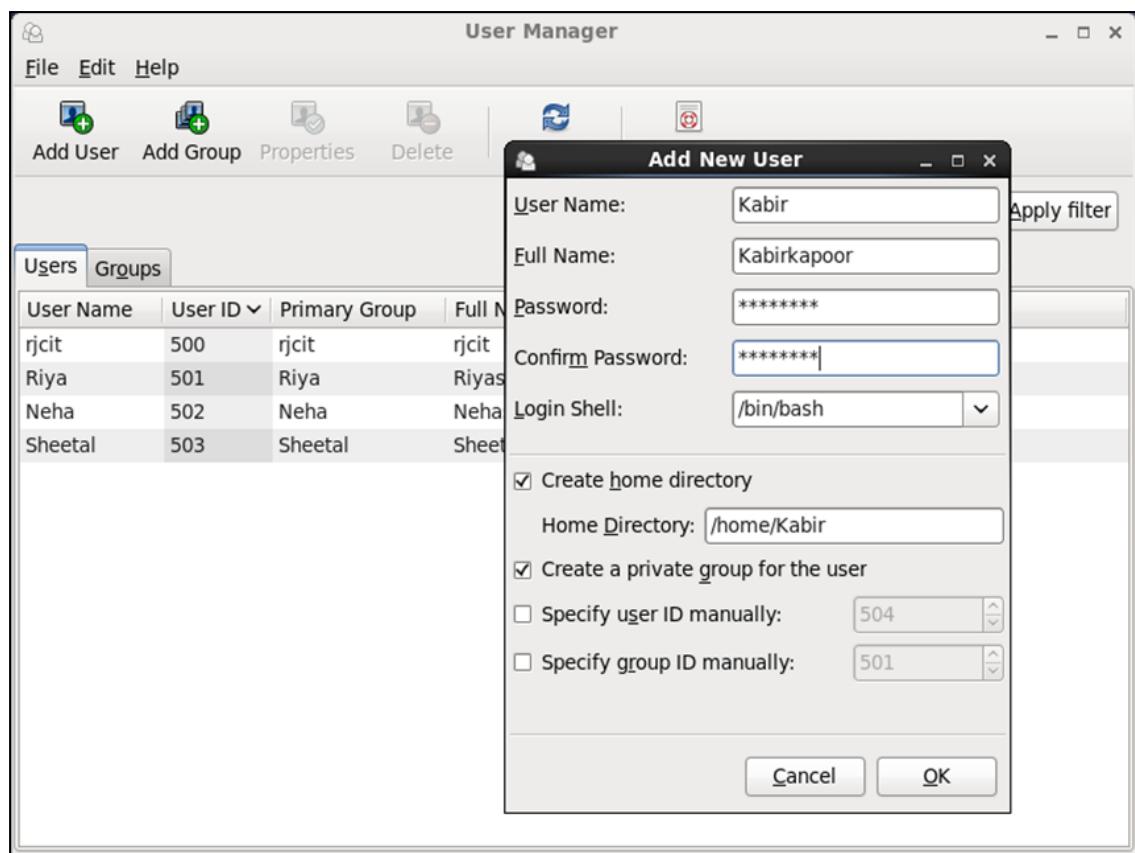
Click on Add User



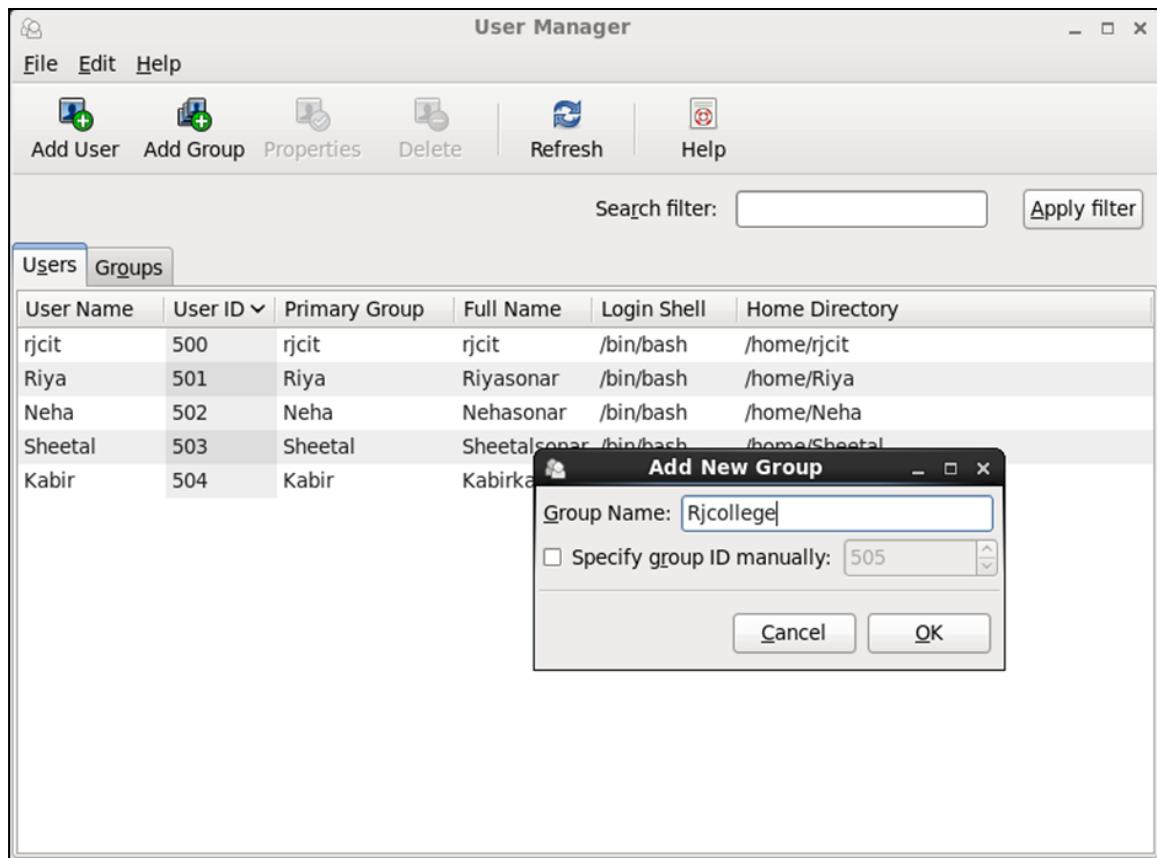
After that type name and password (tyituser) and click on ok



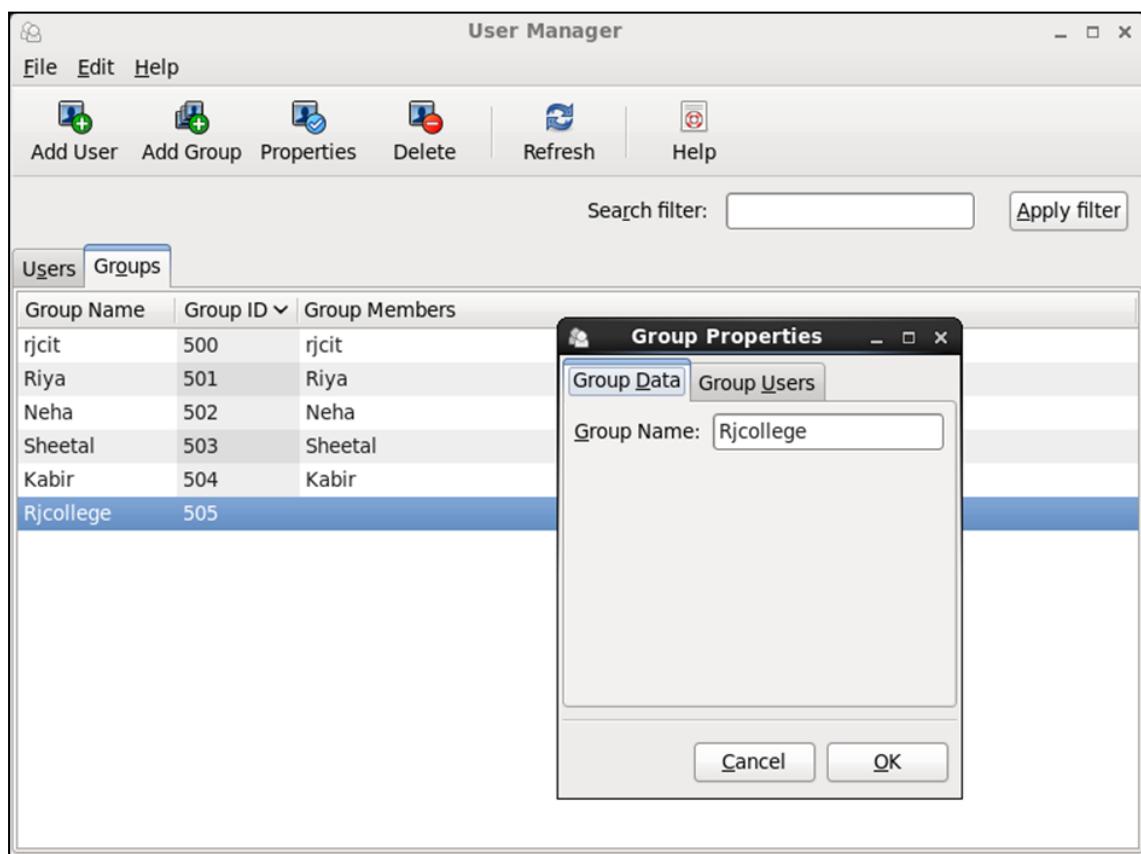


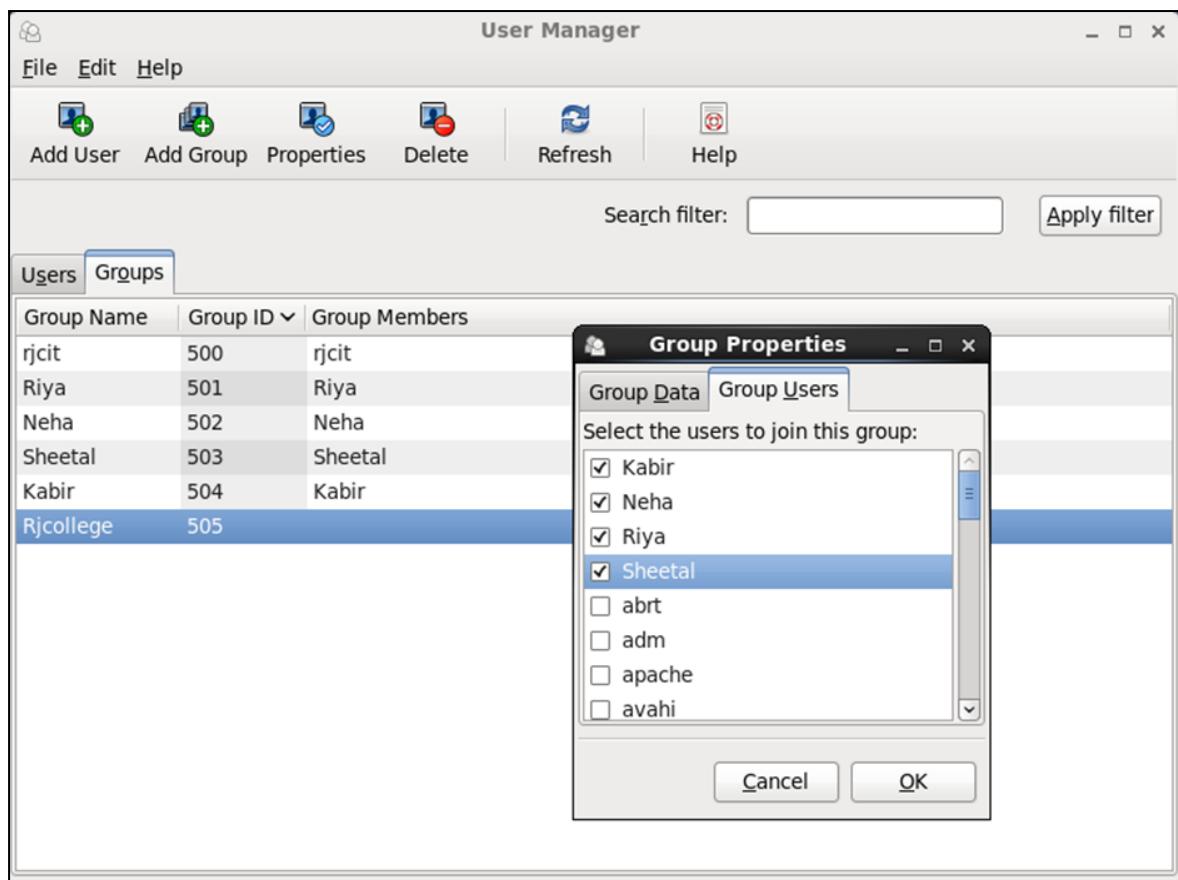


Add Group: Click on Add Group Button



After adding group name select the group members





1] Becoming Super User

Creating user account “Soniya” to grant him the privileges of super user.

useradd Soniya

```
root@localhost:~ 
File Edit View Search Terminal Help
[rjcit@localhost Desktop]$ cd /
[rjcit@localhost /]$ cd ~
[rjcit@localhost ~]$ su - root
Password:
[root@localhost ~]# useradd Soniya
```

Changing password for user Soniya

passwd Soniya

```
[root@localhost ~]# passwd Soniya
Changing password for user Soniya.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
```

➤ **Open the file /etc/sudoers**

```
[root@localhost ~]# vi /etc/sudoers
```

Add this line: Riya ALL=(ALL) ALL

```
root@localhost:~  
File Edit View Search Terminal Help  
##  
## The COMMANDS section may have other options added to it.  
##  
## Allow root to run any commands anywhere  
root    ALL=(ALL)      ALL  
Riya    ALL=(ALL)      ALL  
  
## Allows members of the 'sys' group to run networking, software,  
## service management apps and more.  
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOC  
ATE, DRIVERS  
  
## Allows people in group wheel to run all commands  
# %wheel      ALL=(ALL)      ALL  
  
## Same thing without a password  
# %wheel      ALL=(ALL)      NOPASSWD: ALL  
  
## Allows members of the users group to mount and umount the  
## cdrom as root  
# %users  ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom  
  
## Allows members of the users group to shutdown this system  
-- INSERT --
```

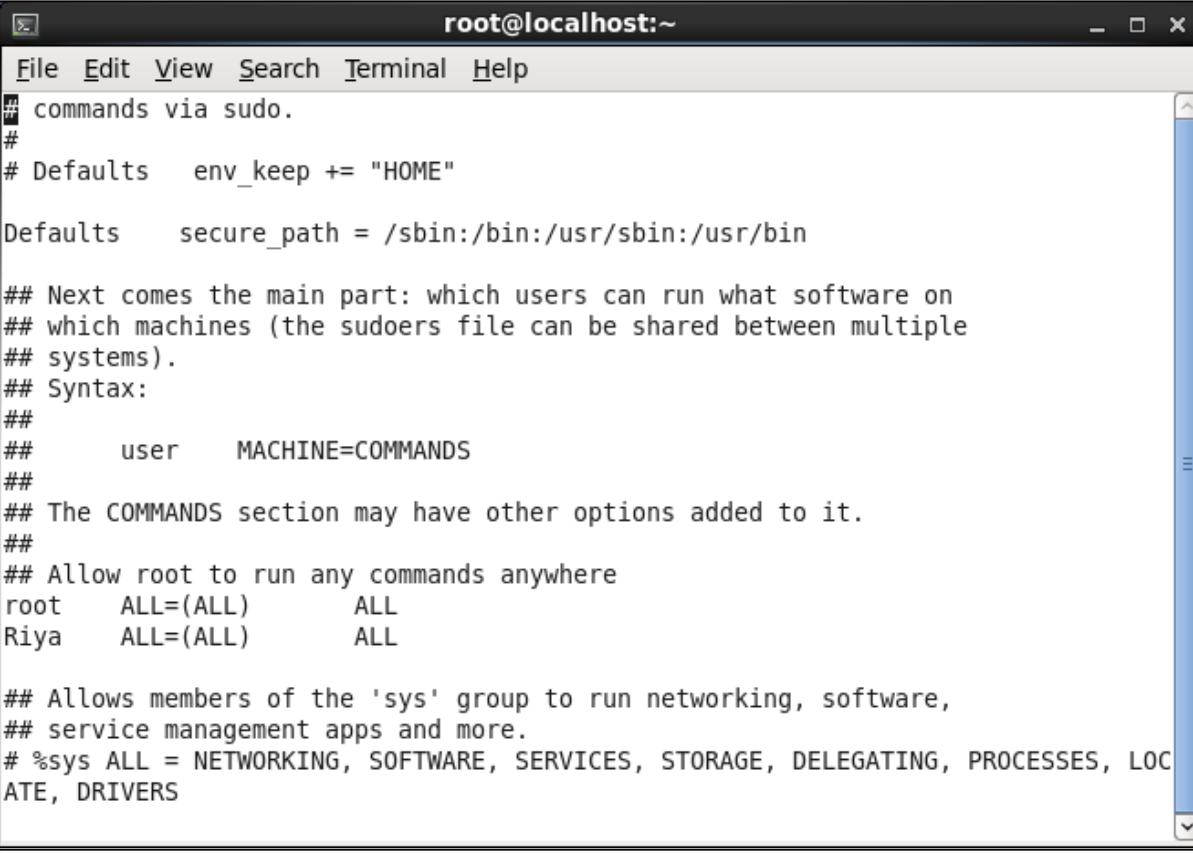
```
root@localhost:~  
File Edit View Search Terminal Help  
## The COMMANDS section may have other options added to it.  
##  
## Allow root to run any commands anywhere  
root    ALL=(ALL)      ALL  
Riya    ALL=(ALL)      ALL  
  
## Allows members of the 'sys' group to run networking, software,  
## service management apps and more.  
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOC  
ATE, DRIVERS  
  
## Allows people in group wheel to run all commands  
# %wheel      ALL=(ALL)      ALL  
  
## Same thing without a password  
# %wheel      ALL=(ALL)      NOPASSWD: ALL  
  
## Allows members of the users group to mount and umount the  
## cdrom as root  
# %users  ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom  
  
## Allows members of the users group to shutdown this system  
# %users  localhost=/sbin/shutdown -h now  
:wq!
```

visudo: To see the changes which is made in /etc/sudoers

ctrl+z: To stop

```
[root@localhost ~]# visudo
```

```
[1]+ Stopped visudo
```



The screenshot shows a terminal window titled "root@localhost:~". The window contains the contents of the /etc/sudoers file. The file includes comments about command execution via sudo, default environment variables, and secure paths. It defines a syntax section and lists users with their allowed commands. It also includes a section for the 'sys' group and a note about sysctl settings.

```
# commands via sudo.
#
# Defaults env_keep += "HOME"

Defaults secure_path = /sbin:/bin:/usr/sbin:/usr/bin

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
##       user      MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)      ALL
Riya   ALL=(ALL)      ALL

## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOC
ATE, DRIVERS
```

```
[1]+ Stopped visudo
```

Test the configuration by making Riya to login and perform any administrative activity as shown below:

su - Riya

```
[root@localhost ~]# su - Riya
```

a. Add user Devil using sudo

```
[Riya@localhost ~]$ sudo useradd Devil
```

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 Riya:
```

b. Changing password of Devil using sudo

```
[Riya@localhost ~]$ sudo passwd Devil
Changing password for user Devil.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
```

2] Temporarily changing identity with the help of su command:

- When root changes identity temporarily, with the help of su command, the system never asks for password:
- when any local user tries to change the identity temporarily, redhat system asks for the password as shown below:

```
[Riya@localhost ~]$ su - Devil
Password:
```

```
[Riya@localhost ~]$ su - Devil
Password:
[Devil@localhost ~]$ su - root
Password:
```

3] Administrative commands

- useradd command with its options:
 - c : Set command for user: 'Riya' account.
 - u : Sets userID(uid)
 - o : Allows non-unique UIDs
 - s : Gives shell to user as shell

```
[root@localhost ~]# useradd -c "this is Riya's account" -u 601 -o -s /sbin/bash
Riya_6408
```

cat /etc/passwd: To check ,the file /etc/passwd shows the entry at last.

```
[root@localhost ~]# cat /etc/passwd
```

```
root@localhost:~  
File Edit View Search Terminal Help  
usbmuxd:x:113:113:usbmuxd user:/sbin/nologin  
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin  
vcsa:x:69:69:virtual console memory owner:/dev:/sbin/nologin  
rtkit:x:499:499:RealtimeKit:/proc:/sbin/nologin  
abrt:x:498:498::/etc/abrt:/sbin/nologin  
haldaemon:x:68:68:HAL daemon:/sbin/nologin  
apache:x:48:48:Apache:/var/www:/sbin/nologin  
saslauthd:x:497:495:"Saslauthd user":/var/empty/saslauth:/sbin/nologin  
postfix:x:89:89::/var/spool/postfix:/sbin/nologin  
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin  
ntp:x:38:38::/etc/ntp:/sbin/nologin  
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin  
tcpdump:x:72:72::/sbin/nologin  
pulse:x:496:494:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin  
gdm:x:42:42::/var/lib/gdm:/sbin/nologin  
rjcit:x:500:500:rjcit:/home/rjcit:/bin/bash  
Riya:x:501:501:Riyasonar:/home/Riya:/bin/bash  
Neha:x:502:502:Nehasonar:/home/Neha:/bin/bash  
Sheetal:x:503:503:Sheetalsonar:/home/Sheetal:/bin/bash  
Kabir:x:504:504:Kabirkapoor:/home/Kabir:/bin/bash  
Soniya:x:505:506::/home/Soniya:/bin/bash  
Devil:x:506:507::/home/Devil:/bin/bash  
Riya_6408:x:601:601:this is Riya's account:/home/Riya_6408:/sbin/bash  
[root@localhost ~]#
```

b. chage command is used to change the user's password

```
[root@localhost ~]# chage -m 15 -M 25 -E 28/08/2023 -W 7 Riya_6408  
[root@localhost ~]# chage -l Riya_6408  
Last password change : Aug 17, 2023  
Password expires : Sep 11, 2023  
Password inactive : never  
Account expires : Apr 08, 2025  
Minimum number of days between password change : 15  
Maximum number of days between password change : 25  
Number of days of warning before password expires : 7
```

cat /etc/shadow: To check the details about password in the file

```
[root@localhost ~]# cat /etc/shadow
```

```
root@localhost:~
```

File Edit View Search Terminal Help

```
usbmuxd:!!!:19579:::::  
avahi-autoipd:!!!:19579:::::  
vcsa:!!!:19579:::::  
rtkit:!!!:19579:::::  
abrt:!!!:19579:::::  
haldaemon:!!!:19579:::::  
apache:!!!:19579:::::  
saslauth:!!!:19579:::::  
postfix:!!!:19579:::::  
avahi:!!!:19579:::::  
ntp:!!!:19579:::::  
sshd:!!!:19579:::::  
tcpdump:!!!:19579:::::  
pulse:!!!:19579:::::  
gdm:!!!:19579:::::  
rjcit:$1$CwZK70Ne$VdYIKdr0lrd0fjXoZlcG1.:19579:0:99999:7:::  
Riya:$1$N8yimdNQJ$AFzrnt79ey73tJ8JFy3Ps.:19586:0:99999:7:::  
Neha:$1$MgypAHpo$xrWTQIyW6WeG4YEkRTNJ20:19586:0:99999:7:::  
Sheetal:$1$P6hXCJTr$TDKwkjgIsyhuxBfDNgdf.:19586:0:99999:7:::  
Kabir:$1$8AhS8rT0$Awofps83Cgc4Ved2xa/7U0:19586:0:99999:7:::  
Soniya:$1$3j9emABI$f4gHf9Jntz7aFXAwo3PaH.:19586:0:99999:7:::  
Devil:$1$LS8dWqQp$KDOMBbAY/rpzWC0JUW8s20:19586:0:99999:7:::  
Riya_6408:!!!:19586:15:25:7::2018:
```

c. passwd command to lock or unlock user's password:

```
[root@localhost ~]# passwd -u Riya_6408  
Unlocking password for user Riya_6408.  
passwd: Warning: unlocked password would be empty.  
passwd: Unsafe operation (use -f to force)
```

```
[root@localhost ~]# passwd -l Riya_6408  
Locking password for user Riya_6408.  
passwd: Success
```

d. chsh command to change the shell of user:

```
[root@localhost ~]# chsh -s /sbin/nologin Riya_6408  
Changing shell for Riya_6408.  
Shell changed.
```

User Management					
File Edit Help       					
Search filter: <input type="text"/> Apply filter					
Users	Groups				
User Name	User ID ▾	Primary Group	Full Name	Login Shell	Home Directory
rjcit	500	rjcit	rjcit	/bin/bash	/home/rjcit
Riya	501	Riya	Riyasonar	/bin/bash	/home/Riya
Neha	502	Neha	Nehasonar	/bin/bash	/home/Neha
Sheetal	503	Sheetal	Sheetalsonar	/bin/bash	/home/Sheetal
Kabir	504	Kabir	Kabirkapoor	/bin/bash	/home/Kabir
Soniya	505	Soniya		/bin/bash	/home/Soniya
Devil	506	Devil		/bin/bash	/home/Devil
Riya_6408	601	Riya_6408	this is Riya's account	/sbin/nologin	/home/Riya_6408

- e. **groupadd command to create a new group and gpasswd command to add members and administrator in the group:**

-A : specifies name of the group administrator
 -M : specifies members to be added in the group

```
[root@localhost ~]# groupadd friends
You have new mail in /var/spool/mail/root
[root@localhost ~]# gpasswd -M Riya,Neha,Sheetal,Kabir -A Riya friends
```

cat /etc/group: To see above things

```
[root@localhost ~]# cat /etc/group
```

The command displays name of the group: group password: group id: group members

```
root@localhost:~  
File Edit View Search Terminal Help  
saslauth:x:495:  
postdrop:x:90:  
postfix:x:89:  
avahi:x:70:  
ntp:x:38:  
sshd:x:74:  
tcpdump:x:72:  
slocate:x:21:  
pulse:x:494:  
pulse-access:x:493:  
fuse:x:492:  
stapdev:x:491:  
stapusr:x:490:  
gdm:x:42:  
rjcit:x:500:  
Riya:x:501:  
Neha:x:502:  
Sheetal:x:503:  
Kabir:x:504:  
Rjcollege:x:505:Kabir,Neha,Riya,Sheetal  
Soniya:x:506:  
Devil:x:507:  
Riya_6408:x:601:  
friends:x:602:Riya,Neha,Sheetal,Kabir
```

f. userdel to delete the user

```
[root@localhost ~]# userdel Kabir
```

/etc/passwd: To check that the user Kabir no longer exists.

```
[root@localhost ~]# cat /etc/passwd
```

```
root@localhost:~  
File Edit View Search Terminal Help  
dbus:x:81:81:System message bus::/sbin/nologin  
usbmuxd:x:113:113:usbmuxd user::/sbin/nologin  
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin  
vcsa:x:69:69:virtual console memory owner:/dev:/sbin/nologin  
rtkit:x:499:499:RealtimeKit:/proc:/sbin/nologin  
abrt:x:498:498::/etc/abrt:/sbin/nologin  
haldaemon:x:68:68:HAL daemon::/sbin/nologin  
apache:x:48:48:Apache:/var/www:/sbin/nologin  
saslauth:x:497:495:"Saslauthd user":/var/empty/saslauth:/sbin/nologin  
postfix:x:89:89::/var/spool/postfix:/sbin/nologin  
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin  
ntp:x:38:38::/etc/ntp:/sbin/nologin  
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin  
tcpdump:x:72:72::/sbin/nologin  
pulse:x:496:494:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin  
gdm:x:42:42::/var/lib/gdm:/sbin/nologin  
rjcit:x:500:500:rjcit:/home/rjcit:/bin/bash  
Riya:x:501:501:Riyasonar:/home/Riya:/bin/bash  
Neha:x:502:502:Nehasonar:/home/Neha:/bin/bash  
Sheetal:x:503:503:Sheetalsonar:/home/Sheetal:/bin/bash  
Soniya:x:505:506::/home/Soniya:/bin/bash  
Devil:x:506:507::/home/Devil:/bin/bash  
Riya_6408:x:601:601:this is Riya's account:/home/Riya_6408:/sbin/nologin  
[root@localhost ~]#
```

User Manager

Add User Add Group Properties Delete Refresh Help

Search filter: Apply filter

Users Groups

User Name	User ID	Primary Group	Full Name	Login Shell	Home Directory
rjcit	500	rjcit	rjcit	/bin/bash	/home/rjcit
Riya	501	Riya	Riyasonar	/bin/bash	/home/Riya
Neha	502	Neha	Nehasonar	/bin/bash	/home/Neha
Sheetal	503	Sheetal	Sheetalsonar	/bin/bash	/home/Sheetal
Soniya	505	Soniya		/bin/bash	/home/Soniya
Devil	506	Devil		/bin/bash	/home/Devil
Riya_6408	601	Riya_6408	this is Riya's account	/sbin/nologin	/home/Riya_6408

g. groupdel to delete the group which is no longer used

```
[root@localhost ~]# groupdel friends
```

```
[root@localhost ~]# cat /etc/group
```

```
rjcit:x:500:  
Riya:x:501:  
Neha:x:502:  
Sheetal:x:503:  
Rjcollege:x:505:Neha,Riya,Sheetal  
Soniya:x:506:  
Devil:x:507:  
Riya_6408:x:601:
```

The screenshot shows a Windows-style application titled "User Manager". The window has a menu bar with "File", "Edit", and "Help". Below the menu is a toolbar with icons for "Add User" (user icon with a plus), "Add Group" (group icon with a plus), "Properties" (document icon), "Delete" (trash can icon), "Refresh" (refresh icon), and "Help" (help icon). To the right of the toolbar is a search bar labeled "Search filter:" with an "Apply filter" button. Below the search bar is a tab bar with "Users" and "Groups", where "Groups" is currently selected. A table below the tabs displays the list of users and their group memberships. The table has columns: "Group Name", "Group ID", and "Group Members". The data is as follows:

Group Name	Group ID	Group Members
rjcit	500	rjcit
Riya	501	Riya
Neha	502	Neha
Sheetal	503	Sheetal
Rjcollege	505	Neha, Riya, Sheetal
Soniya	506	Soniya
Devil	507	Devil
Riya_6408	601	Riya_6408

Practical 5. Firewall and Cryptographic services

a. Securing Server with iptables

service iptables stop : To Stop Firewalls.

```
[root@localhost ~]# service iptables stop
iptables: Flushing firewall rules:                                [  OK  ]
iptables: Setting chains to policy ACCEPT: filter                 [  OK  ]
iptables: Unloading modules:                                     [  OK  ]
```

service iptables restart : To Restart Firewalls.

```
[root@localhost ~]# service iptables restart
iptables: Applying firewall rules:                                [  OK  ]
```

iptables -L

```
[root@localhost ~]# iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source          destination
ACCEPT    all  --  anywhere        anywhere         state RELATED,ESTAB
ISHED
ACCEPT    icmp --  anywhere        anywhere
ACCEPT    all  --  anywhere        anywhere
ACCEPT    tcp  --  anywhere        anywhere         state NEW tcp dpt:s
sh
REJECT   all  --  anywhere        anywhere         reject-with icmp-ho
st-prohibited

Chain FORWARD (policy ACCEPT)
target     prot opt source          destination
REJECT   all  --  anywhere        anywhere         reject-with icmp-ho
st-prohibited

Chain OUTPUT (policy ACCEPT)
target     prot opt source          destination
[root@localhost ~]#
```

Iptables command to accept connections by default (accept).

```
[root@localhost ~]# iptables -P INPUT ACCEPT
[root@localhost ~]# iptables -P FORWARD ACCEPT
[root@localhost ~]# iptables -P OUTPUT ACCEPT
```

Iptables command to deny all the connections (drop).

```
[root@localhost ~]# iptables -P INPUT DROP  
[root@localhost ~]# iptables -P FORWARD DROP  
[root@localhost ~]# iptables -P OUTPUT DROP
```

Iptables command to reject all network connections (reject).

```
[root@localhost ~]# iptables -A INPUT -j REJECT  
[root@localhost ~]# iptables -A FORWARD -j REJECT  
[root@localhost ~]# iptables -A OUTPUT -j REJECT
```

Iptables -L: to check the connections.

```
[root@localhost ~]# iptables -L  
Chain INPUT (policy ACCEPT)  
target     prot opt source          destination  
ACCEPT    all  --  anywhere        anywhere          state RELATED,ESTAB  
LISTED  
ACCEPT    icmp --  anywhere        anywhere  
ACCEPT    all  --  anywhere        anywhere  
ACCEPT    tcp  --  anywhere        anywhere          state NEW tcp dpt:s  
sh  
REJECT   all  --  anywhere        anywhere          reject-with icmp-ho  
st-prohibited  
REJECT   all  --  anywhere        anywhere          reject-with icmp-po  
rt-unreachable  
REJECT   all  --  anywhere        anywhere          reject-with icmp-po  
rt-unreachable  
  
Chain FORWARD (policy ACCEPT)  
target     prot opt source          destination  
REJECT   all  --  anywhere        anywhere          reject-with icmp-ho  
st-prohibited  
REJECT   all  --  anywhere        anywhere          reject-with icmp-po  
rt-unreachable  
REJECT   all  --  anywhere        anywhere          reject-with icmp-po  
rt-unreachable
```

Accept host with IP address 192.168.1.5

```
[root@localhost ~]# iptables -A INPUT -p tcp -s 192.168.1.5 --dport ssh -j ACCEPT
```

Block all incoming connections to port 22.

```
[root@localhost ~]# iptables -A INPUT -i eth0 -p tcp --dport 22 -m state --state NEW,E  
STABLISH -j ACCEPT
```

Allowing All incoming ssh connection

```
[root@localhost ~]# iptables -A INPUT -p tcp -s 192.168.1.5 --dport ssh -j ACCEPT
```

Allowing outgoing ssh connection for specific address

```
[root@localhost ~]# iptables -A OUTPUT -p tcp -d 192.168.1.3 --sport ssh -j ACCEPT
```

Allowing outgoing ssh connection which established for incoming ssh connection request

```
[root@localhost ~]# iptables -A OUTPUT -o eth0 -p tcp --sport 22 -m state --state NEW,ESTABLISHED -j ACCEPT
```

Iptables for incoming ping request

```
[root@localhost ~]# iptables -A INPUT -p icmp --icmp-type echo-request -j DROP
```

To drop all outgoing telnet connection

```
[root@localhost ~]# iptables -A OUTPUT -p tcp --dport telnet -j DROP
```

To Reject all incoming telnet connection

```
[root@localhost ~]# iptables -A INPUT -p tcp --dport telnet -j REJECT
```

Iptables to reject all incoming traffic except ssh & local connection

```
[root@localhost ~]# iptables -A INPUT -i lo -j ACCEPT
[root@localhost ~]# iptables -A INPUT -p tcp --dport ssh -j ACCEPT
[root@localhost ~]# iptables -A INPUT -j REJECT
```

Iptables to drop all the incoming connections on a specific network interface

```
[root@localhost ~]# iptables -A INPUT -i eth0 -s 192.168.0.0/24 -j DROP
```

Iptables -L : to show all the work done by above commands.

```
[root@localhost ~]# iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source          destination
ACCEPT    all  --  anywhere        anywhere         state RELATED,ESTABLISHED
ACCEPT    icmp --  anywhere        anywhere
ACCEPT    all  --  anywhere        anywhere
ACCEPT    tcp  --  anywhere        anywhere         state NEW tcp dpt:ssh
REJECT    all  --  anywhere        anywhere         reject-with icmp-host-prohibited
REJECT    all  --  anywhere        anywhere         reject-with icmp-port-unreachable
REJECT    all  --  anywhere        anywhere         reject-with icmp-port-unreachable
ACCEPT    tcp  --  192.168.1.5    anywhere         tcp dpt:ssh
ACCEPT    tcp  --  192.168.1.5    anywhere         tcp dpt:ssh
ACCEPT    tcp  --  anywhere        anywhere         tcp dpt:ssh state NEW,ESTABLISHED
ACCEPT    tcp  --  192.168.1.5    anywhere         tcp dpt:ssh
DROP      icmp --  anywhere        anywhere         icmp echo-request
REJECT    tcp  --  anywhere        anywhere         tcp dpt:telnet reject-with icmp-port-unreachable
ACCEPT    all  --  anywhere        anywhere
ACCEPT    tcp  --  anywhere        anywhere         tcp dpt:ssh
REJECT    all  --  anywhere        anywhere         reject-with icmp-port-unreachable
```

```
DROP      all  --  192.168.0.0/24      anywhere
Chain FORWARD (policy ACCEPT)
target      prot opt source          destination
REJECT     all  --  anywhere        anywhere        reject-with icmp-host-prohibited
REJECT     all  --  anywhere        anywhere        reject-with icmp-port-unreachable
REJECT     all  --  anywhere        anywhere        reject-with icmp-port-unreachable

Chain OUTPUT (policy DROP)
target      prot opt source          destination
REJECT     all  --  anywhere        anywhere        reject-with icmp-port-unreachable
ACCEPT     tcp  --  anywhere        192.168.1.3    tcp spt:ssh
ACCEPT     tcp  --  anywhere        anywhere        tcp spt:ssh state NEW,ESTABLISHED
DROP       tcp  --  anywhere        anywhere        tcp dpt:telnet
[root@localhost ~]#
```

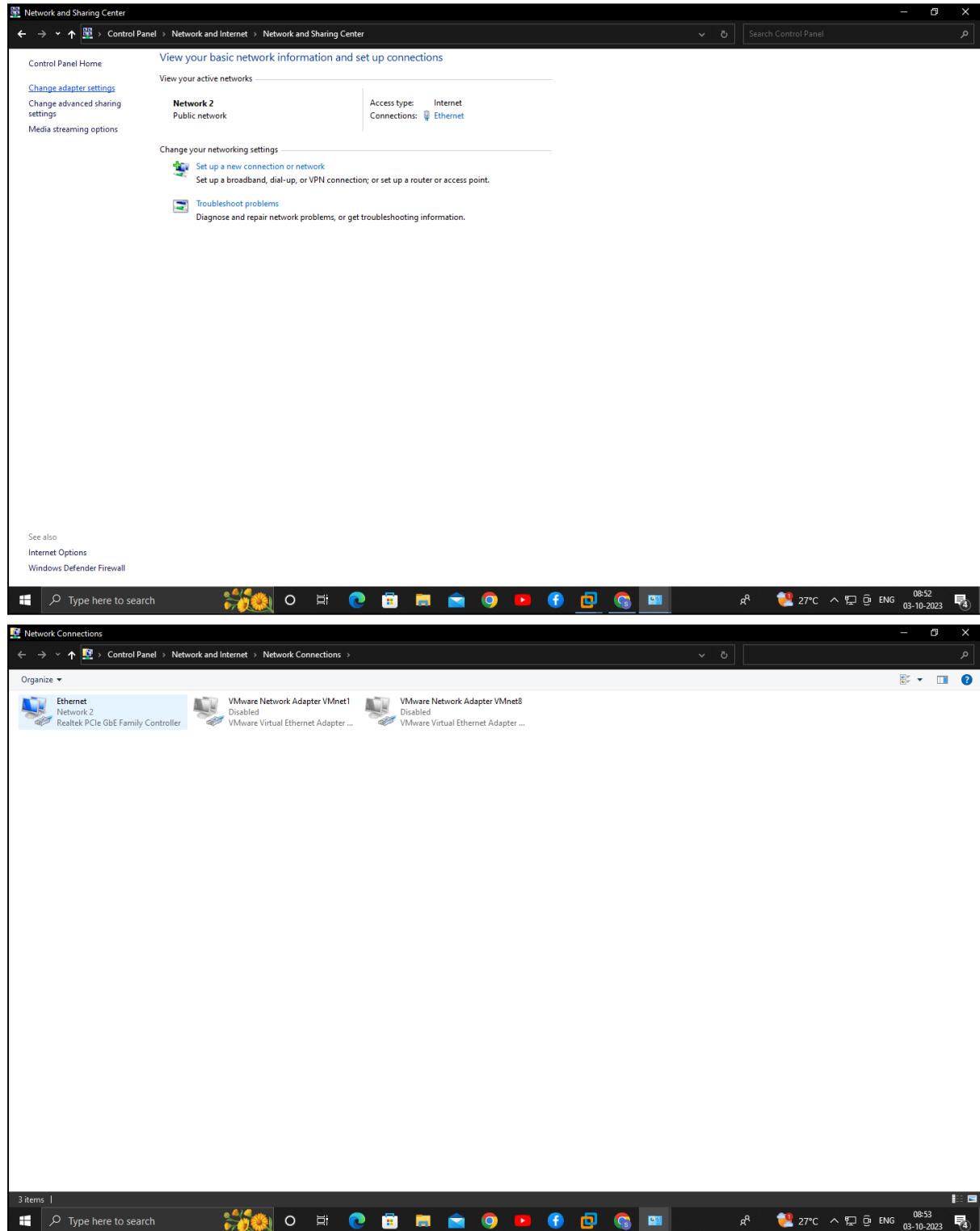
Iptables -F : To Flush all the rules

```
[root@localhost ~]# iptables -F
[root@localhost ~]# iptables -L
Chain INPUT (policy ACCEPT)
target      prot opt source          destination
Chain FORWARD (policy ACCEPT)
target      prot opt source          destination
Chain OUTPUT (policy DROP)
target      prot opt source          destination
```

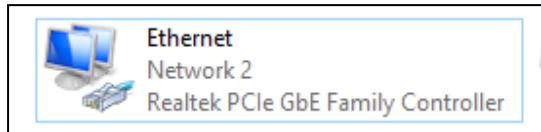
Practical 6. Configuring Server for File Sharing

c. Configuring Samba Server

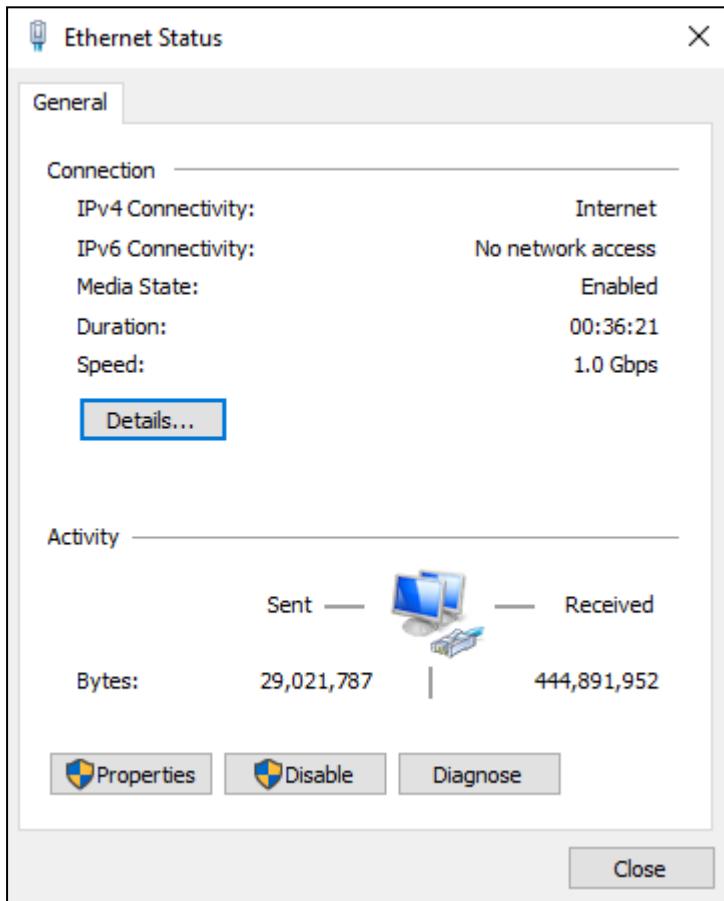
Open Windows Network Connections Folder through this path
“Control Panel\Network and Internet\Network Connections”



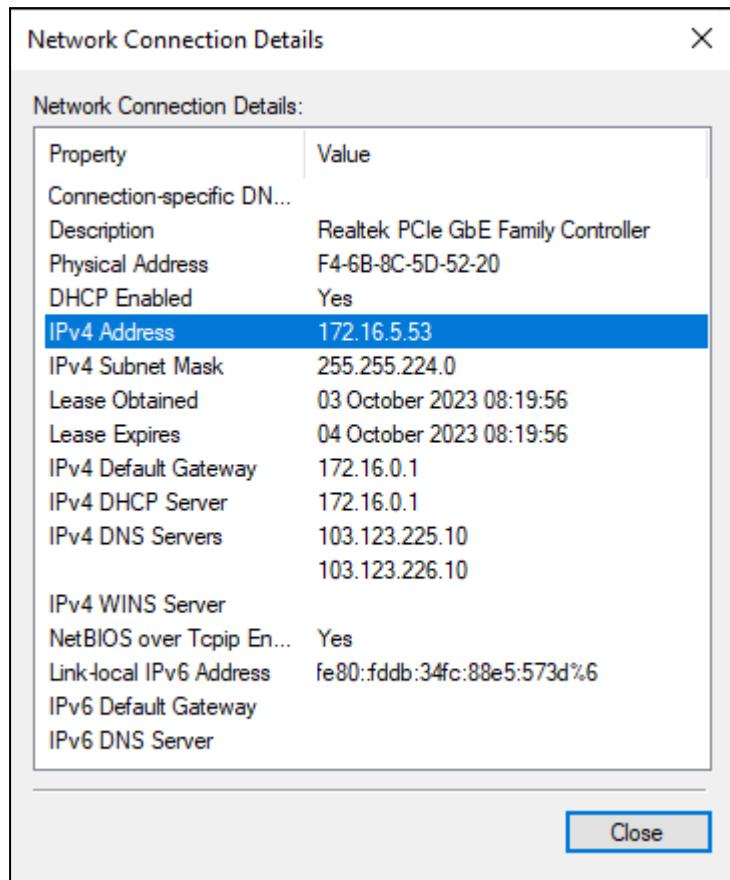
Click on Windows Connected Internet Service.



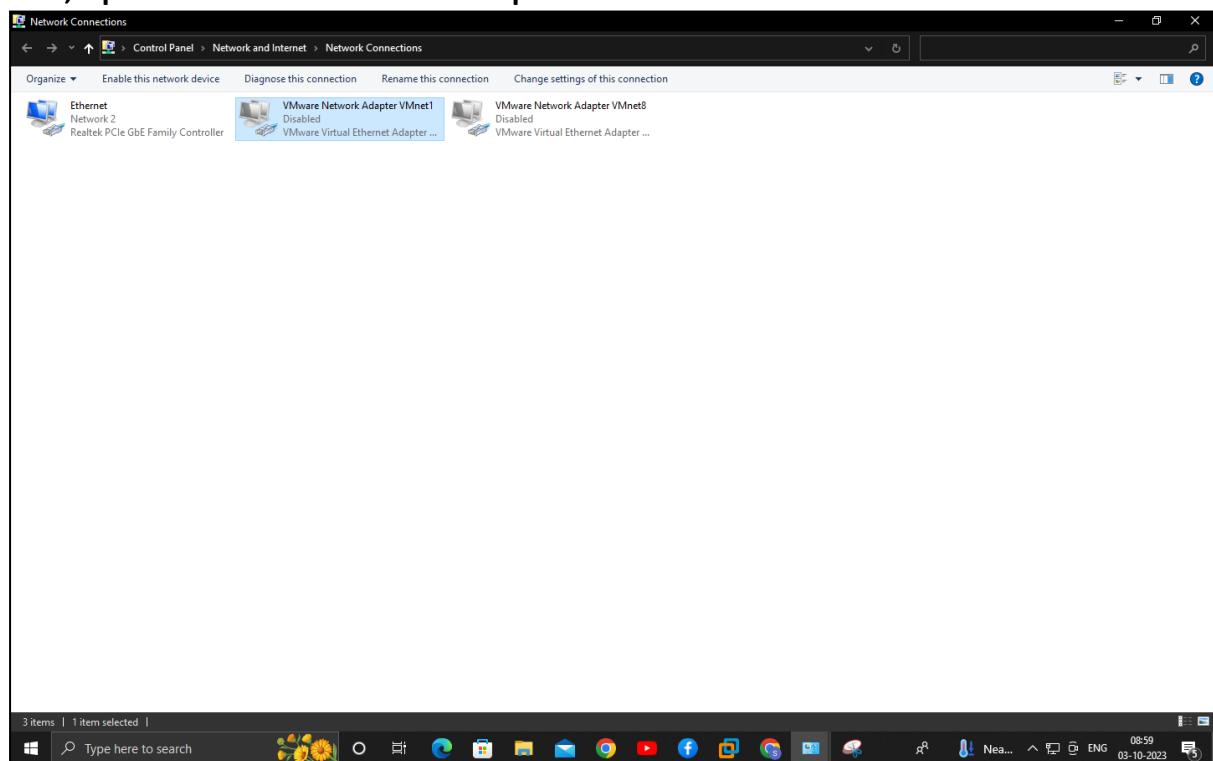
Click on Details



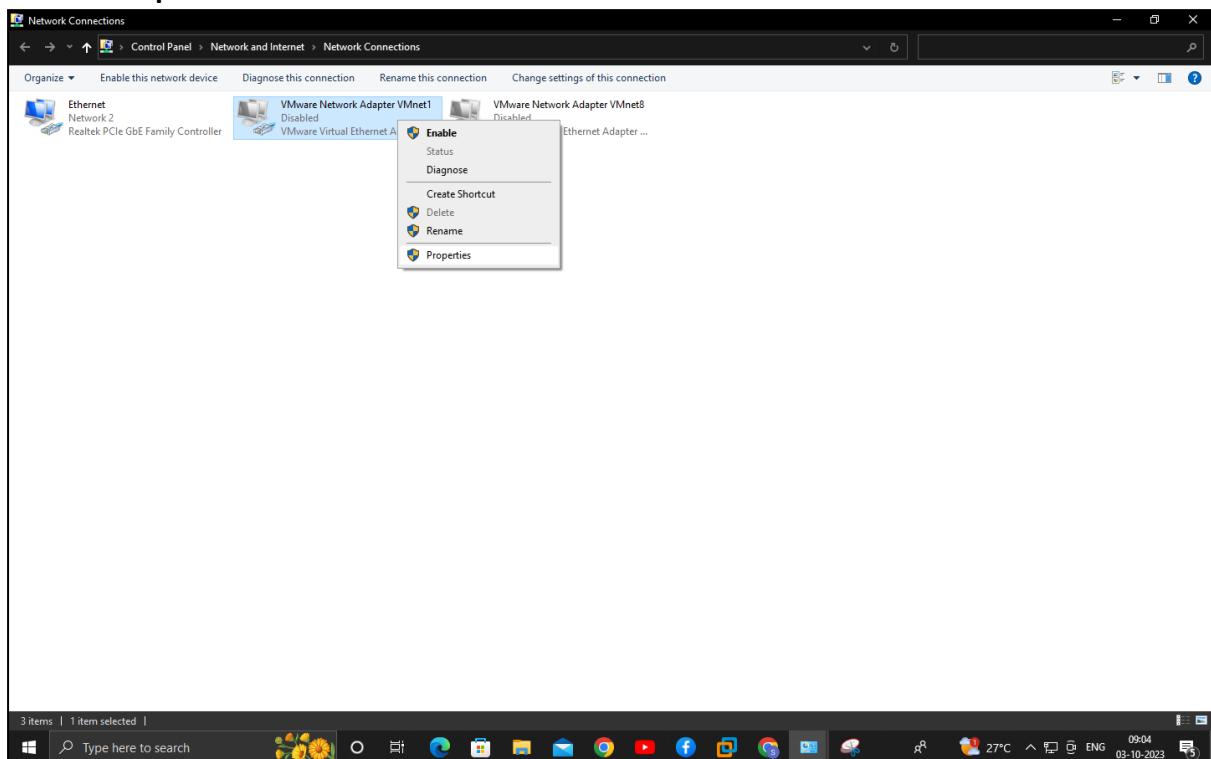
View the System IPv4 Address “172.16.5.53”.



Now, Open The VMware Network Adapter

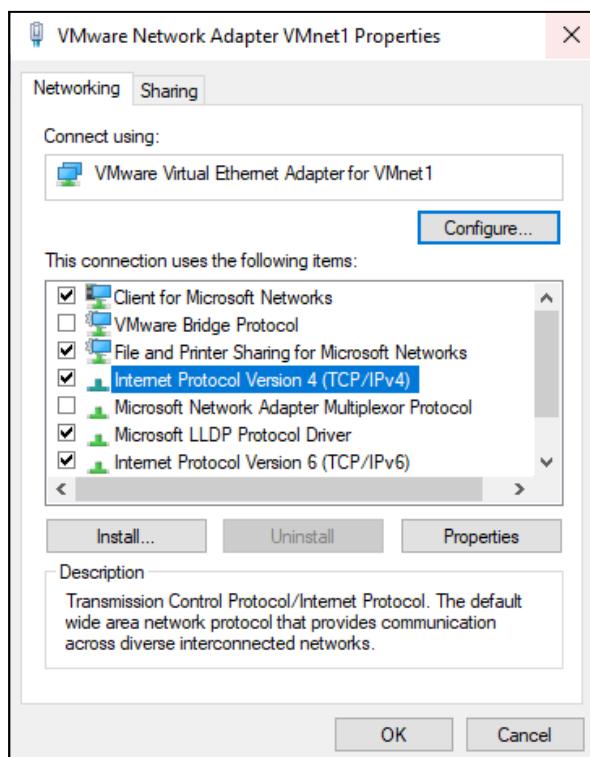


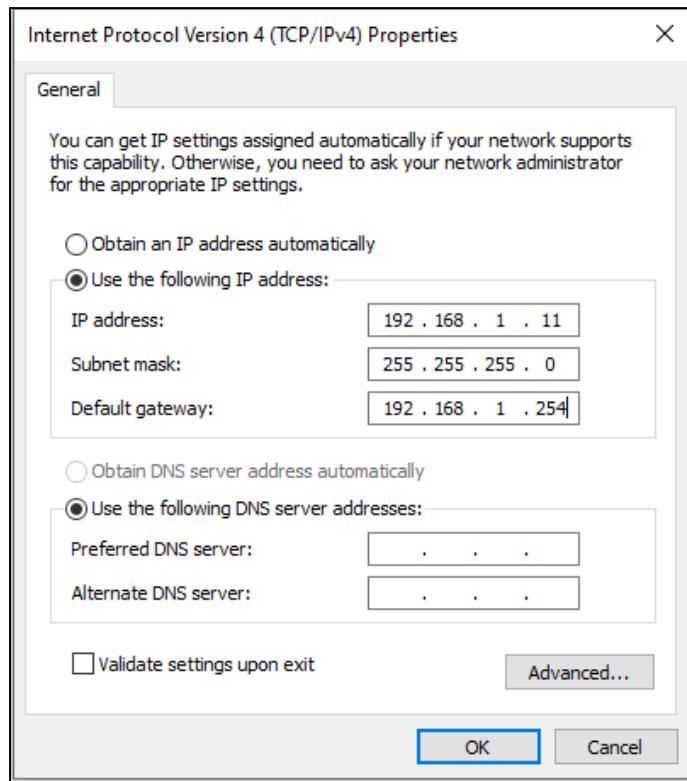
click on Properties.



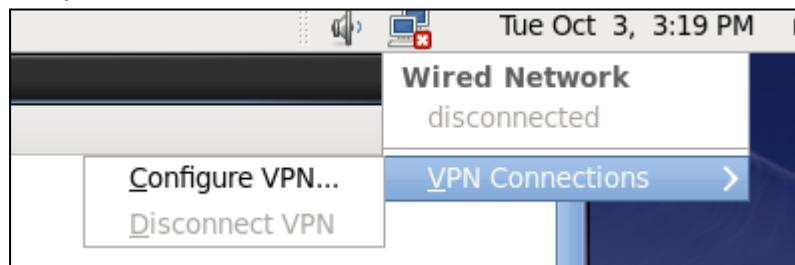
Now click on Internet Protocol Version 4 and set the below lines as follow:

IP address: 192.168.1.11
Subnet mask: 255.255.255.0
Default gateway: 192.168.1.254





Now, Switch on the Linux Machine on VMware and the set IP address for it.



Editing System eth0

Connection name: System eth0

Connect automatically

Wired 802.1x Security IPv4 Settings **IPv6 Settings**

Method: Manual

Addresses

Address	Netmask	Gateway
192.168.1.3	255.255.255.0	0.0.0.0

Add Delete

DNS servers:

Search domains:

DHCP client ID:

Require IPv4 addressing for this connection to complete

Routes...

Available to all users

Cancel **Apply...**

Network Connections

Wired Wireless Mobile Broadband VPN DSL

Name	Last Used
Wired connection 1	never
System eth0	never

Add Edit... Delete...

Close

Ifconfig: to check the ip address of the system.

```
root@localhost:~#
File Edit View Search Terminal Help
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet HWaddr 00:0C:29:9D:E4:0E
          inet addr:192.168.1.3 Bcast:192.168.1.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

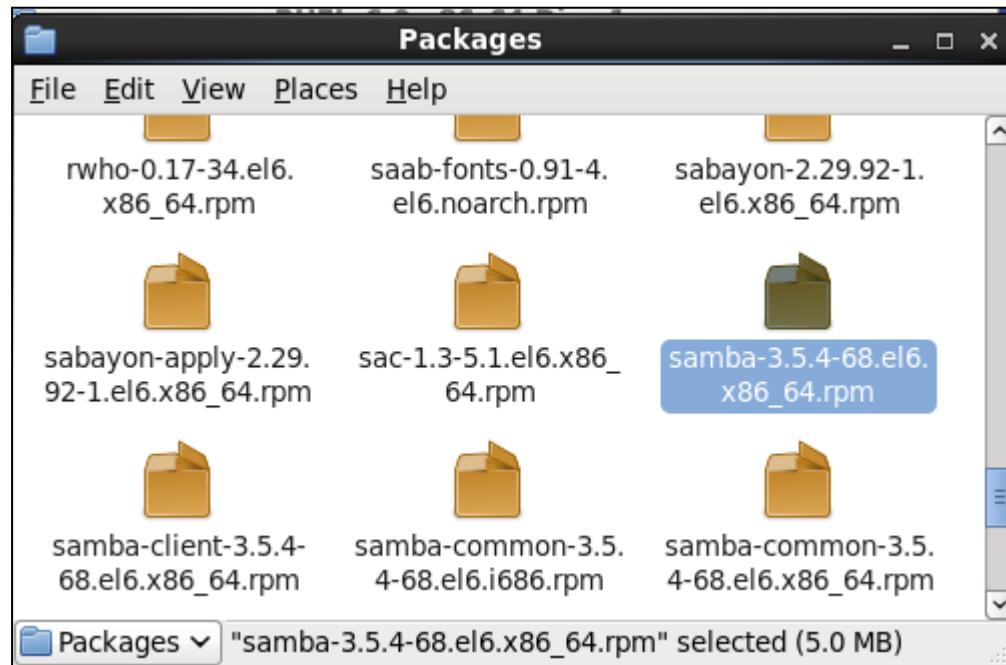
lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:16436 Metric:1
          RX packets:16 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:960 (960.0 b) TX bytes:960 (960.0 b)

[root@localhost ~]#
```

Go to the packages directory

```
[root@localhost ~]# cd /media/RHEL_6.0\ x86_64\ Disc\ 1/Packages
[root@localhost Packages]#
```

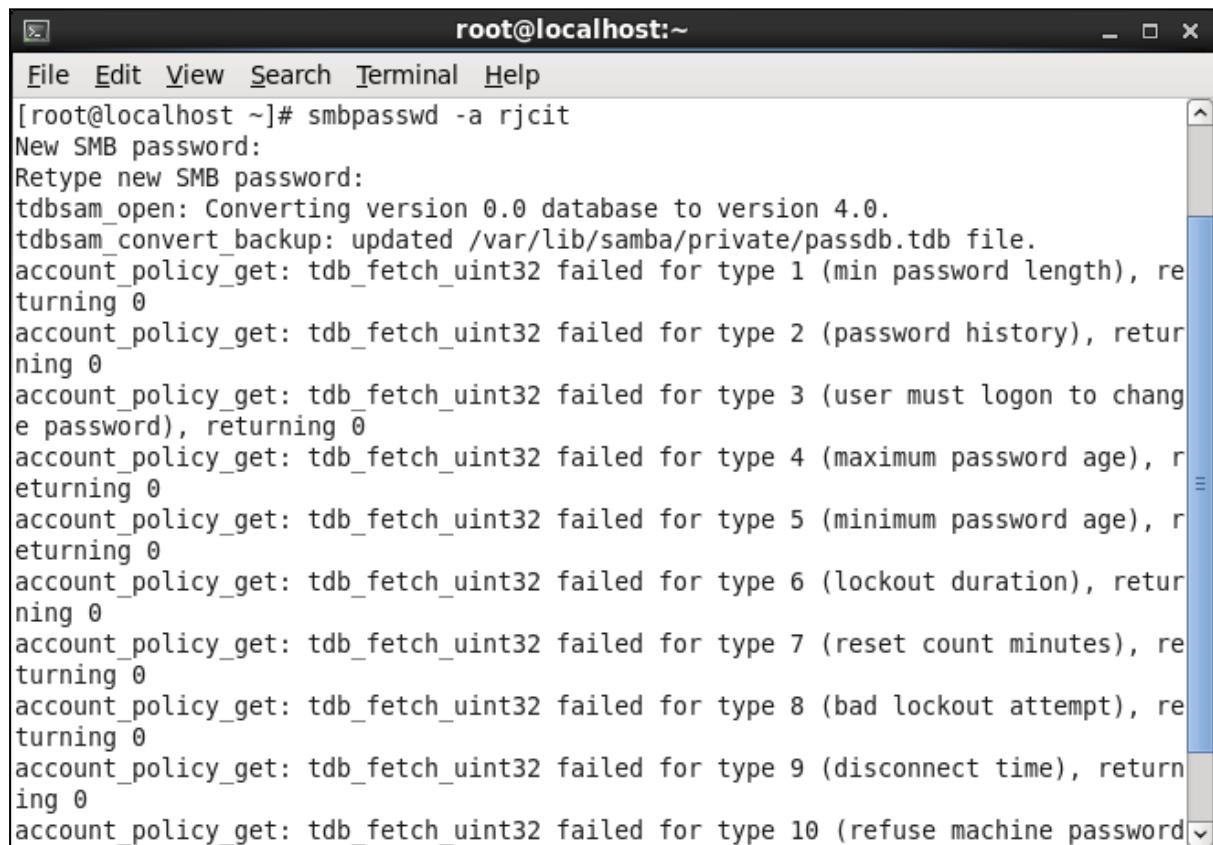
Install all samba packages.



Check whether the samba package is installed or not.

```
[root@localhost Packages]# rpm -qa | grep samba
samba-client-3.5.4-68.el6.x86_64
samba-winbind-clients-3.5.4-68.el6.x86_64
samba-common-3.5.4-68.el6.x86_64
samba-3.5.4-68.el6.x86_64
[root@localhost Packages]#
```

Create a Samba user account that has access to the share.



```
File Edit View Search Terminal Help
root@localhost:~
[root@localhost ~]# smbpasswd -a rjcit
New SMB password:
Retype new SMB password:
tdbsam_open: Converting version 0.0 database to version 4.0.
tdbsam_convert_backup: updated /var/lib/samba/private/passdb.tdb file.
account_policy_get: tdb_fetch_uint32 failed for type 1 (min password length), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 2 (password history), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 3 (user must logon to change password), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 4 (maximum password age), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 5 (minimum password age), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 6 (lockout duration), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 7 (reset count minutes), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 8 (bad lockout attempt), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 9 (disconnect time), returning 0
account_policy_get: tdb_fetch_uint32 failed for type 10 (refuse machine password)
```

```
root@localhost:~  
File Edit View Search Terminal Help  
tdbsam_open: Converting version 0.0 database to version 4.0.  
tdbsam_convert_backup: updated /var/lib/samba/private/passdb.tdb file.  
account_policy_get: tdb_fetch_uint32 failed for type 1 (min password length), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 2 (password history), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 3 (user must logon to change password), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 4 (maximum password age), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 5 (minimum password age), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 6 (lockout duration), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 7 (reset count minutes), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 8 (bad lockout attempt), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 9 (disconnect time), returning 0  
account_policy_get: tdb_fetch_uint32 failed for type 10 (refuse machine password change), returning 0  
Added user rjcit.  
[root@localhost ~]#
```

Create a directory **/data** on the Linux file system on the Samba server.

```
[root@localhost Packages]# cd /home
```

```
[root@localhost home]# mkdir /data  
[root@localhost home]#
```

Change directory as data.

```
[root@localhost home]# cd /data  
[root@localhost data]#
```

```
[root@localhost data]# touch fi f2 f3
```

```
[root@localhost data]# cat > test  
This is Samba Practical
```

```
[root@localhost data]# cd /home  
[root@localhost home]#
```

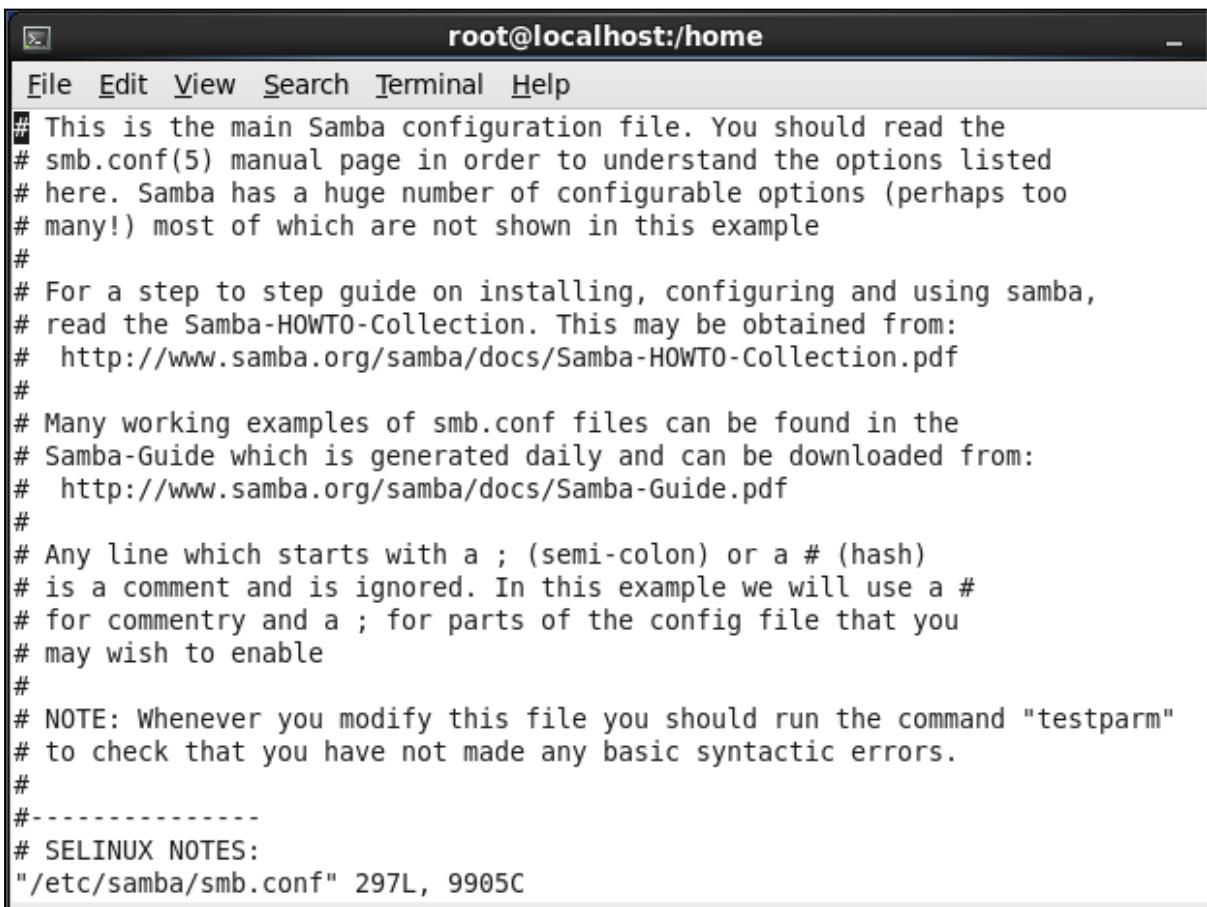
Give full permission to this directory then, Set directory with the samba share t type, if you want to treat the files as samba share data.

```
[root@localhost home]# chmod 777 /data  
[root@localhost home]#
```

```
[root@localhost home]# chcon -t samba_share_t /data  
[root@localhost home]#
```

Open smb.conf file with vi editor.

```
[root@localhost home]# vi /etc/samba/smb.conf
```



```
File Edit View Search Terminal Help  
# This is the main Samba configuration file. You should read the  
# smb.conf(5) manual page in order to understand the options listed  
# here. Samba has a huge number of configurable options (perhaps too  
# many!) most of which are not shown in this example  
#  
# For a step to step guide on installing, configuring and using samba,  
# read the Samba-HOWTO-Collection. This may be obtained from:  
# http://www.samba.org/samba/docs/Samba-HOWTO-Collection.pdf  
#  
# Many working examples of smb.conf files can be found in the  
# Samba-Guide which is generated daily and can be downloaded from:  
# http://www.samba.org/samba/docs/Samba-Guide.pdf  
#  
# Any line which starts with a ; (semi-colon) or a # (hash)  
# is a comment and is ignored. In this example we will use a #  
# for commentary and a ; for parts of the config file that you  
# may wish to enable  
#  
# NOTE: Whenever you modify this file you should run the command "testparm"  
# to check that you have not made any basic syntactic errors.  
#-----  
# SELINUX NOTES:  
"/etc/samba/smb.conf" 297L, 9905C
```

Add the below data at the end of the file:

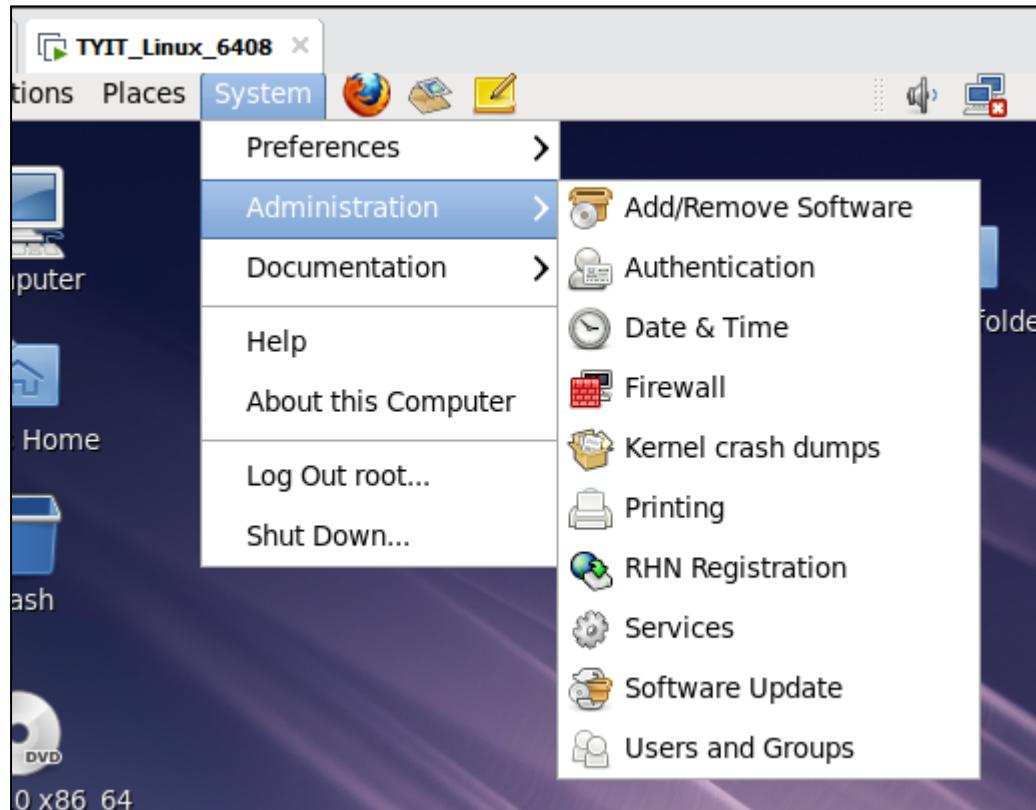
```
; [data]  
; comment = data  
; path = /home/data  
; public = yes  
; writable = yes  
; write list = rjcit  
; user list = rjcit  
  
:wq! ■
```

Restart the smb service.

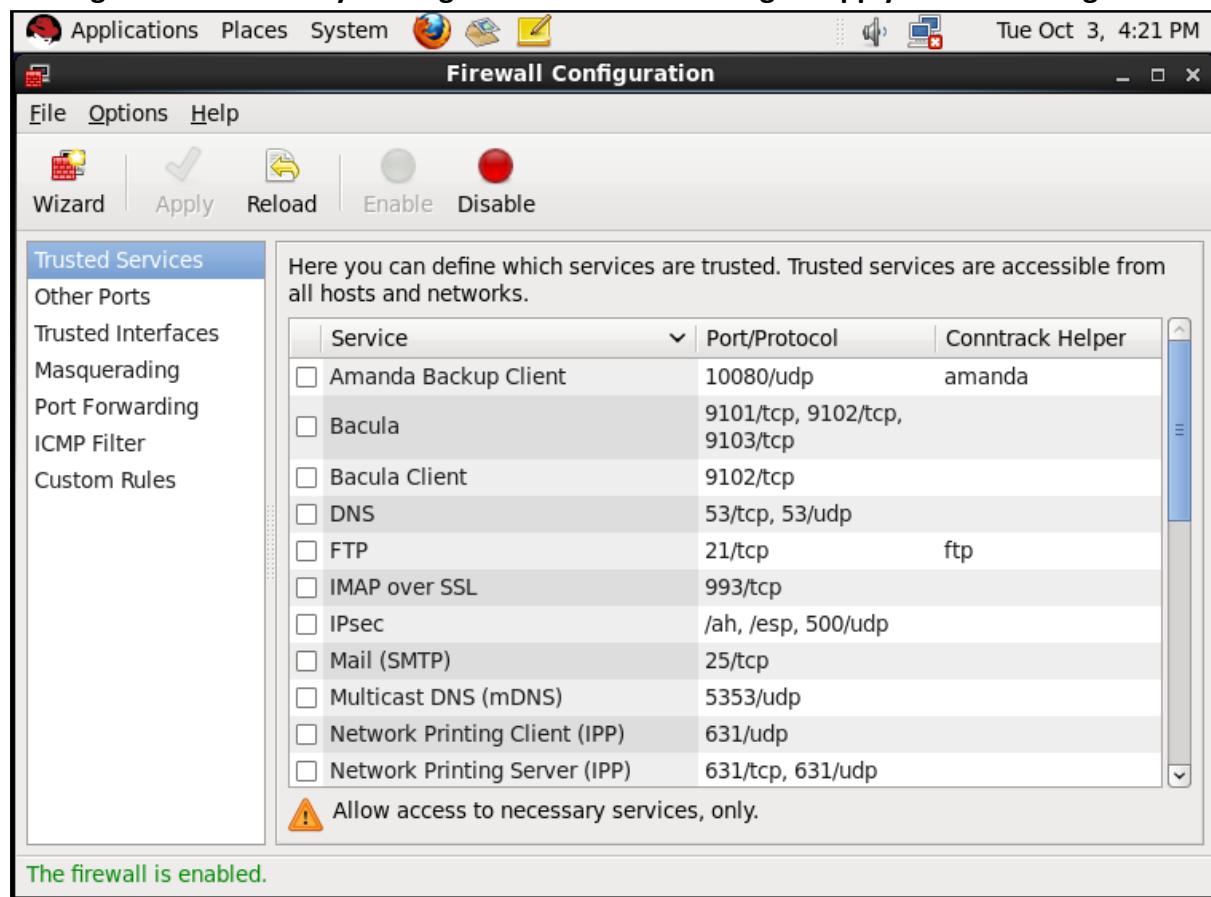
```
[root@localhost home]# service smb restart
Shutting down SMB services: [FAILED]
Starting SMB services: [ OK ]
```

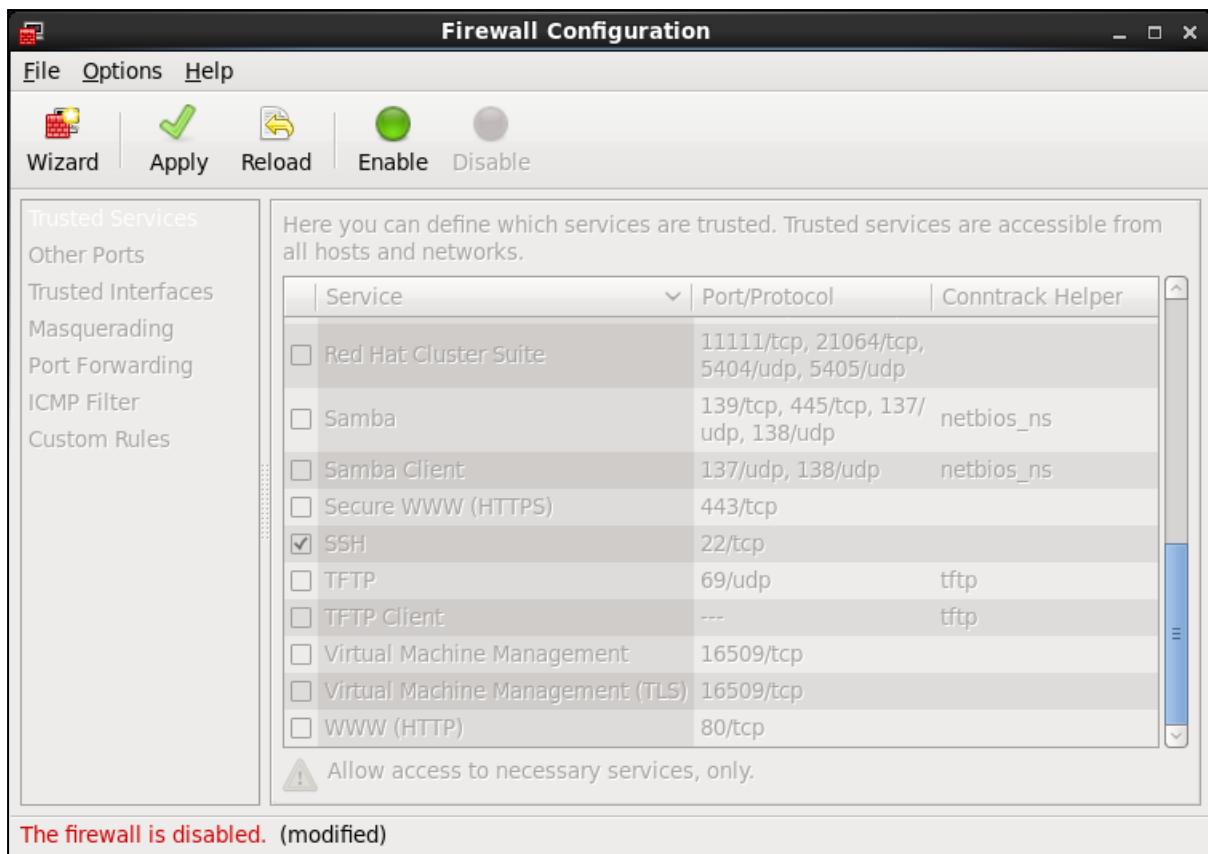
```
[root@localhost home]# service smb restart
Shutting down SMB services: [ OK ]
Starting SMB services: [ OK ]
```

Go to Firewall: System => Administration => Firewall.



Turning off the firewall by clicking on Disable then clicking on apply to make changes.





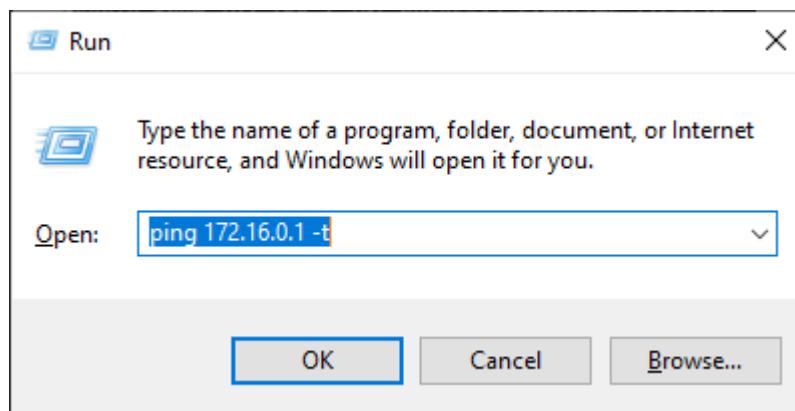
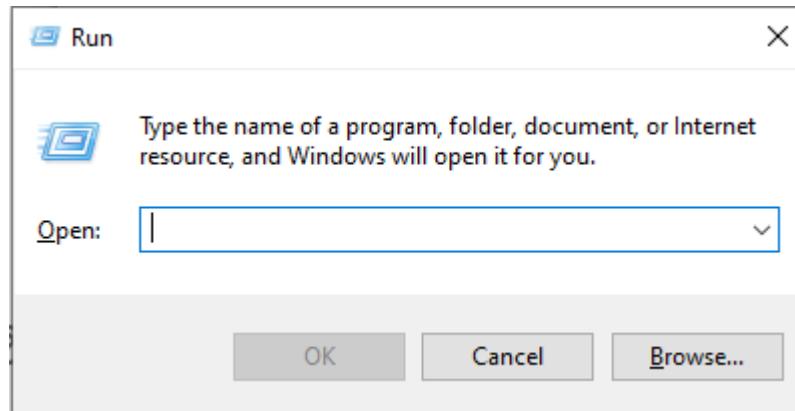
Now, try to ping the ipaddress of the system to receive the packets from Windows Server.

Ping 192.168.1.3

```
[root@localhost ~]# ping 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 56(84) bytes of data.
64 bytes from 192.168.1.3: icmp_seq=1 ttl=64 time=0.030 ms
64 bytes from 192.168.1.3: icmp_seq=2 ttl=64 time=0.055 ms
64 bytes from 192.168.1.3: icmp_seq=3 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=4 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=5 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=6 ttl=64 time=0.055 ms
64 bytes from 192.168.1.3: icmp_seq=7 ttl=64 time=0.055 ms
64 bytes from 192.168.1.3: icmp_seq=8 ttl=64 time=0.071 ms
64 bytes from 192.168.1.3: icmp_seq=9 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=10 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=11 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=12 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=13 ttl=64 time=0.056 ms
64 bytes from 192.168.1.3: icmp_seq=14 ttl=64 time=0.066 ms
64 bytes from 192.168.1.3: icmp_seq=15 ttl=64 time=0.052 ms
64 bytes from 192.168.1.3: icmp_seq=16 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=17 ttl=64 time=0.053 ms
64 bytes from 192.168.1.3: icmp_seq=18 ttl=64 time=0.034 ms
64 bytes from 192.168.1.3: icmp_seq=19 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=20 ttl=64 time=0.076 ms
64 bytes from 192.168.1.3: icmp_seq=21 ttl=64 time=0.064 ms
64 bytes from 192.168.1.3: icmp_seq=22 ttl=64 time=0.055 ms
64 bytes from 192.168.1.3: icmp_seq=23 ttl=64 time=0.056 ms
64 bytes from 192.168.1.3: icmp_seq=24 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=25 ttl=64 time=0.053 ms
```

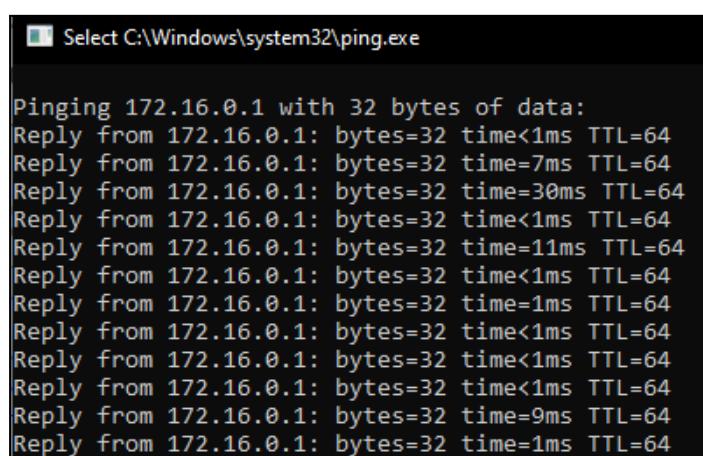
```
64 bytes from 192.168.1.3: icmp_seq=23 ttl=64 time=0.056 ms
64 bytes from 192.168.1.3: icmp_seq=24 ttl=64 time=0.054 ms
64 bytes from 192.168.1.3: icmp_seq=25 ttl=64 time=0.053 ms
^C
--- 192.168.1.3 ping statistics ---
25 packets transmitted, 25 received, 0% packet loss, time 24227ms
rtt min/avg/max/mdev = 0.030/0.054/0.076/0.012 ms
[root@localhost ~]#
```

On Windows Server, open the run command by pressing “Windows + r”.



Type ping ipaddress of the Windows System to receive packets from VMware Networks.

Ping 192.168.1.10 -t



Practical 7. DNS Configuration

DNS Server :

- A Domain Name System (DNS) server, or name server, is used to resolve an IP address to a hostname or vice versa.
- This is necessary because, although domain names are easy for people remember, computer or machines, access websites based on IP addresses. When we type in a web browser, e.g. www.google.com, our Internet Service Provider views the
- DNS associated with the domain name, translates it into a machine friendly IP address (for example: 216.58.203.196 is the IP for google.com) and directs our Internet connection to the correct website.
- DNS is a hierarchically distributed database that creates hierarchical names that can be resolved to IP address. The IP address are then resolved to MAC addresses. Therefore, DNS provides the means for naming IP hosts, and for locating IP hosts when they are queried for by name.

ifconfig : Check the ip address

```
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet HWaddr 00:0C:29:28:14:6D
          inet addr:192.168.1.3  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe28:146d/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
                  RX packets:101 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:27 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:8353 (8.1 KiB)  TX bytes:3999 (3.9 KiB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING  MTU:16436  Metric:1
                  RX packets:8 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:0
                  RX bytes:480 (480.0 b)  TX bytes:480 (480.0 b)
```

vi /etc/sysconfig/network-scripts/ifcfg-eth0

```
[root@localhost ~]# vim /etc/sysconfig/network-scripts/ifcfg-eth0
```

```
DEVICE="eth0"
NM_CONTROLLED="yes"
ONBOOT="yes"
TYPE=Ethernet
BOOTPROTO=none
IPADDR=192.168.1.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
UUID=5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
HWADDR=00:0C:29:1A:F0:95
```

Type DNS1=192.168.1.3

```
DEVICE=eth0
NM_CONTROLLED=yes
ONBOOT=no
HWADDR=00:0C:29:10:1C:3F
TYPE=Ethernet
BOOTPROTO=none
DNS1=192.168.1.3
IPADDR=192.168.1.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
UUID=5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
NETMASK=255.255.255.0
USERCTL=no
~  
~  
~  
~  
~  
~  
-- INSERT --
```

16,11

All

:w!

```
DEVICE=eth0
NM_CONTROLLED=yes
ONBOOT=no
HWADDR=00:0C:29:10:1C:3F
TYPE=Ethernet
BOOTPROTO=none
DNS1=192.168.1.3
IPADDR=192.168.1.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
UUID=5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
NETMASK=255.255.255.0
USERCTL=no
~  
~  
~  
~  
~  
~  
:w!
```

:q!

```
DEVICE=eth0
NM_CONTROLLED=yes
ONBOOT=no
HWADDR=00:0C:29:10:1C:3F
TYPE=Ethernet
BOOTPROTO=none
DNS1=192.168.1.3
IPADDR=192.168.1.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
NAME="System eth0"
UUID=5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03
NETMASK=255.255.255.0
USERCTL=no
```

vim /etc/hosts

```
[root@localhost ~]# vim /etc/hosts
```

```
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4  
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6  
192.168.1.3 server.tyit.com
```

vim /etc/sysconfig/network

```
[root@localhost ~]# vim /etc/sysconfig/network
```

```
NETWORKING=yes  
HOSTNAME=server.tyit.com
```

vim /etc/resolv.conf

```
[root@localhost ~]# vim /etc/resolv.conf
```

```
1 # Generated by NetworkManager
2 server tyit.com
3 nameserver 192.168.1.3
```

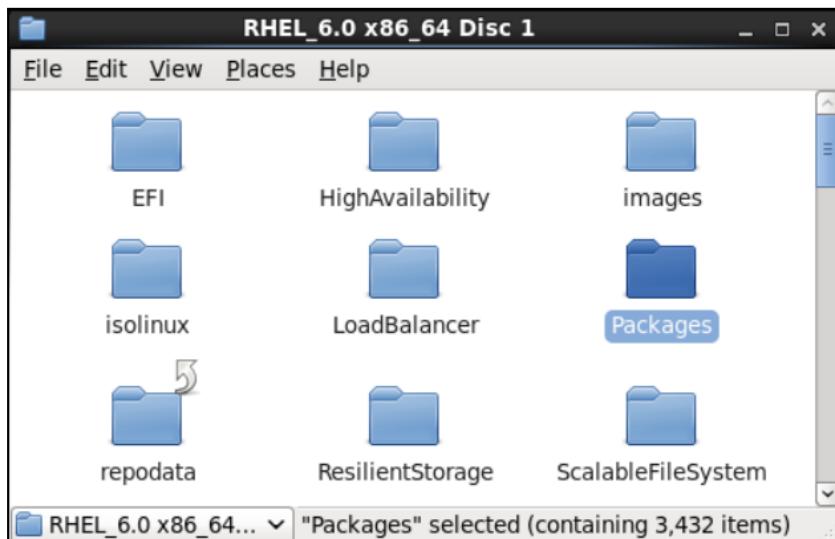
➤ **Install Bind Package :**

i . Desktop

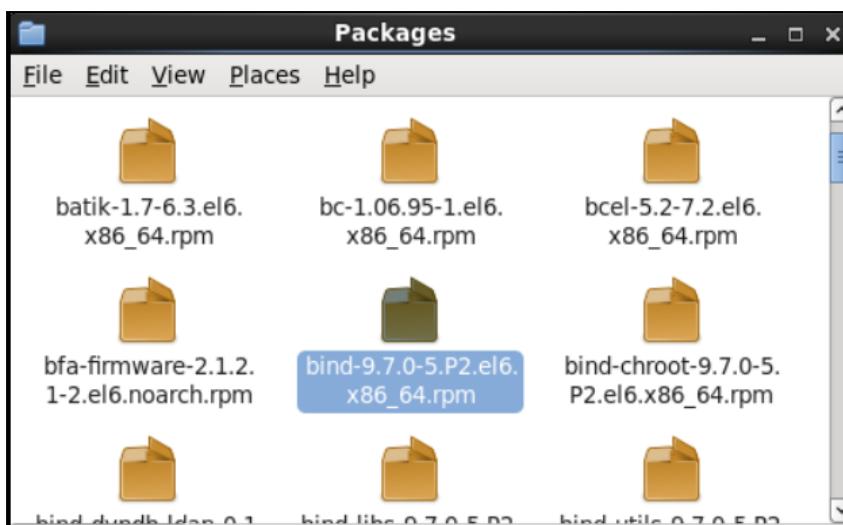
ii. CD



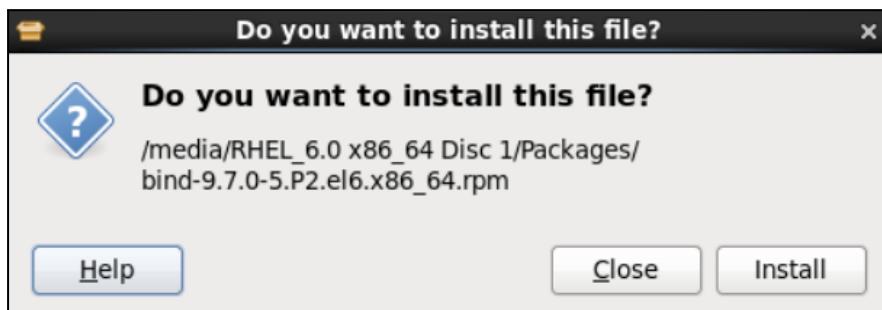
iii. Packages



iv. Bind



v. Install



■ Install all bind Packages

```
[root@localhost ~]# cd /media/RHEL_6.0\ x86_64\ Disc\ 1/Packages/  
[root@localhost Packages]# rpm -qa bind  
bind-9.7.0-5.P2.el6.x86_64  
[root@localhost Packages]# rpm -ivh bind*  
warning: bind-9.7.0-5.P2.el6.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID  
fd431d51: NOKEY  
Preparing... ################################ [100%]  
    package bind-libs-32:9.7.0-5.P2.el6.x86_64 is already installed  
    package bind-32:9.7.0-5.P2.el6.x86_64 is already installed  
    package bind-utils-32:9.7.0-5.P2.el6.x86_64 is already installed
```

```
[root@localhost Packages]# rpm -ivh bind-9.7.0-5.P2.el6.x86_64.rpm  
warning: bind-9.7.0-5.P2.el6.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID  
fd431d51: NOKEY  
Preparing... ################################ [100%]  
  1:bind  
    warning: /etc/named.conf created as /etc/named.conf.  
rpmnew  
warning: /etc/named.rfc1912.zones created as /etc/named.rfc1912.zones.rpmnew  
##### [100%]
```

■ Query to check whether the bind packages are installed or not.

```
[root@localhost ~]# rpm -qa | grep bind*  
binutils-2.20.51.0.2-5.11.el6.x86_64  
rpcbind-0.2.0-8.el6.x86_64  
bind-utils-9.7.0-5.P2.el6.x86_64  
libini_config-0.5.1-28.el6.x86_64  
libproxy-bin-0.3.0-2.el6.x86_64  
samba-winbind-clients-3.5.4-68.el6.x86_64  
ypbind-1.20.4-29.el6.x86_64  
bind-libs-9.7.0-5.P2.el6.x86_64  
PackageKit-device-rebind-0.5.8-13.el6.x86_64
```

■ vim /etc/named.conf

```
[root@localhost Packages]# vim /etc/named.conf
```

For setting number press ESC and type : se nu

Line 11 : listen-on port 53 {192.168.1.3; }

Line 12 : For commenting this line put # Sign in front of it.

Line 17 : allow-query { any; };

Check the last line of file and note down the last line

```
10 options {
11     listen-on port 53 { 192.168.1.3; };
12 #     listen-on-v6 port 53 { ::1; };
13     directory      "/var/named";
14     dump-file      "/var/named/data/cache_dump.db";
15     statistics-file "/var/named/data/named_stats.txt";
16     memstatistics-file "/var/named/data/named_mem_stats.txt";
17     allow-query    { any; };
18     recursion yes;
```

- **vi /etc/named.rfc1912.zones.**

```
[root@localhost Packages]# vim /etc/named.rfc1912.zones
```

Line 13 : Change Zone “localhost.locaLdomain” IN to zone “tyit.com” IN.

Line 15 : Change file “named.localhost” to “forward.zone”.

13 zone "localhost.locaLdomain" IN { 14 type master; 15 file "named.localhost"; 16 allow-update { none; }; 17 };	13 zone "tyit.com" IN { 14 type master; 15 file "forward.zone"; 16 allow-update { none; }; 17 };
--	--

Line 30 : change zone “1.0.0.127.in-addr.arpa” IN to zone “1.168.192.in-addr.arpa” IN

Line 33 : change file “named.loopback” to file “reverse.zone”

31 zone "1.0.0.127.in-addr.arpa" IN { 32 type master; 33 file "named.loopback"; 34 allow-update { none; }; 35 };	31 zone "1.168.192.in-addr.arpa" IN { 32 type master; 33 file "reverse.zone"; 34 allow-update { none; }; 35 };
--	--

- Change directory to cd /var/named

```
[root@localhost Packages]# cd /var/named/
```

- ls

```
[root@localhost named]# ls
data dynamic named.ca named.empty named.localhost named.loopback slaves
```

- Copy the files into new file using cp named.localhost forward.zone

```
[root@localhost named]# cp named.localhost forward.zone
```

- Copy the files into new file using cp named.localhost reverse.zone

```
[root@localhost named]# cp named.localhost reverse.zone
```

- Type ls to see those files.

```
[root@localhost named]# ls
data      forward.zone  named.empty      named.loopback  slaves
dynamic   named.ca      named.localhost  reverse.zone
```

- Open forward zone file using vi forward.zone

```
[root@localhost named]# vim forward.zone
```

Change the few lines of below window

```
$TTL 1D
@ IN SOA @ rname.invalid. (
          0 ; serial
          1D ; refresh
          1H ; retry
          1W ; expire
          3H ) ; minimum
NS @
A 127.0.0.1
AAAA ::1
```

Like this

```
$TTL 1D
@ IN SOA server.tyit.com. root.server.tyit.com. (
          0 ; serial
          1D ; refresh
          1H ; retry
          1W ; expire
          3H ) ; minimum
IN      NS      server.tyit.com.
server IN      A      192.168.1.3
```

- Open reverse zone file using vi reverse.zone

```
[root@localhost named]# vim reverse.zone
```

Change the few lines of below window

```
$TTL 1D
@ IN SOA @ rname.invalid. (
    0      ; serial
    1D     ; refresh
    1H     ; retry
    1W     ; expire
    3H )   ; minimum
NS      @
A       127.0.0.1
AAAA    ::1
```

Like this

```
$TTL 1D
@ IN SOA server.tyit.com. root.server.tyit.com. (
    0      ; serial
    1D     ; refresh
    1H     ; retry
    1W     ; expire
    3H )   ; minimum
IN      NS      server.tyit.com.
3       IN      PTR      server.tyit.com.
```

- chgrp named forward.zone

```
[root@localhost named]# chgrp named forward.zone
```

- chgrp named reverse.zone

```
[root@localhost named]# chgrp named reverse.zone
```

- Start the dns server using service named start

```
[root@localhost named]# service named start
Starting named: [ OK ]
```

- Check the dns is configured
- Use dig command : dig server.tyit.com

```
[root@localhost ~]# dig server.tyit.com

; <>> DiG 9.7.0-P2-RedHat-9.7.0-5.P2.el6 <>> server.tyit.com
; global options: +cmd
; Got answer:
; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57972
; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 0

; QUESTION SECTION:
server.tyit.com.      IN      A

;ANSWER SECTION:
server.tyit.com.    86400   IN      A      192.168.1.3

;AUTHORITY SECTION:
tyit.com.            86400   IN      NS     server.tyit.com.

; Query time: 14 msec
; SERVER: 192.168.1.3#53(192.168.1.3)
; WHEN: Wed Sep 20 01:02:51 2023
; MSG SIZE rcvd: 63
```

- Dig -x 192.168.1.3

```
[root@localhost ~]# dig -x 192.168.1.3

; <>> DiG 9.7.0-P2-RedHat-9.7.0-5.P2.el6 <>> -x 192.168.1.3
; global options: +cmd
; Got answer:
; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 18139
; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 1

; QUESTION SECTION:
;3.1.168.192.in-addr.arpa.      IN      PTR

;ANSWER SECTION:
3.1.168.192.in-addr.arpa. 86400 IN      PTR     server.tyit.com.

;AUTHORITY SECTION:
1.168.192.in-addr.arpa. 86400 IN      NS     server.tyit.com.

;ADDITIONAL SECTION:
server.tyit.com.        86400   IN      A      192.168.1.3

; Query time: 0 msec
; SERVER: 192.168.1.3#53(192.168.1.3)
; WHEN: Wed Sep 20 01:03:09 2023
; MSG SIZE rcvd: 101
```

Practical 8. Setting Up a Mail Server

a. Configuring mail using mutt

- Mutt is a command line-based Email client. It's a very useful and powerful tool to send and read mails from the command line in UNIX based systems.
- Mutt also supports POP and IMAP protocols for receiving mails. It opens with a colored interface to send Email which makes it user friendly to send emails from command line.
- The Mut MUA is available in the default Red Hat Enterprise Linux repositories, but you'll have to install it.

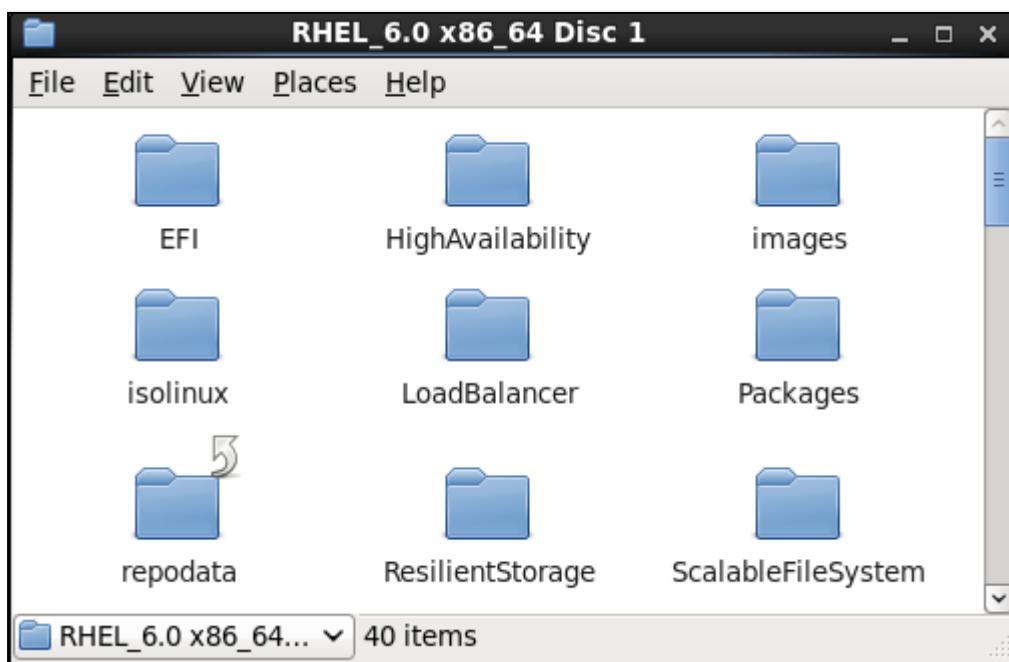
Send mail from one user to another using the mail server by mutt package.

First, we have to install mutt package to run the mail server.

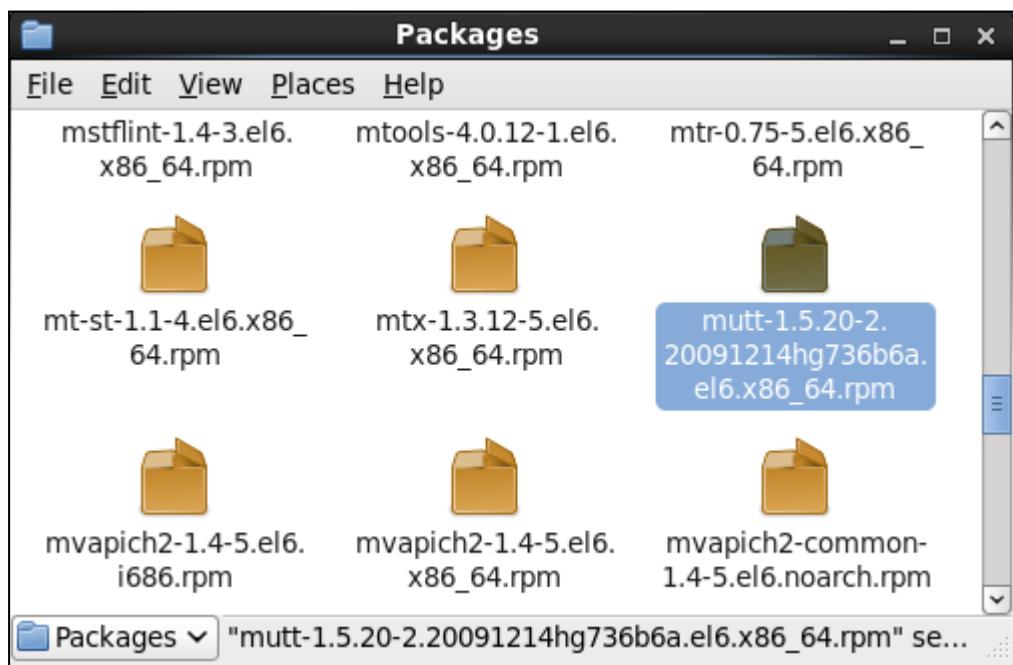
Click on the RHEL cd icon that will be displayed on the main window system.



Click on Packages folder in which there is mutt package.



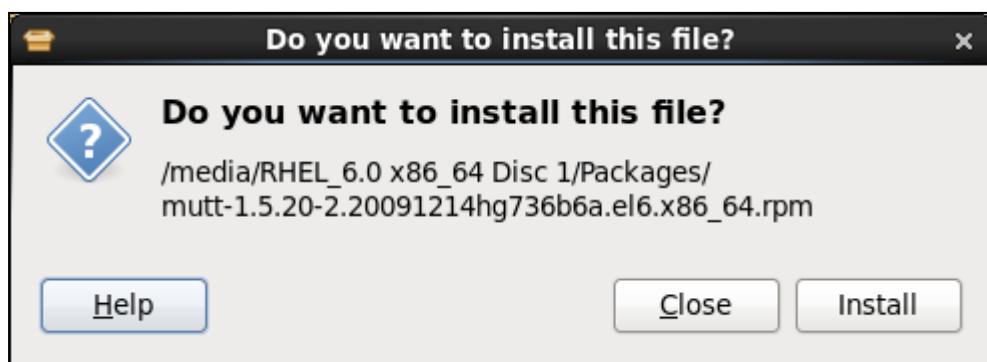
Click on mutt and install it.



Click on "Continue Anyway".



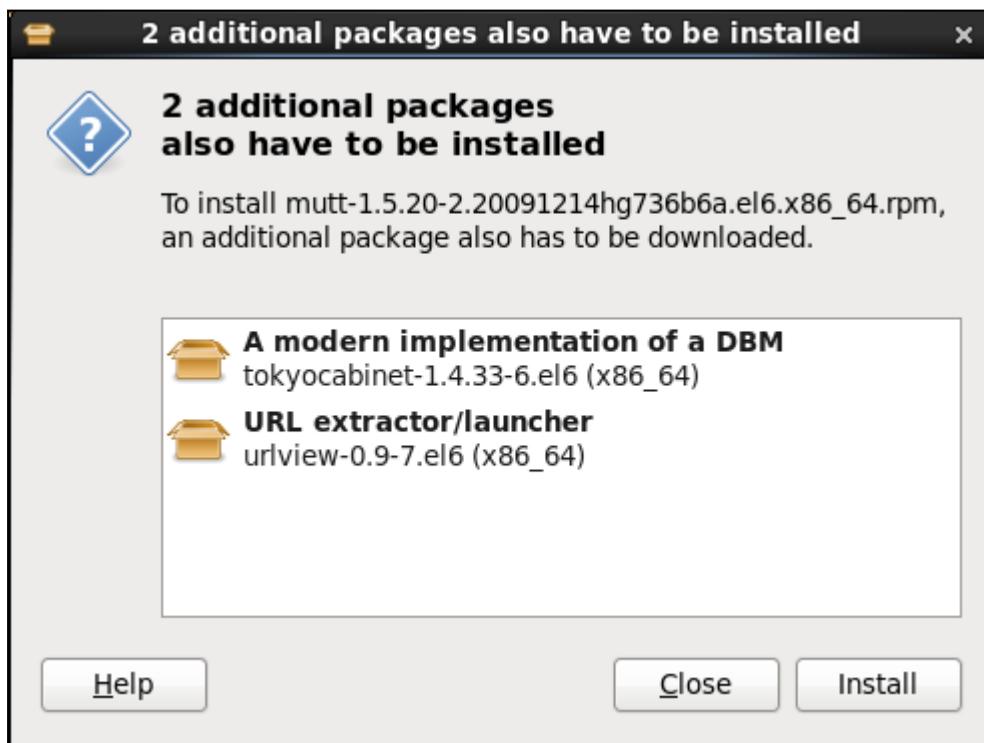
Click on "Install".



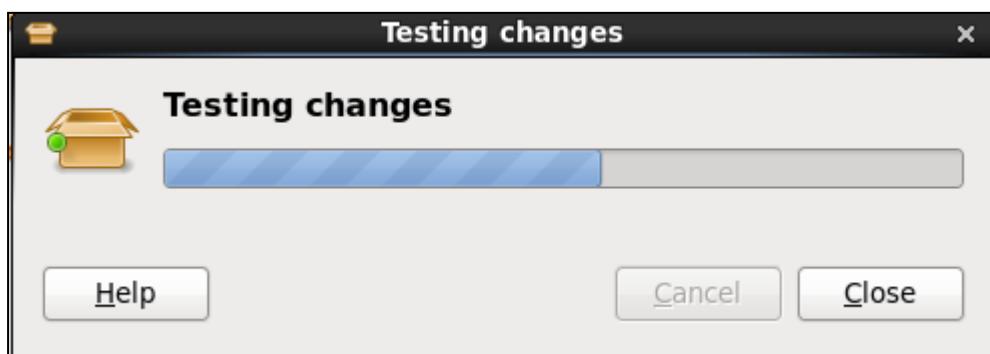
As we can see it is finding and resolving the dependencies.



Click on "Install" to install those 2 additional packages.



Installing the mutt with those dependencies.



Now, to check whether the mutt package has been installed or not, we use the command

```
rpm -qa | grep mutt
```

```
[root@localhost ~]# rpm -qa | grep mutt
mutt-1.5.20-2.20091214hg736b6a.el6.x86_64
[root@localhost ~]# █
```

Now, we will create 2 additional users whom we will share the mail.

```
Useradd user6408
```

```
Passwd tyituser
```

```
[root@localhost ~]# rpm -qa | grep mutt
mutt-1.5.20-2.20091214hg736b6a.el6.x86_64
[root@localhost ~]# useradd user6408
[root@localhost ~]# passwd
Changing password for user root.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
[root@localhost ~]# █
```

```
Useradd user6409
```

```
Passwd tyituser
```

```
[root@localhost ~]# useradd user6409
You have new mail in /var/spool/mail/root
[root@localhost ~]# passwd
Changing password for user root.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
```

switch to user6408

```
[root@localhost ~]# su - user6408
[user6408@localhost ~]$
```

ctrl+d to save and quit.

```
[user6408@localhost ~]$ mail -s Hello Riya
Hello Riya
This is User6408
EOT
```

switch to user6409 to check user6408's message.

```
[user6408@localhost ~]$ su - Riya  
Password:  
[Riya@localhost ~]$
```

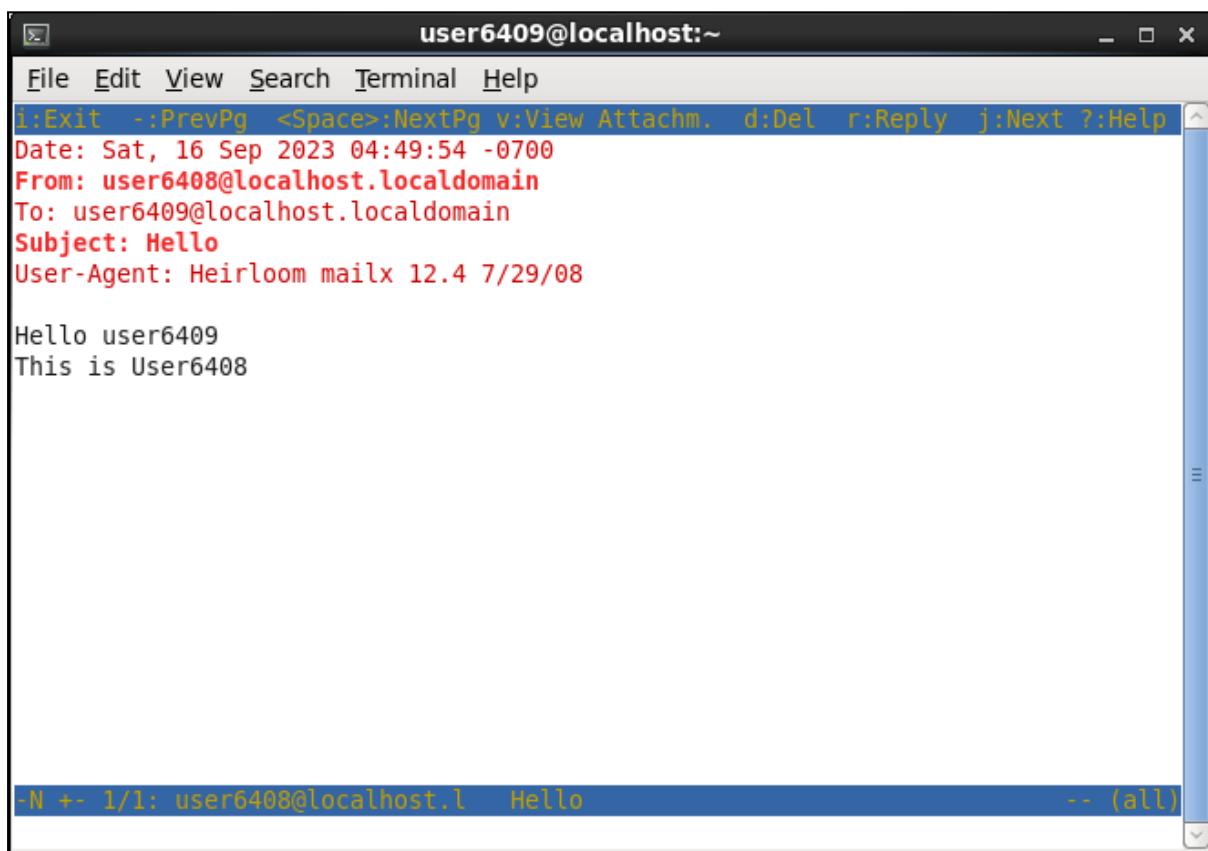
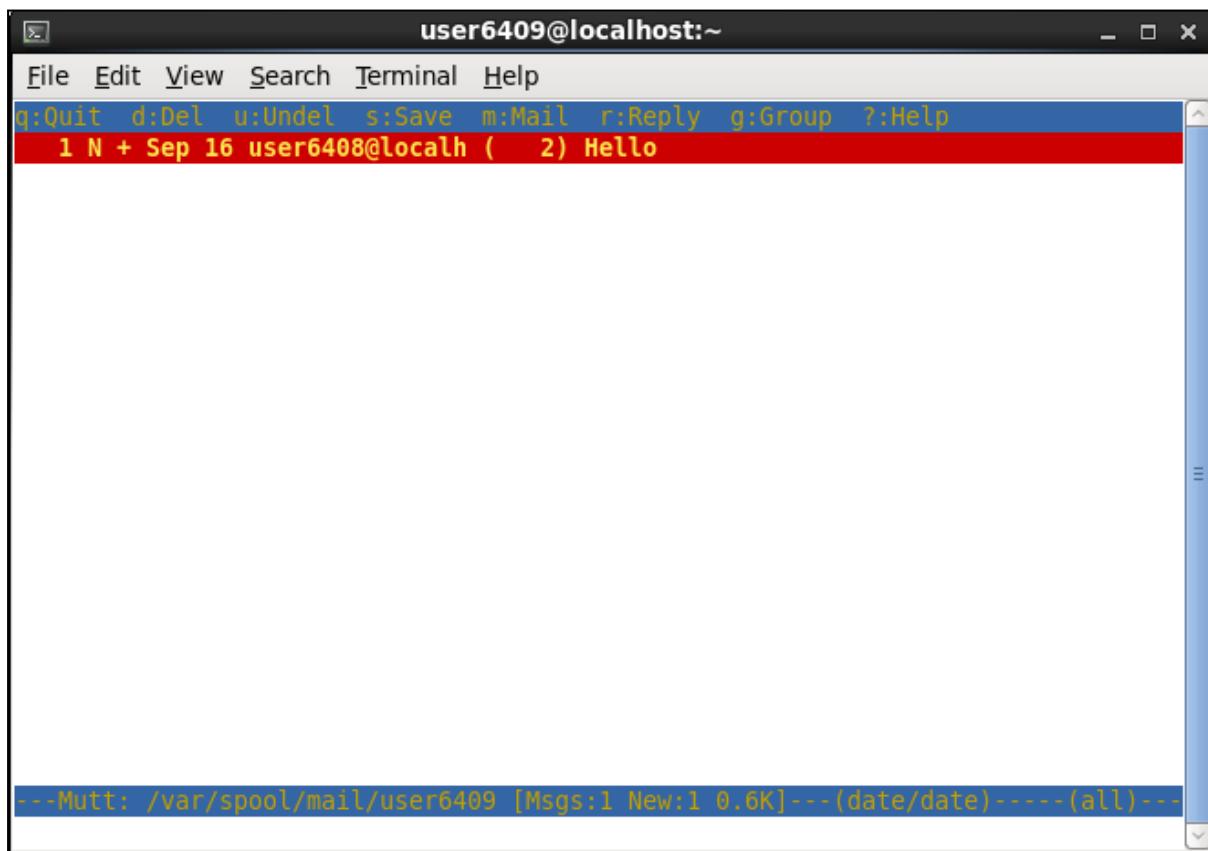
mutt

```
[Riya@localhost ~]$ mutt
```

Type y



Press Enter.



Press r : to reply to mail

Press Enter then y

A screenshot of a terminal window titled "user6409@localhost:~". The window contains the following text:

```
i:Exit --PrevPg <Space>:NextPg v:View Attachm. d:Del r:Reply j:Next ?:Help
Date: Sat, 16 Sep 2023 04:49:54 -0700
From: user6408@localhost.localdomain
To: user6409@localhost.localdomain
Subject: Hello
User-Agent: Heirloom mailx 12.4 7/29/08

Hello user6409
This is User6408
```

The bottom status bar shows the command: `-N +- 1/1: user6408@localhost.l Hello -- (all)`. The cursor is positioned at the end of the command.

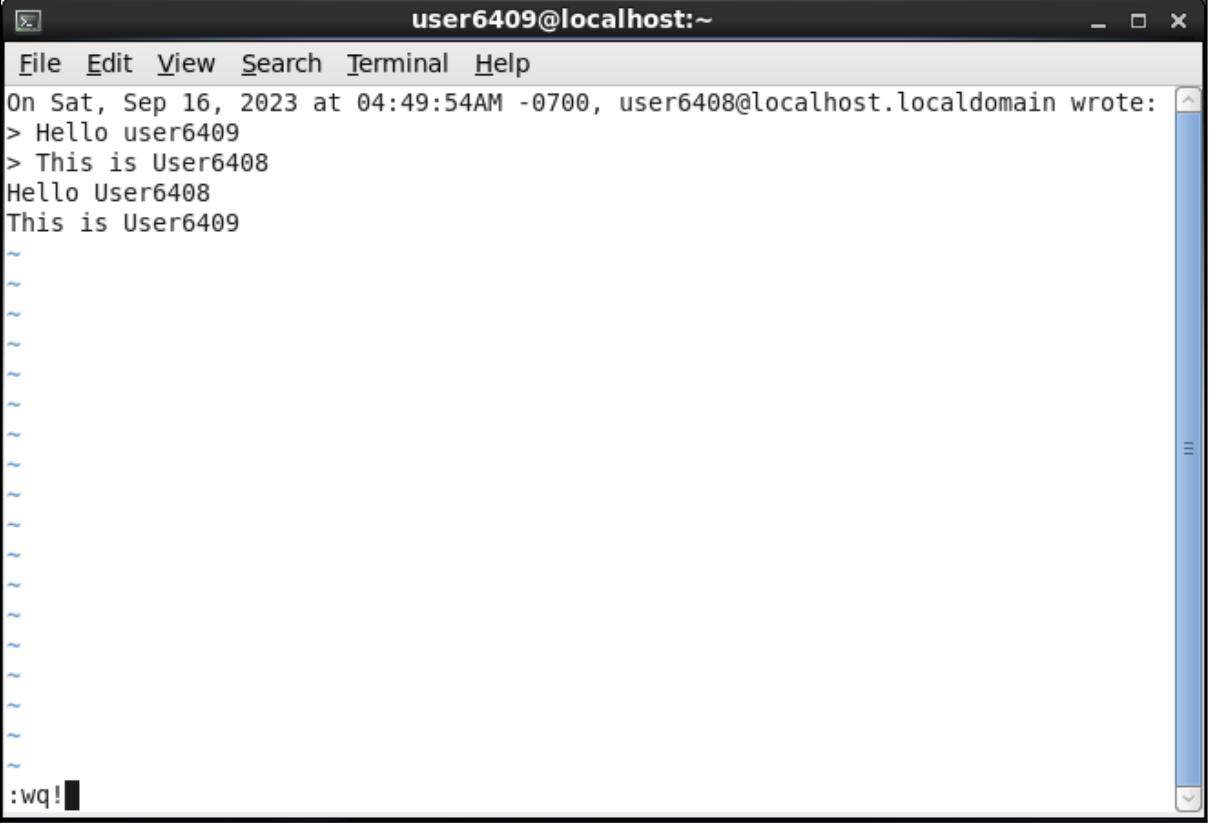
Press i : to enter the message to reply

A screenshot of a terminal window titled "user6409@localhost:~". The window contains the following text:

```
File Edit View Search Terminal Help
On Sat, Sep 16, 2023 at 04:49:54AM -0700, user6408@localhost.localdomain wrote:
> Hello user6409
> This is User6408
Hello User6408
This is User6409
```

The bottom status bar shows the command: `-- INSERT --`.

:wq! : save and quit using

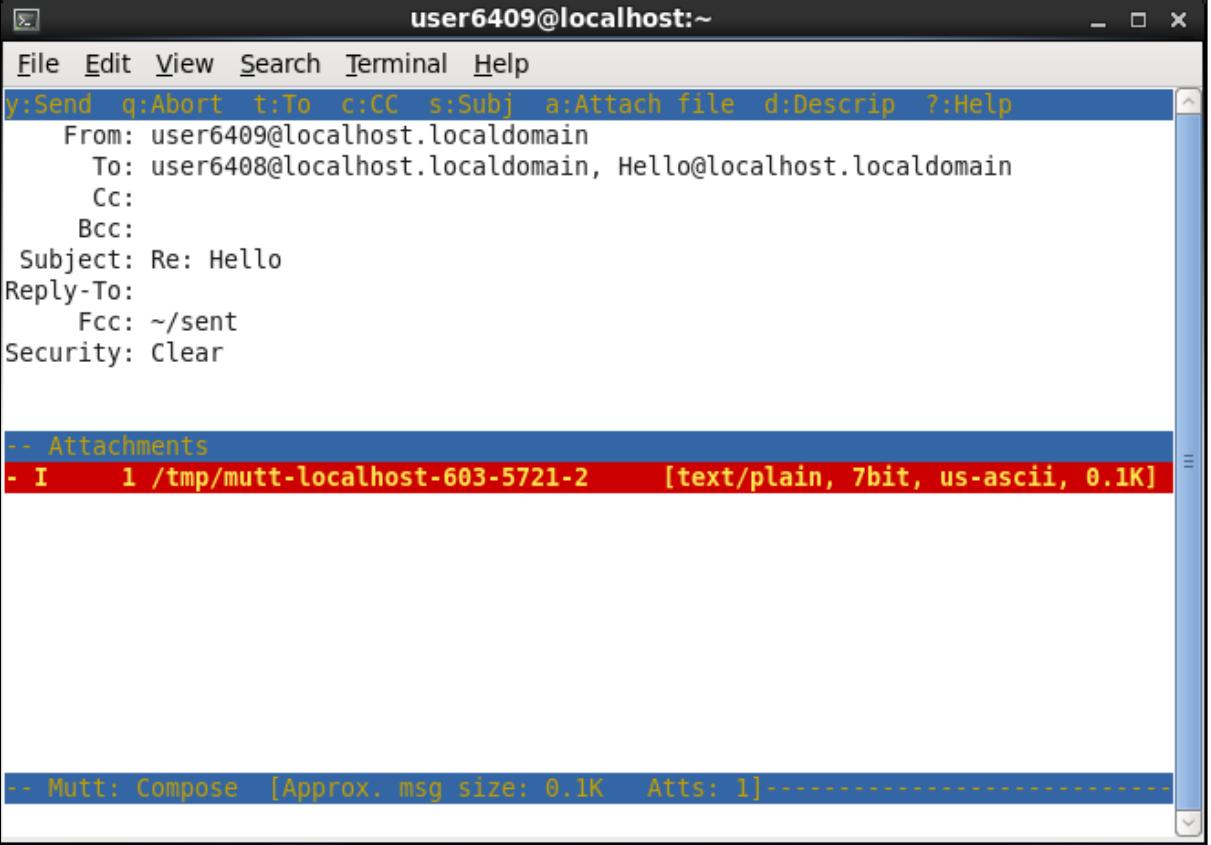


A screenshot of a terminal window titled "user6409@localhost:~". The window contains a message from another user:

```
On Sat, Sep 16, 2023 at 04:49:54AM -0700, user6408@localhost.localdomain wrote:  
> Hello user6409  
> This is User6408  
Hello User6408  
This is User6409
```

The message ends with a series of tilde (~) characters, indicating a continuation of the message body. At the bottom of the window, the command ":wq!" is typed, indicating the user is saving and quitting.

Type y : to send the message.



A screenshot of a terminal window titled "user6409@localhost:~". The window shows a message being composed in Mutt:

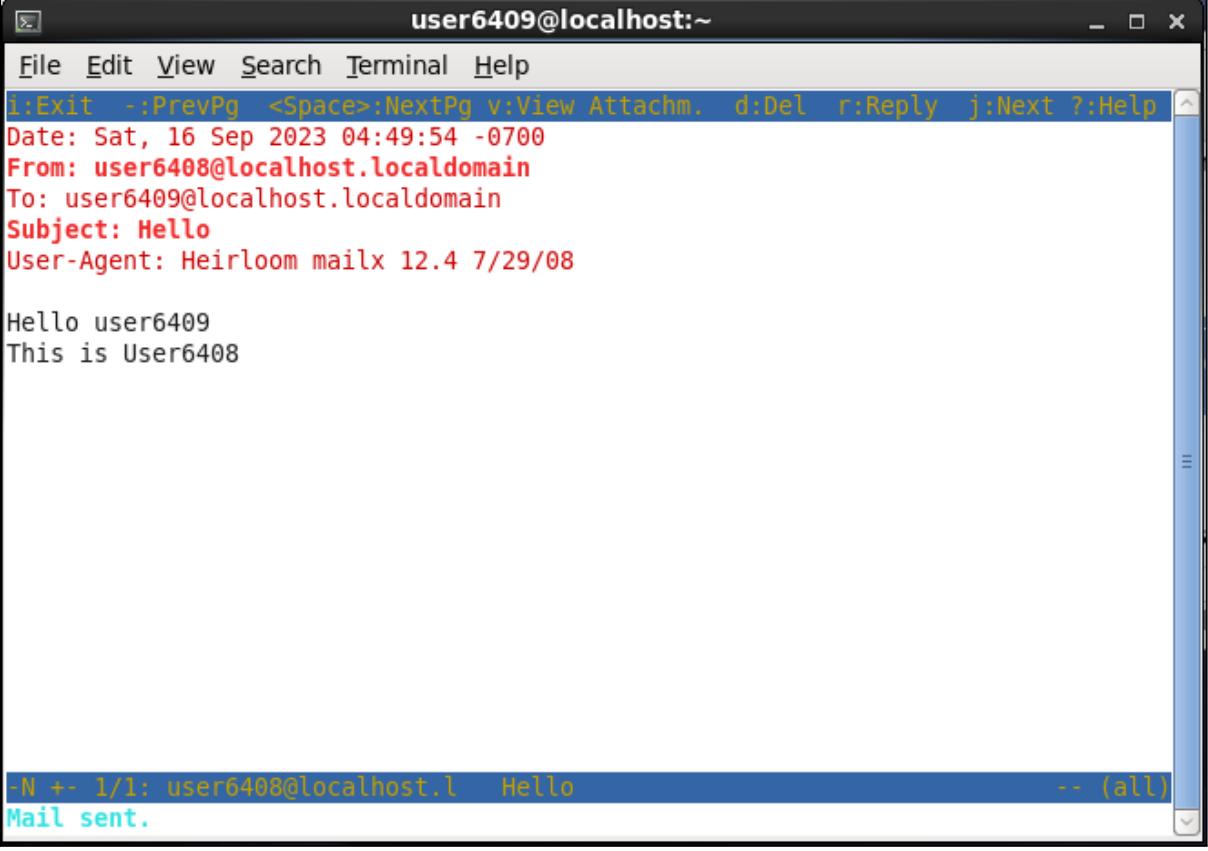
```
y:Send q:Abort t:To c:CC s:Subj a:Attach file d:Descrip ?:Help  
From: user6409@localhost.localdomain  
To: user6408@localhost.localdomain, Hello@localhost.localdomain  
Cc:  
Bcc:  
Subject: Re: Hello  
Reply-To:  
Fcc: ~/sent  
Security: Clear
```

The message header is partially filled. Below the message, the "Attachments" section is shown:

```
-- Attachments  
- I 1 /tmp/mutt-localhost-603-5721-2 [text/plain, 7bit, us-ascii, 0.1K]
```

At the bottom of the window, the status bar displays: "... Mutt: Compose [Approx. msg size: 0.1K Atts: 1]-----".

As the mail has been sent.



The screenshot shows a terminal window titled "user6409@localhost:~". The window contains the following text:

```
File Edit View Search Terminal Help
i:Exit --PrevPg <Space>:NextPg v:View Attachm. d:Del r:Reply j:Next ?:Help
Date: Sat, 16 Sep 2023 04:49:54 -0700
From: user6408@localhost.localdomain
To: user6409@localhost.localdomain
Subject: Hello
User-Agent: Heirloom mailx 12.4 7/29/08

Hello user6409
This is User6408
```

At the bottom of the window, there is a status bar with the following information:

```
+N +- 1/1: user6408@localhost.l Hello -- (all)
Mail sent.
```

Now switch to user6408

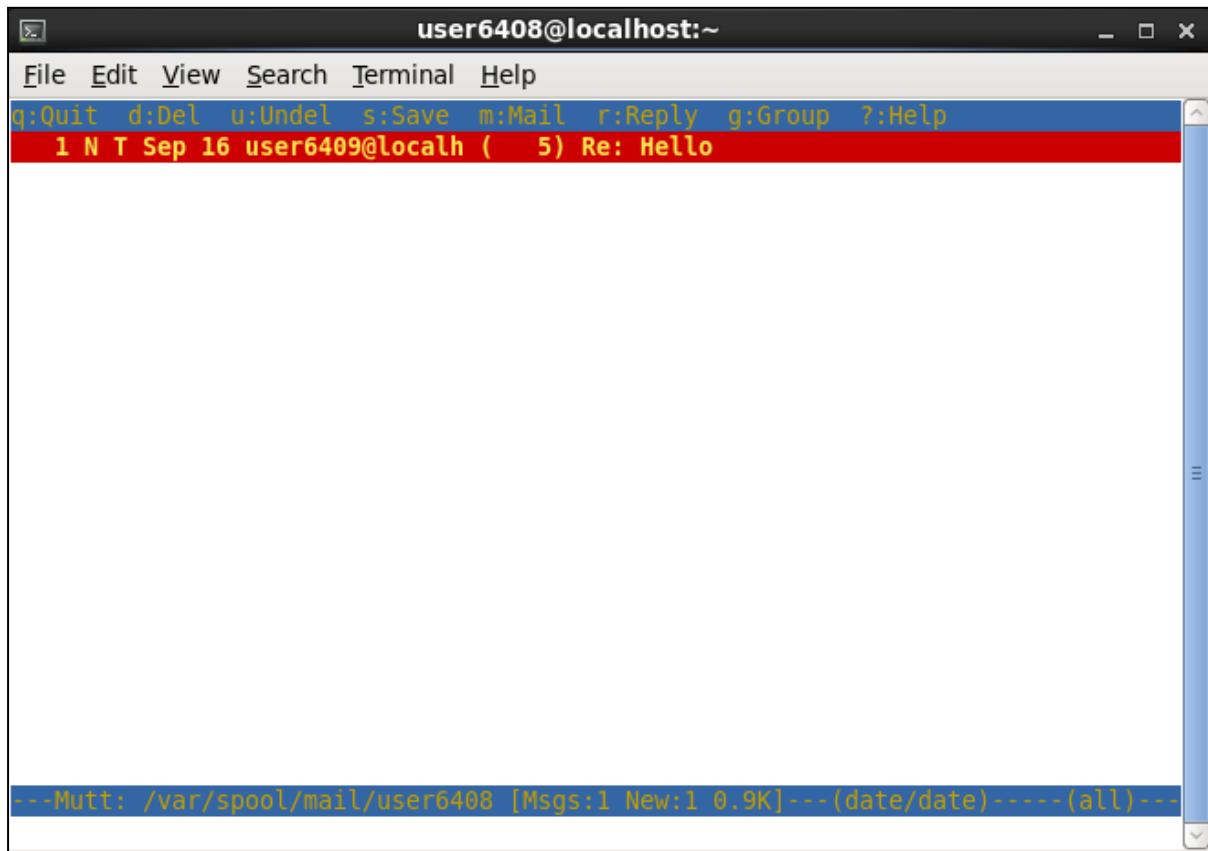
mutt

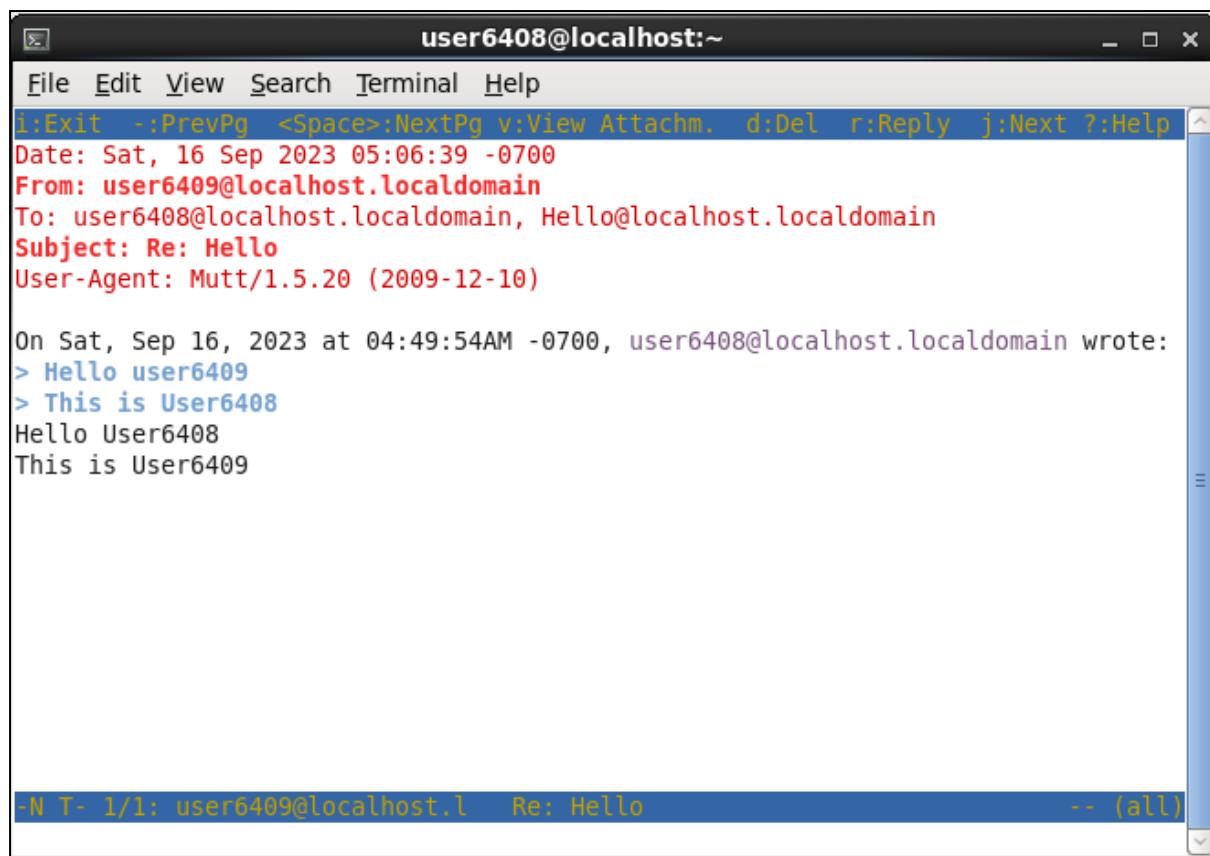
```
[root@localhost ~]# su - user6408
[user6408@localhost ~]$ mutt
```

Press y



As we can see there is a reply mail press Enter to read it.





Practical 10. Working with shell scripts

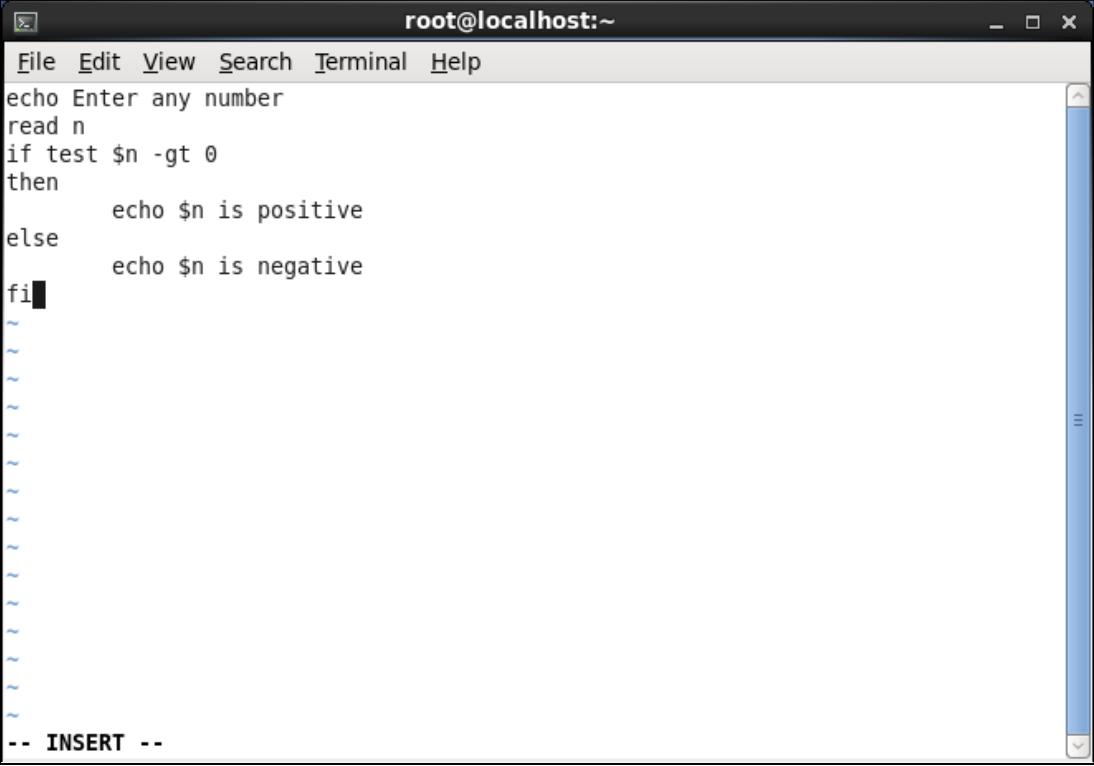
➤ Program that demonstrates the use of if..else with test

1. Program to demonstrate that the given number is positive or negative.

Create a vi editor to write the script:

```
[root@localhost Desktop]# cd ~  
[root@localhost ~]# vi prog1
```

Code



The screenshot shows a terminal window titled "root@localhost:~". The window contains a vi editor session. The script code is as follows:

```
echo Enter any number  
read n  
if test $n -gt 0  
then  
    echo $n is positive  
else  
    echo $n is negative  
fi
```

The status bar at the bottom of the terminal window indicates "-- INSERT --".

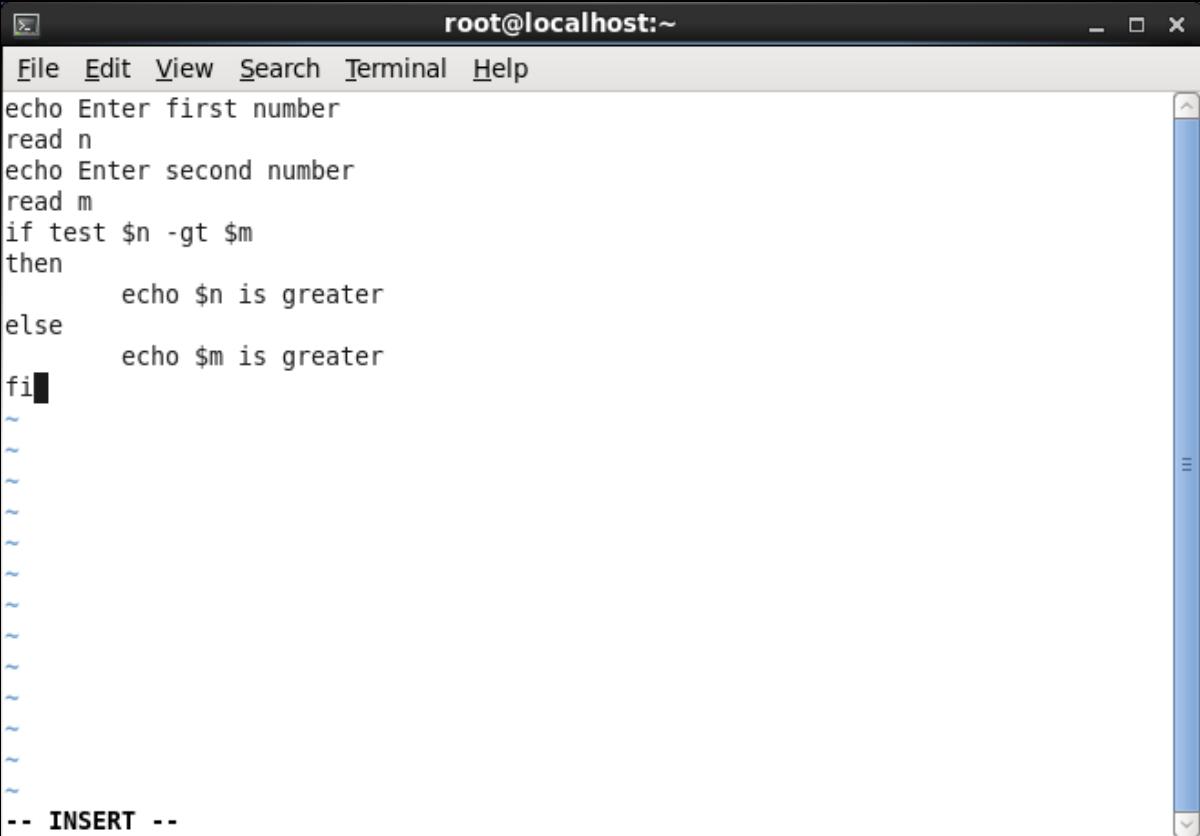
```
[root@localhost ~]# chmod +x prog1
```

Output

```
[root@localhost ~]# bash prog1  
Enter any number  
6  
6 is positive  
[root@localhost ~]# bash prog1  
Enter any number  
-1  
-1 is negative
```

2.Program to demonstrate which number is greater entered by the user.

```
[root@localhost ~]# vi prog2
```



```
root@localhost:~  
File Edit View Search Terminal Help  
echo Enter first number  
read n  
echo Enter second number  
read m  
if test $n -gt $m  
then  
    echo $n is greater  
else  
    echo $m is greater  
fi  
-- INSERT --
```

Output

```
[root@localhost ~]# bash prog2  
Enter first number  
5  
Enter second number  
3  
5 is greater  
[root@localhost ~]# bash prog2  
Enter first number  
5  
Enter second number  
7  
7 is greater
```

3. Program to demonstrate that the entered number is even or odd.

```
[root@localhost ~]# vi prog3
```

The screenshot shows a terminal window titled "root@localhost:~". Inside the window, the vi editor is open, displaying the following script:

```
echo Enter a number
read n
if test `expr $n % 2` -eq 0
then
    echo $n is Even number
else
    echo $n is Odd number
fi
```

The status bar at the bottom of the vi window indicates "-- INSERT --".

Output

```
[root@localhost ~]# bash prog3
Enter a number
4
4 is Even number
[root@localhost ~]# bash prog3
Enter a number
5
5 is Odd number
```

4.Program to demonstrate Profit or Loss.

```
[root@localhost ~]# vi prog4
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains the following Bash script:

```
echo Enter cost price
read cp
echo Enter Selling Price
read sp
if test $sp -gt $cp
then
    echo Profit is $((sp-cp))
else
    echo Loss is $((cp-sp))
fi
```

The cursor is positioned at the end of the "fi" line. The status bar at the bottom of the terminal window displays "-- INSERT --".

Output

```
[root@localhost ~]# bash prog4
Enter cost price
100
Enter Selling Price
200
Profit is 100
[root@localhost ~]# bash prog4
Enter cost price
200
Enter Selling Price
150
Loss is 50
```

5.Program to demonstrate that the entered character is a vowel or consonant.

```
[root@localhost ~]# vi prog5
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains the following code:

```
echo Enter the Character
read ch
if [[ $ch == [AEIOUaeiou] ]]
then
    echo $ch is a Vowel
else
    echo $ch is a Consonant
fi
```

The cursor is positioned at the end of the "fi" line. At the bottom of the terminal window, it says "-- INSERT --".

Output

```
[root@localhost ~]# bash prog5
Enter the Character
a
a is a Vowel
[root@localhost ~]# bash prog5
Enter the Character
r
r is a Consonant
```

```
[root@localhost ~]# bash prog5
Enter the Character
E
E is a Vowel
[root@localhost ~]# bash prog5
Enter the Character
X
X is a Consonant
```

6.Program to demonstrate that the year is a leap year or not.

```
[root@localhost ~]# vi prog6
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains the following code:

```
echo Enter the year
read y

if ((y%4 == 0))
then
    echo $y is leap year
else
    echo $y is not leap year
fi
```

The status bar at the bottom of the terminal window displays "-- INSERT --".

Output

```
[root@localhost ~]# bash prog6
Enter the year
2004
2004 is leap year
[root@localhost ~]# bash prog6
Enter the year
2005
2005 is not leap year
```

7.Program to check whether the given file exists or not.

```
[root@localhost ~]# vi prog7
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains the following code:

```
File Edit View Search Terminal Help
echo Enter the file name
read fname
if [ -f $fname ]
then
    echo the File exists.
else
    echo the File $fname does not exists.
fi
-- INSERT --
```

The code is a Bash script that prompts the user for a file name, reads it into the variable \$fname, and then checks if the file exists using the command [-f \$fname]. If it does, it prints "the File exists.". Otherwise, it prints "the File \$fname does not exists.". The script ends with a fi statement. At the bottom of the terminal window, there is a message "-- INSERT --".

Output

```
[root@localhost ~]# bash prog7
Enter the file name
prog1
the File exists.
[root@localhost ~]# bash prog7
Enter the file name
prog8
the File prog8 does not exists.
```

Program 8

```
[root@localhost ~]# vi prog8
```

```
root@localhost:~  
File Edit View Search Terminal Help  
echo Enter the marks of Five Subject  
read a  
read b  
read c  
read d  
read e  
m=$((a + $b + $c + $d + $e))  
echo Total marks is $m  
per=$(expr $m / 5)  
echo Percentage is $per%
```

```
root@localhost:~  
File Edit View Search Terminal Help  
echo Percentage is $per%  
if [ $per -lt 35 ]  
then  
    echo Grade = Fail  
fi  
if [ $per -ge 35 -a $per -lt 45 ]  
then  
    echo Grade = Third  
fi  
if [ $per -ge 45 -a $per -lt 60 ]  
then  
    echo Grade = Second  
fi  
if [ $per -ge 60 -a $per -lt 75 ]  
then  
    echo Grade = First  
fi  
if [ $per -ge 75 ]  
then  
    echo Grade = First D  
fi  
  
-- INSERT --
```

Output

```
[root@localhost ~]# vi prog8
[root@localhost ~]# bash prog8
Enter the marks of Five Subject
76
89
45
56
67
Total marks is 333
Percentage is 66%
Grade = First
[root@localhost ~]#
```

```
[root@localhost ~]# bash prog8
Enter the marks of Five Subject
33
44
33
55
44
Total marks is 209
Percentage is 41%
Grade = Third
[root@localhost ~]#
```

9.Program to print the day of week using a case .

```
[root@localhost ~]# vi prog9
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains a vi editor session with the following code:

```
echo Enter the Day Number
read num
case $num in
1) echo Sunday;;
2) echo Monday;;
3) echo Tuesday;;
4) echo Wednesday;;
5) echo Thursday;;
6) echo Friday;;
7) echo Saturday;;
*) echo Enter the number bet 1 to 7;;
esac
```

The cursor is positioned at the end of the "esac" line. The status bar at the bottom of the terminal window displays "-- INSERT --".

Output

```
[root@localhost ~]# bash prog9
Enter the Day Number
4
Wednesday
[root@localhost ~]# bash prog9
Enter the Day Number
6
Friday
```

10.Program to check Whether the number is +ve or -ve or 0 using elif.

```
[root@localhost ~]# vi prog9
```

The screenshot shows a terminal window titled "root@localhost:~". Inside the window, the vi editor is open with the following code:

```
File Edit View Search Terminal Help
echo Enter the number
read a
if [ $a -lt 0 ]
then
    echo $a is Negative.
elif [ $a -gt 0 ]
then
    echo $a is Positive.
else
    echo $a is Zero.
fi
-- INSERT --
```

The code uses an if-elif-else construct to determine the sign of the input number \$a. The terminal window has a dark background with light-colored text. The status bar at the bottom right indicates "-- INSERT --".

Output

```
[root@localhost ~]# bash prog10
Enter the number
5
5 is Positive.
[root@localhost ~]# bash prog10
Enter the number
-2
-2 is Negative.
[root@localhost ~]# bash prog10
Enter the number
0
0 is Zero.
```

11.Program to find the pattern using a case.

```
[root@localhost ~]# vi prog11
```

```
root@localhost:~  
File Edit View Search Terminal Help  
echo Enter the Word  
read str  
case $str in  
[aeiouAEIOU]*) echo The Word begins with a vowels;;  
[0-9]*) echo The Word begins with a digit;;  
*[0-9]) echo The Word ends with a digit;;  
????) echo The Word entered is 4 lettered word;;  
*) echo The Wors entered is either starts with a Constraints or incorrect input;;  
esac  
-- INSERT --
```

Output

```
[root@localhost ~]# bash prog11  
Enter the Word  
Ice  
The Word begins with a vowels  
[root@localhost ~]# bash prog11  
Enter the Word  
adam  
The Word begins with a vowels  
[root@localhost ~]# bash prog11  
Enter the Word  
2473  
The Word begins with a digit  
[root@localhost ~]# bash prog11  
Enter the Word  
riya@  
The Wors entered is either starts with a Constraints or incorrect input
```

12. Menu Driven Program

```
[root@localhost ~]# vi prog12
```

```
root@localhost:~ File Edit View Search Terminal Help echo Enter echo 1 To see the content of /etc/passwd echo 2 To see list of users echo 3 To see present working directory echo 4 exit echo Enter your choice read n case $n in 1) cat /etc/passwd;; 2) ls /home;; 3) pwd;; 4) exit;; *) echo Enter the choice as 1, 2, 3, or 4;; esac -- INSERT --
```

Output

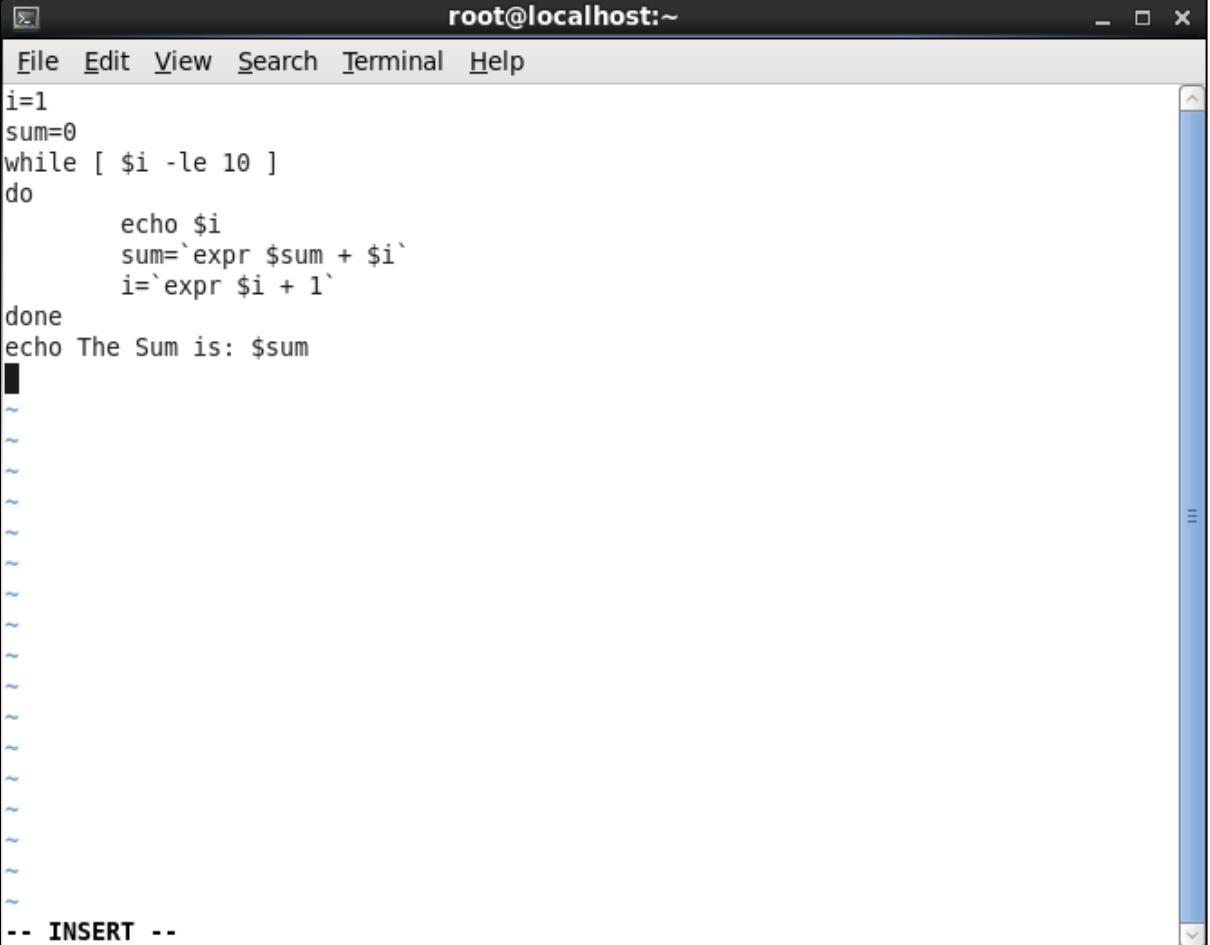
```
[root@localhost ~]# bash prog12
Enter
1 To see the content of /etc/passwd
2 To see list of users
3 To see present working directory
4 exit
Enter your choice
1
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin/nologin
daemon:x:2:2:daemon:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
uucp:x:10:14:uucp:/var/spool/uucp:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
gopher:x:13:30:gopher:/var/gopher:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/sbin/nologin
dbus:x:81:81:System message bus:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
vcса:x:69:69:virtual console memory owner:/dev:/sbin/nologin
rtkit:x:499:499:RealtimeKit:/proc:/sbin/nologin
```

```
games:x:12:100:games:/usr/games:/sbin/nologin
gopher:x:13:30:gopher:/var/gopher:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/sbin/nologin
dbus:x:81:81:System message bus:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
vcса:x:69:69:virtual console memory owner:/dev:/sbin/nologin
rtkit:x:499:499:RealtimeKit:/proc:/sbin/nologin
abrt:x:498:498::/etc/abrt:/sbin/nologin
haldaemon:x:68:68:HAL daemon:/sbin/nologin
apache:x:48:48:Apache:/var/www:/sbin/nologin
saslauthd:x:497:495:"Saslauthd user":/var/empty/saslauth:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
pulse:x:496:494:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
rjcit:x:500:500:rjcit:/home/rjcit:/bin/bash
Riya:x:501:501:Riyasonar:/home/Riya:/bin/bash
Neha:x:502:502:Nehasonar:/home/Neha:/bin/bash
Sheetal:x:503:503:Sheetalsonar:/home/Sheetal:/bin/bash
Soniya:x:505:506::/home/Soniya:/bin/bash
Devil:x:506:507::/home/Devil:/bin/bash
Riya_6408:x:601:601:this is Riya's account:/home/Riya_6408:/sbin/nologin
```

```
[root@localhost ~]# bash prog12
Enter
1 To see the content of /etc/passwd
2 To see list of users
3 To see present working directory
4 exit
Enter your choice
2
Devil Kabir Neha Riya Riya_6408 rjcit Sheetal Soniya
[root@localhost ~]# bash prog12
Enter
1 To see the content of /etc/passwd
2 To see list of users
3 To see present working directory
4 exit
Enter your choice
3
/root
[root@localhost ~]# bash prog12
Enter
1 To see the content of /etc/passwd
2 To see list of users
3 To see present working directory
4 exit
Enter your choice
4
```

13. Write a Program to Print First 10 Numbers and their sum using a while loop.

```
[root@localhost ~]# vi prog13
```



```
root@localhost:~  
File Edit View Search Terminal Help  
i=1  
sum=0  
while [ $i -le 10 ]  
do  
    echo $i  
    sum=`expr $sum + $i`  
    i=`expr $i + 1`  
done  
echo The Sum is: $sum  
-- INSERT --
```

Output

```
[root@localhost ~]# bash prog13  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
The Sum is: 55
```

14. Write a Program to Print First 10 Numbers and their sum using do..until loop.

```
[root@localhost ~]# vi prog14
```

```
i=1
sum=0
until [ $i -gt 10 ]
do
    echo $i
    sum=`expr $sum + $i`
    i=`expr $i + 1`
done
echo The Sum is: $sum
```

Output

```
[root@localhost ~]# bash prog14
1
2
3
4
5
6
7
8
9
10
The Sum is: 55
```

15.Find sum using for loop.

```
[root@localhost ~]# vi prog15
```

```
sum=0
for i in 1 2 3 4 5 6 7 8 9 10
do
    sum=`expr $sum + $i`
    echo $i
done
echo The Sum is: $sum
```

Output

```
[root@localhost ~]# bash prog15
1
2
3
4
5
6
7
8
9
10
The Sum is: 55
```

16.Summation of 1+2+3+.....+N:

```
[root@localhost ~]# vi prog16
```

```
echo Enter the Number
read n
i=1
sum=0
while [ $i -le $n ]
do
    sum=`expr $sum + $i`
    i=`expr $i + 1`
done
echo "Summnation= $sum"
```

Output

```
[root@localhost ~]# bash prog16
Enter the Number
6
Summnation= 21
[root@localhost ~]# bash prog16
Enter the Number
3
Summnation= 6
```

17. Write a program to print the table of entered number.

```
[root@localhost ~]# vi prog17
```

The screenshot shows a terminal window titled "root@localhost:~". The window contains a vi editor session with the following code:

```
j=1
echo Input Number
read n
echo "Print Table of $n"
for i in 1 2 3 4 5 6 7 8 9 10
do
    j=`expr $n \* $i`
    echo "$n x $i = $j"
    i=`expr $i + 1`
done
```

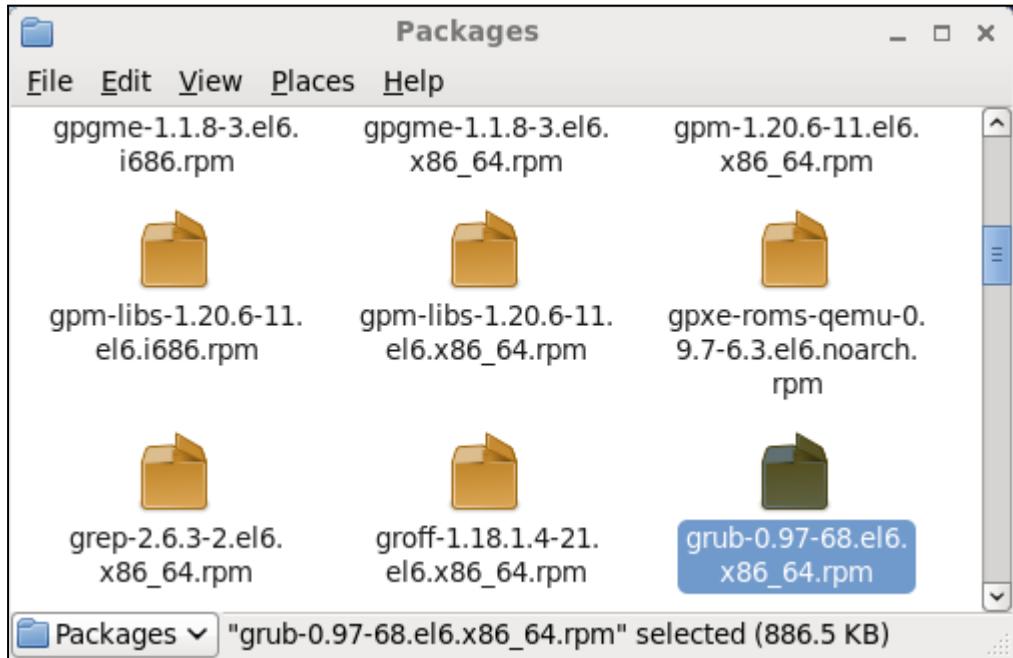
The cursor is positioned at the end of the "done" line. The status bar at the bottom of the terminal window displays "-- INSERT --".

Output

```
[root@localhost ~]# bash prog17
Input Number
6
Print Table of 6
6 x 1 = 6
6 x 2 = 12
6 x 3 = 18
6 x 4 = 24
6 x 5 = 30
6 x 6 = 36
6 x 7 = 42
6 x 8 = 48
6 x 9 = 54
6 x 10 = 60
```

Practical 11. Configuring Booting with GRUB

Install the Grub package from packages folder by searching “grub”.



Open grub configuration file in the “/boot/grub/grub.conf” directory.

```
[root@localhost ~]# vi /boot/grub/grub.conf
```

Copy the last 6 lines from title Red Hat Enterprise Linux and paste it below and make some changes in it.

```
# grub.conf generated by anaconda
#
# Note that you do not have to rerun grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#          all kernel and initrd paths are relative to /boot/, eg.
#          root (hd0,0)
#          kernel /vmlinuz-version ro root=/dev/sda2
#          initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux (2.6.32-71.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=b2192fb5-78e2-4132-93a9-c71c6189698a rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=latarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
        initrd /initramfs-2.6.32-71.el6.x86_64.img
```

Only change the title as shown below.

```
title My Client Machine (RHEL6)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=779f168a-97f7-43c5-bf1
8-165921f10e74 rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=l
atarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img
```

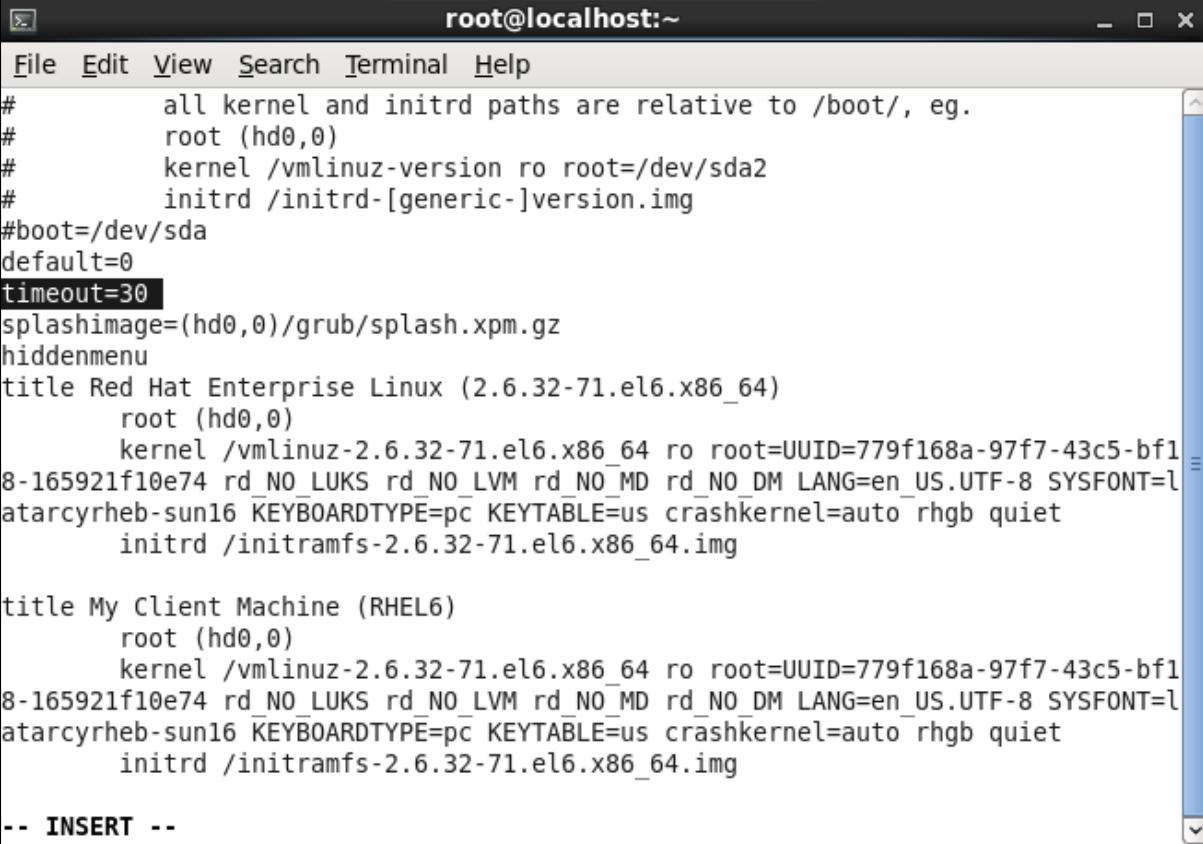
Also change the timeout service.

```
timeout=5
```

Increase it by 30.

```
timeout=30
```

Like this will be shown after changes.



The screenshot shows a terminal window titled "root@localhost:~". The window contains the GRUB configuration file. The "timeout" setting has been changed from 5 to 30. The "title" for the second entry has been updated to "My Client Machine (RHEL6)". The configuration includes kernel and initrd paths, root device specification, and various boot parameters like LANG, SYSFONT, and crashkernel.

```
#      all kernel and initrd paths are relative to /boot/, eg.
#      root (hd0,0)
#      kernel /vmlinuz-version ro root=/dev/sda2
#          initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=30
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux (2.6.32-71.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=779f168a-97f7-43c5-bf1
8-165921f10e74 rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=l
atarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img

title My Client Machine (RHEL6)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=779f168a-97f7-43c5-bf1
8-165921f10e74 rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=l
atarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img

-- INSERT --
```

```
root@localhost:~
```

File Edit View Search Terminal Help

```
#      all kernel and initrd paths are relative to /boot/, eg.
#      root (hd0,0)
#      kernel /vmlinuz-version ro root=/dev/sda2
#      initrd /initrd-[generic-]version.img
#boot=/dev/sda
default=0
timeout=30
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux (2.6.32-71.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=779f168a-97f7-43c5-bf1
8-165921f10e74 rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=l
atarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img

title My Client Machine (RHEL6)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-71.el6.x86_64 ro root=UUID=779f168a-97f7-43c5-bf1
8-165921f10e74 rd_NO_LUKS rd_NO_LVM rd_NO_MD rd_NO_DM LANG=en_US.UTF-8 SYSFONT=l
atarcyrheb-sun16 KEYBOARDTYPE=pc KEYTABLE=us crashkernel=auto rhgb quiet
    initrd /initramfs-2.6.32-71.el6.x86_64.img

-- INSERT --
```

Restart the Linux environment by using “init 6”.

```
[root@server ~]# init 6
```

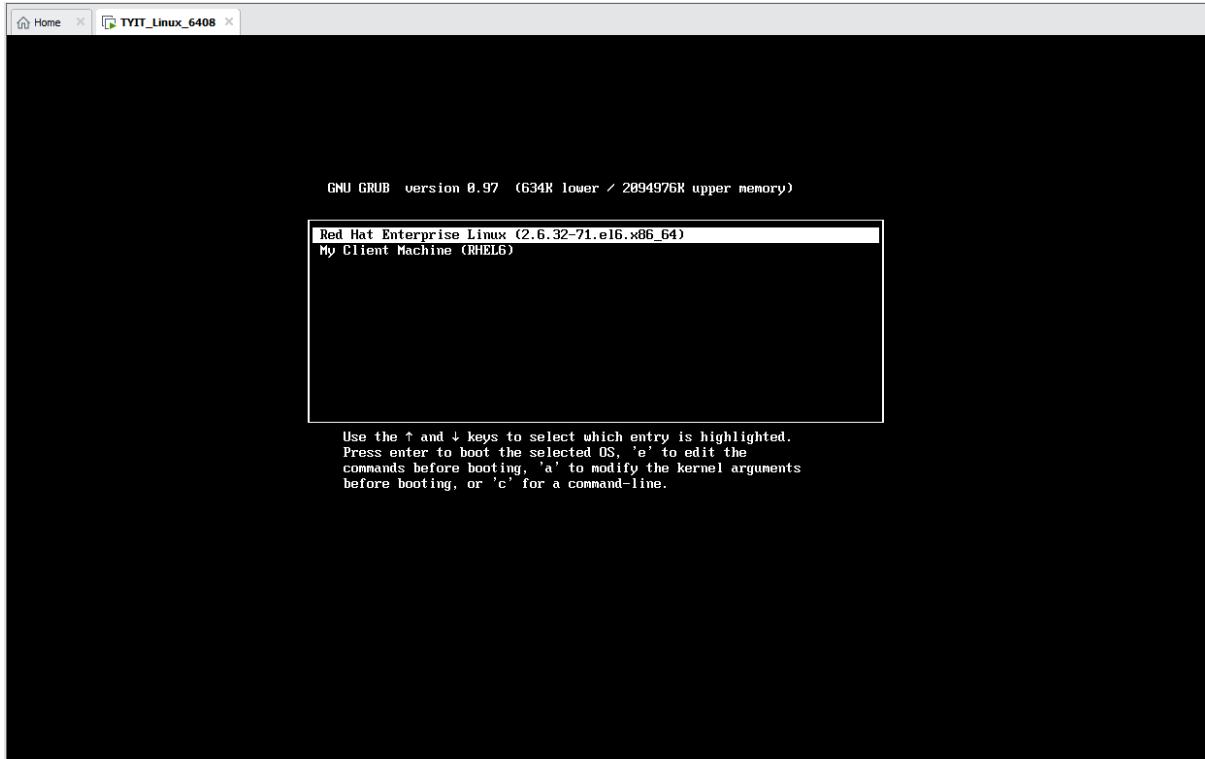
After restarting we can see there is a 30 seconds timeout shown at last of the 2nd sentence.

```
Press any key to enter the menu

Booting Red Hat Enterprise Linux (2.6.32-71.el6.x86_64) in 26 seconds...■
```

By pressing any key it will ask about which environment do we want to run.

As we can see both the grub entries are shown below



By up and down arrow we can select the environment in which we want to run.

By pressing enter on our new environment which we have created by name “My Client Machine.” It will open the same environment as of the Red Hat Enterprise Linux, it means the environment is working correctly.

