

Q1 : 1. What is suid,sgid & sticky bit permissions. Explain in brief

ANS :

SUID is the Set User ID which is used to set on the file which allow only that file has to be executed with the permission on which file it has given. If SUID set on a file, it allows the file to be executed with the permissions of the file owner instead of the user executing it.

SGID is the Set group ID which set on a file and it allows the file to be executed with the permission of the group. When we set this SGID on directory new files inherit the directory's group.

Sticky Bit : It is applied to directories to prevent users from deleting files owned by others.

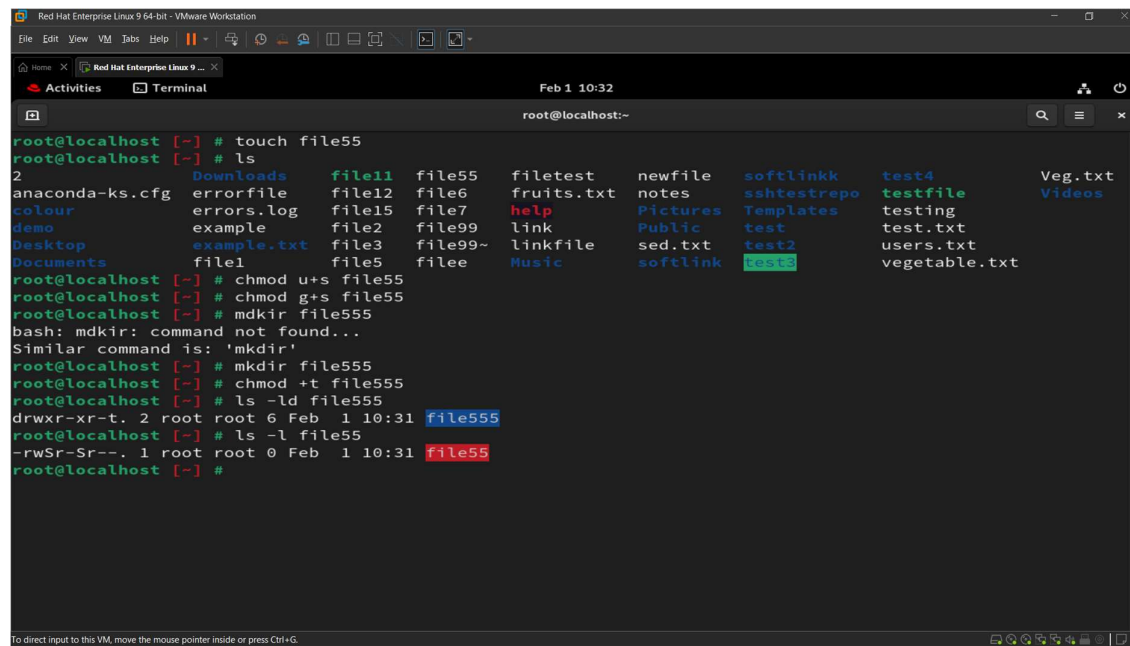
Commands :

chmod u+s filename # Set SUID

chmod g+s filename # Set SGID

chmod +t directory # Set Sticky Bit

ls -l # Check permissions



```
root@localhost:~# touch file55
root@localhost:~# ls
2  Downloads  file11  file55  filetest  newfile  softlinkk  test4  Veg.txt
anaconda-ks.cfg  errorfile  file12  file6  fruits.txt  notes  sshrestrepo  testfile  Videos
colour  errors.log  file15  file7  help  Pictures  Templates  testing
demo  example  file2  file99  link  Public  test  test.txt
Desktop  example.txt  file3  file99~  linkfile  sed.txt  test2  users.txt
Documents  file1  file5  filee  Music  softlink  test3  vegetable.txt
root@localhost:~# chmod u+s file55
root@localhost:~# chmod g+s file55
root@localhost:~# mkdir file555
bash: mkdir: command not found...
Similar command is: 'mkdir'
root@localhost:~# mkdir file555
root@localhost:~# chmod +t file555
root@localhost:~# ls -ld file555
drwxr-xr-t. 2 root root 6 Feb 1 10:31 file555
root@localhost:~# ls -l file55
-rwSr--r--. 1 root root 0 Feb 1 10:31 file55
root@localhost:~#
```

Q2 :

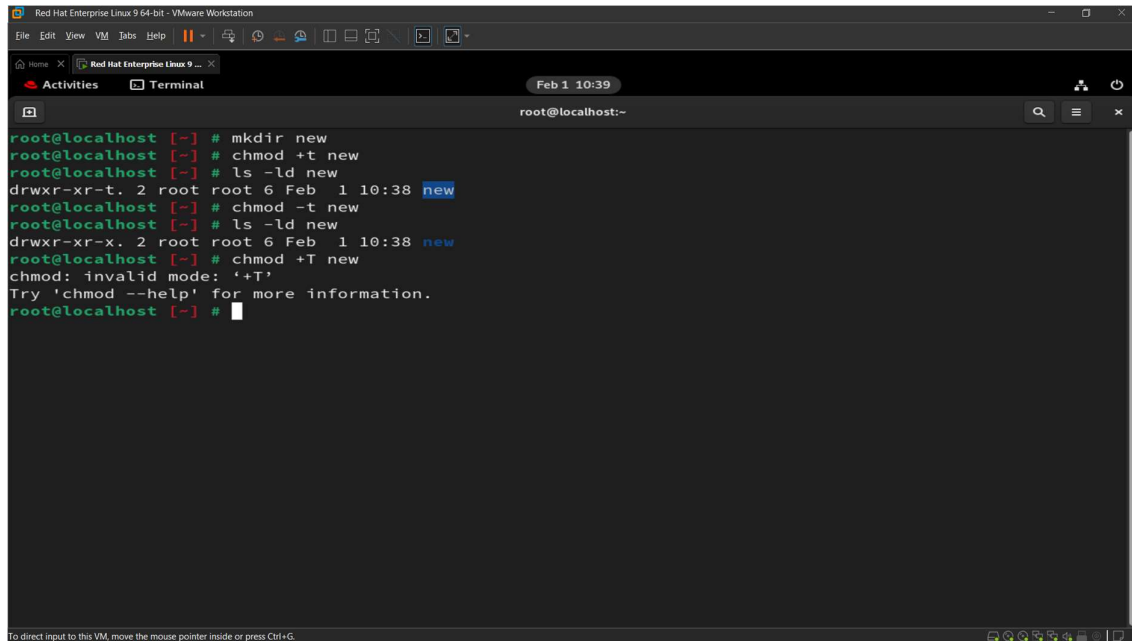
(A) The permission -rwSr--r-- represented in octal expression will be?

The Permission -rwSr--r-- represented in octal will be 4644.

(B) What is the difference between t and T when applying the sticky bit Permission?

In the sticky bit (t) means the directory has to executable permissions for others and prevent users from deleting files owned by others.

In the sticky bit (T) means no executable permissions for others.



```
root@localhost [-] # mkdir new
root@localhost [-] # chmod +t new
root@localhost [-] # ls -ld new
drwxr-xr-t. 2 root root 6 Feb 1 10:38 new
root@localhost [-] # chmod -t new
root@localhost [-] # ls -ld new
drwxr-xr-x. 2 root root 6 Feb 1 10:38 new
root@localhost [-] # chmod +T new
chmod: invalid mode: '+T'
Try 'chmod --help' for more information.
root@localhost [-] #
```

Q3 : 3. Create a collaborative directory “/common/admin” with the following characteristics:

(A) Group ownership of /common/admin is sysadmin.

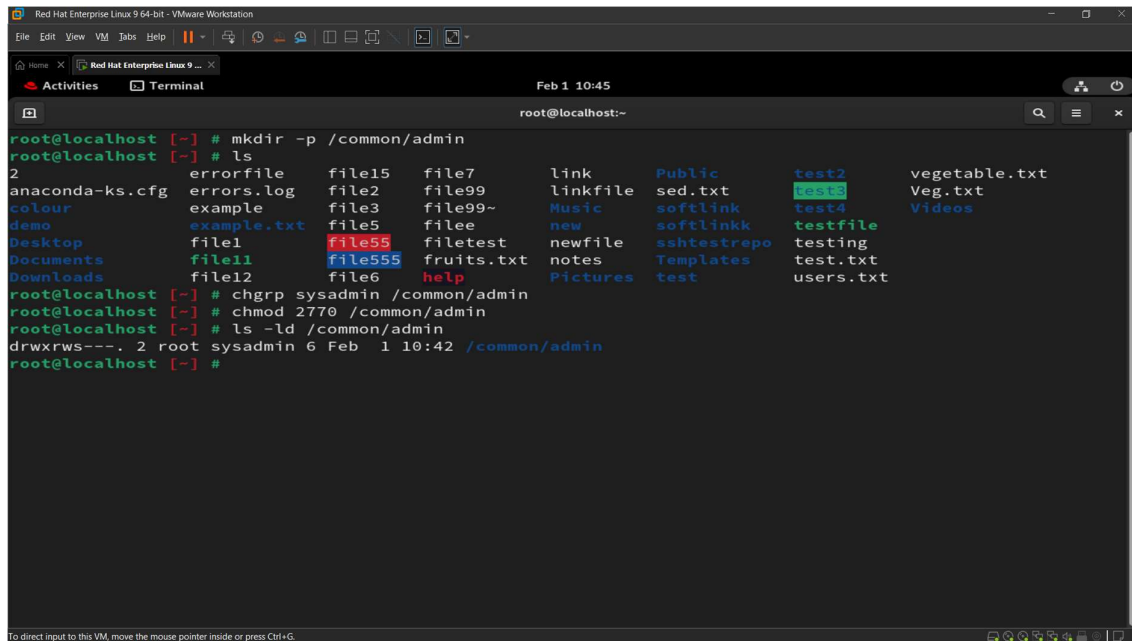
Command : `# mkdir -p /common/admin`

(B) The directory should be readable, writable, and accessible to members of sysadmin, but not to any other user.

Command : `# chgrp sysadmin /common/admin`

C) Files created in /common/admin automatically have group ownership set to the sysadmin group.

Command : `# chmod 2770 /common/admin` # SGID ensures new files belong to sysadmin



```
root@localhost [-] # mkdir -p /common/admin
root@localhost [-] # ls
2          errorfile  file15  file7    link    Public    test2    vegetable.txt
anaconda-ks.cfg errors.log file2    file99~ linkfile sed.txt  test3    Veg.txt
colour     example  file3    file99~ Music   softlink test4    Videos
demo       example.txt file5    filee    new     softlinkk testfile
Desktop    file1    file55   filetest newfile sshtestrepo testing
Documents  file11   file555  fruits.txt notes    Templates test.txt
Downloads  file12   file6    help     Pictures test    users.txt
root@localhost [-] # chgrp sysadmin /common/admin
root@localhost [-] # chmod 2770 /common/admin
root@localhost [-] # ls -ld /common/admin
drwxrws---. 2 root sysadmin 6 Feb 1 10:42 /common/admin
root@localhost [-] #
```

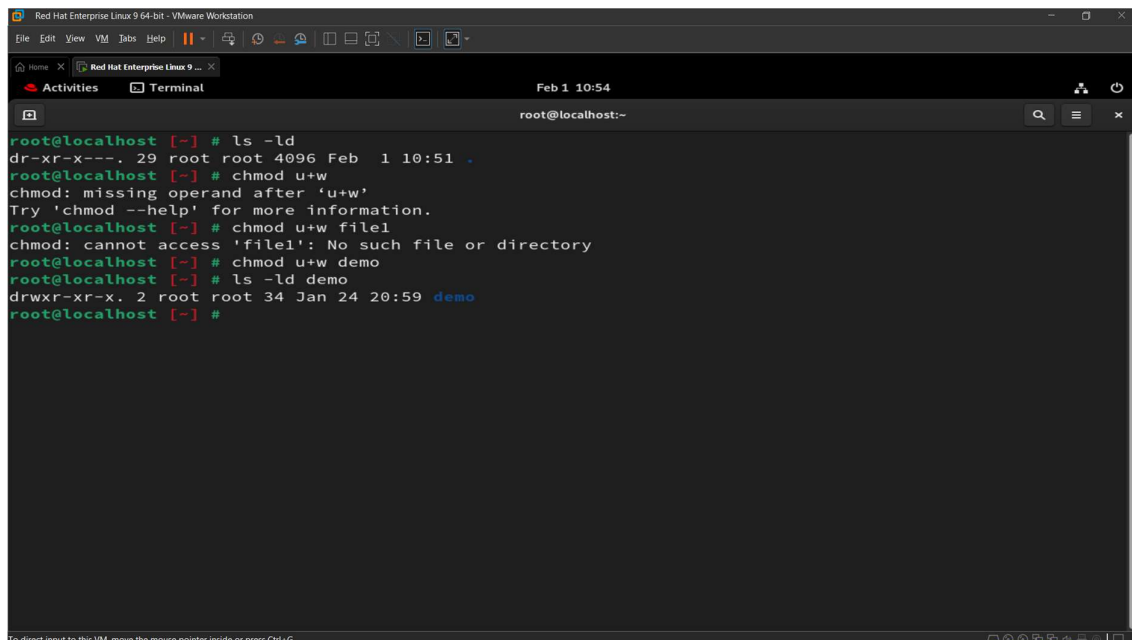
Q4 : A user is unable to rename a file in their home directory despite having full permissions on the file. What might be the reason for this issue?

Ans : If a user is not able to rename the file than the issue is likely due to insufficient write permission on the directory. The user must have write and execute permission on the directory.

Commands to check :

ls -ld # Check home directory permissions

chmod u+w file1 # Grant write access



```
root@localhost [-] # ls -ld
dr-xr-x---. 29 root root 4096 Feb 1 10:51 .
root@localhost [-] # chmod u+w
chmod: missing operand after 'u+w'
Try 'chmod --help' for more information.
root@localhost [-] # chmod u+w file1
chmod: cannot access 'file1': No such file or directory
root@localhost [-] # chmod u+w demo
root@localhost [-] # ls -ld demo
drwxr-xr-x. 2 root root 34 Jan 24 20:59 demo
root@localhost [-] #
```

Q5 : . Difference between default ACL and recursive ACL. Write the command to set it.

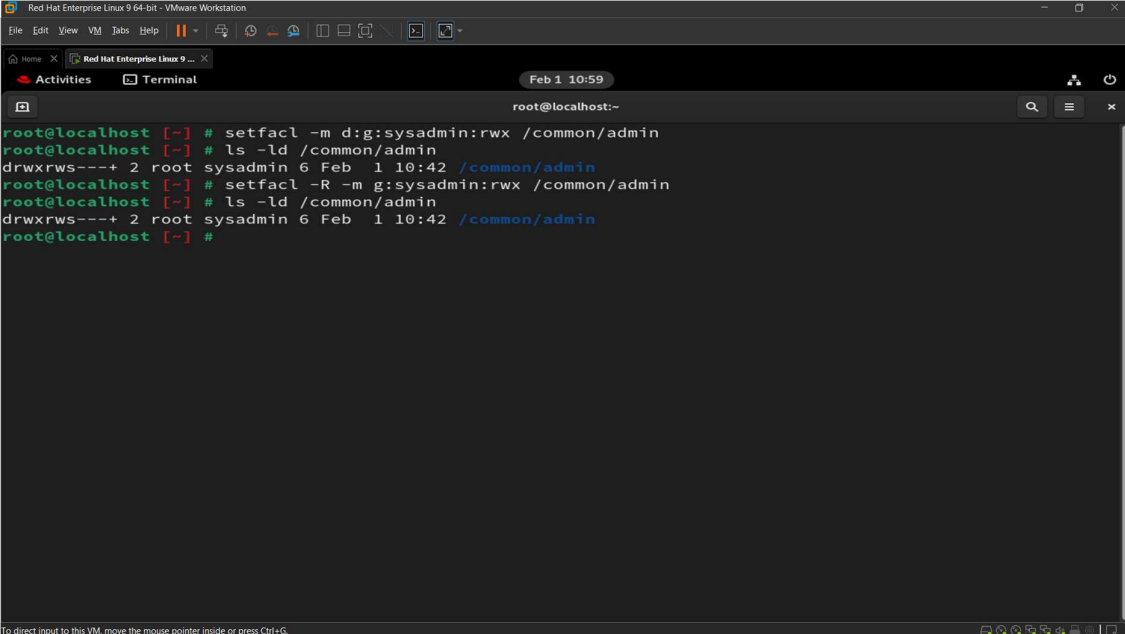
Default ACL : The main use of default ACL is ,it set the permission for future files in a directory.

Recursive ACL : It is used to applies permission to all existing files.

Commands :

setfacl -m d:g:sysadmin:rwX /common/admin # Default ACL

setfacl -R -m g:sysadmin:rwX /common/admin # Recursive ACL



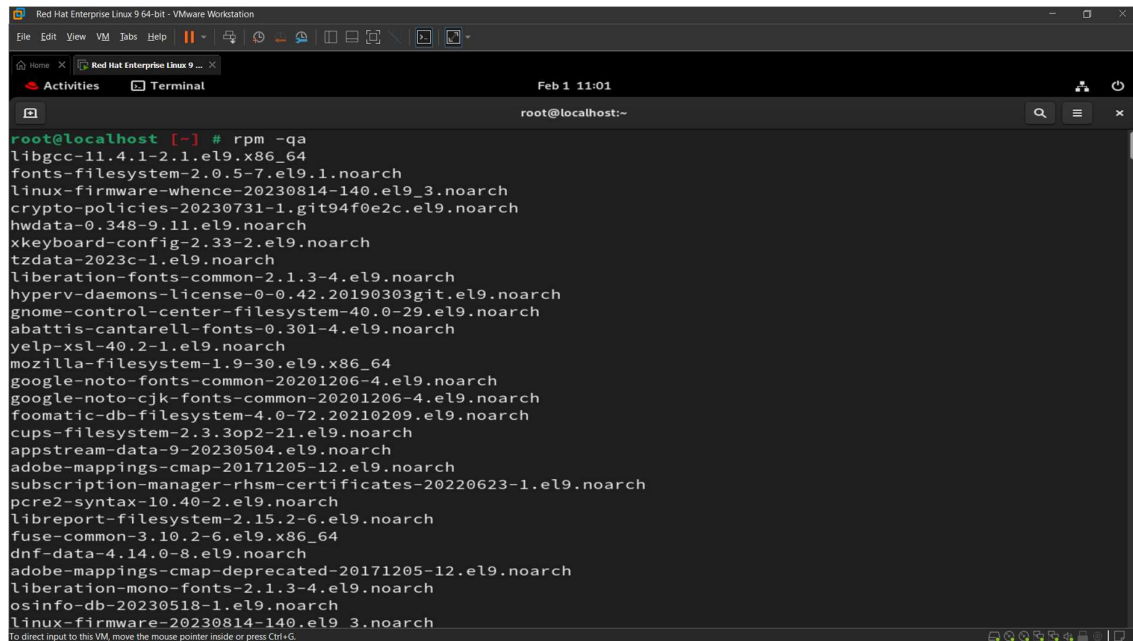
```
root@localhost [~] # setfacl -m d:g:sysadmin:rwX /common/admin
root@localhost [~] # ls -ld /common/admin
drwxrws---+ 2 root sysadmin 6 Feb  1 10:42 /common/admin
root@localhost [~] # setfacl -R -m g:sysadmin:rwX /common/admin
root@localhost [~] # ls -ld /common/admin
drwxrws---+ 2 root sysadmin 6 Feb  1 10:42 /common/admin
root@localhost [~] #
```

Q7.

(A) Which command lists all installed RPM packages on the system?

The command to list all installed RPM package on the system is (rpm -qa)

Command : rpm -qa

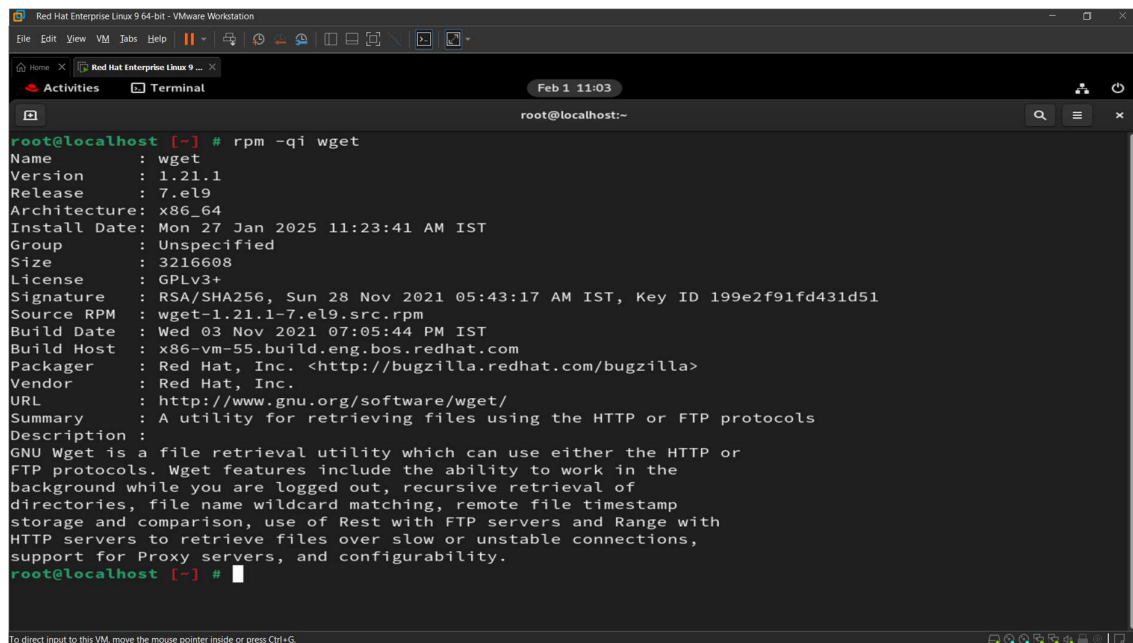


```
root@localhost [-] # rpm -qa
libgcc-11.4.1-2.1.el9.x86_64
fonts-filesystem-2.0.5-7.el9.1.noarch
linux-firmware-whence-20230814-140.el9_3.noarch
crypto-policies-20230731-1.git94f0e2c.el9.noarch
hwdata-0.348-9.11.el9.noarch
xkeyboard-config-2.33-2.el9.noarch
tzdata-2023c-1.el9.noarch
liberation-fonts-common-2.1.3-4.el9.noarch
hyperv-daemons-license-0-0.42.20190303git.el9.noarch
gnome-control-center-filesystem-40.0-29.el9.noarch
abattis-cantarell-fonts-0.301-4.el9.noarch
yelp-xsl-40.2-1.el9.noarch
mozilla-filesystem-1.9-30.el9.x86_64
google-noto-fonts-common-20201206-4.el9.noarch
google-noto-cjk-fonts-common-20201206-4.el9.noarch
foomatic-db-filesystem-4.0-72.20210209.el9.noarch
cups-filesystem-2.3.30p2-21.el9.noarch
appstream-data-9-20230504.el9.noarch
adobe-mappings-cmap-20171205-12.el9.noarch
subscription-manager-rhsm-certificates-20220623-1.el9.noarch
pcr2-syntax-10.40-2.el9.noarch
libreport-filesystem-2.15.2-6.el9.noarch
fuse-common-3.10.2-6.el9.x86_64
dnf-data-4.14.0-8.el9.noarch
adobe-mappings-cmap-deprecated-20171205-12.el9.noarch
liberation-mono-fonts-2.1.3-4.el9.noarch
osinfo-db-20230518-1.el9.noarch
linux-firmware-20230814-140.el9_3.noarch
```

(B) Which command provides detailed information about an installed package, including its version and description?

Ans : The command which is used to provide the detailed information about an installed package is (rpm -qi package-name)

Command : rpm -qi wget

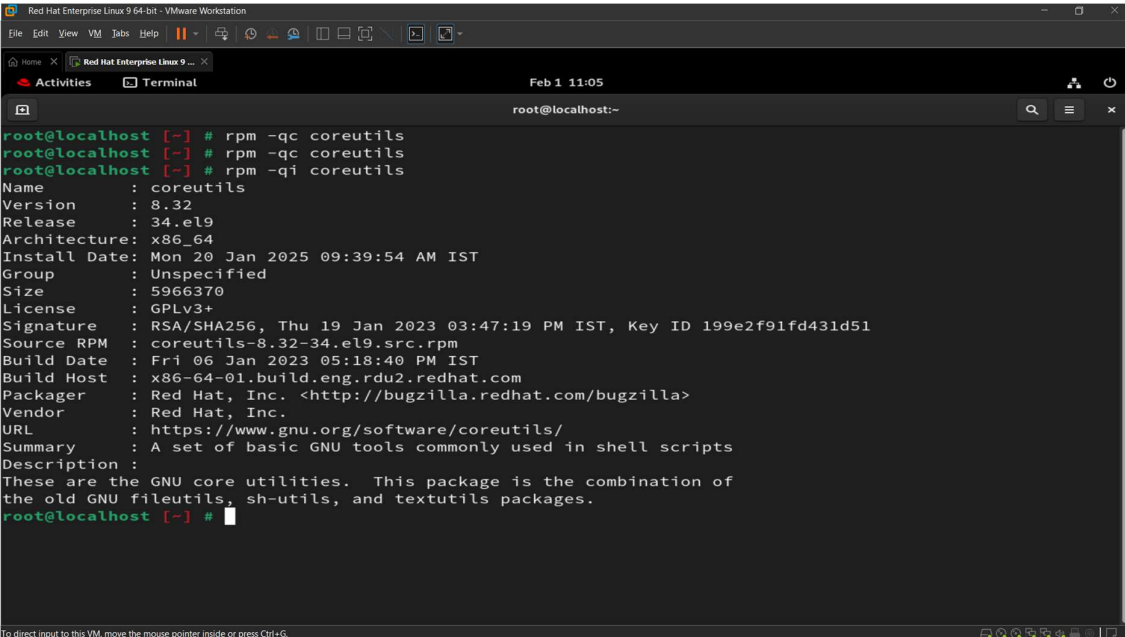


```
root@localhost [-] # rpm -qi wget
Name       : wget
Version    : 1.21.1
Release    : 7.el9
Architecture: x86_64
Install Date: Mon 27 Jan 2025 11:23:41 AM IST
Group      : Unspecified
Size       : 3216608
License    : GPLv3+
Signature  : RSA/SHA256, Sun 28 Nov 2021 05:43:17 AM IST, Key ID 199e2f91fd431d51
Source RPM : wget-1.21.1-7.el9.src.rpm
Build Date : Wed 03 Nov 2021 07:05:44 PM IST
Build Host : x86-vm-55.build.eng.bos.redhat.com
Packager   : Red Hat, Inc. <http://bugzilla.redhat.com/bugzilla>
Vendor     : Red Hat, Inc.
URL        : http://www.gnu.org/software/wget/
Summary    : A utility for retrieving files using the HTTP or FTP protocols
Description:
GNU Wget is a file retrieval utility which can use either the HTTP or
FTP protocols. Wget features include the ability to work in the
background while you are logged out, recursive retrieval of
directories, file name wildcard matching, remote file timestamp
storage and comparison, use of Rest with FTP servers and Range with
HTTP servers to retrieve files over slow or unstable connections,
support for Proxy servers, and configurability.
```

(C) Which command lists all configuration files of coreutils package?

Ans : The command which will list all configurations files of coreutils package is (rpm -qc coreutils)

Command : rpm -qc coreutils

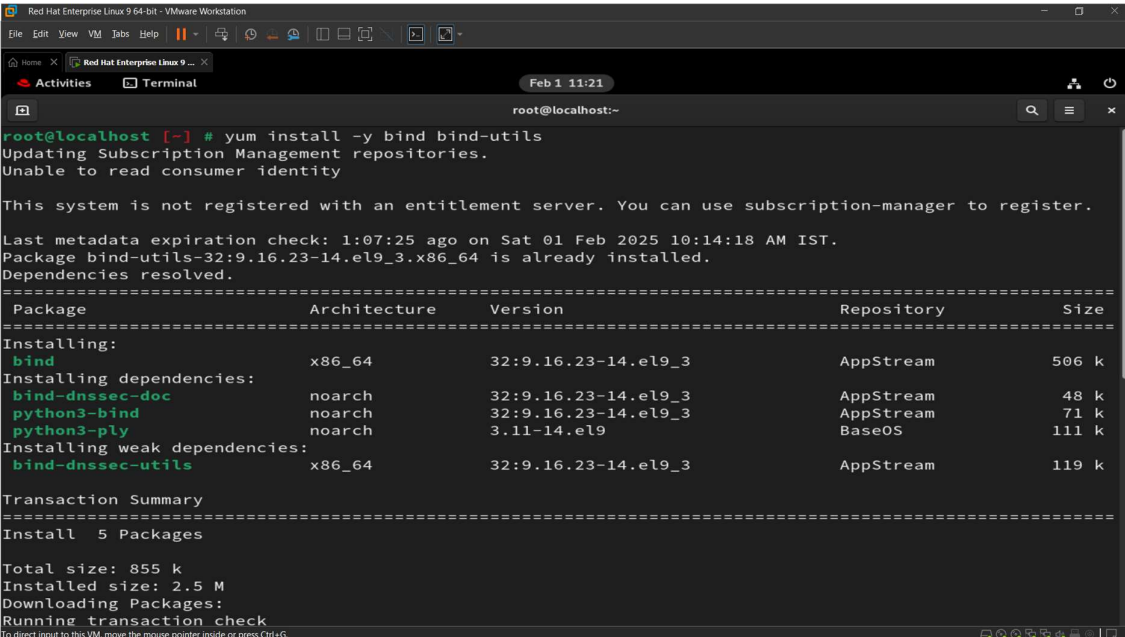
A terminal window titled "Red Hat Enterprise Linux 9 64-bit - VMware Workstation" showing the command 'rpm -qc coreutils' being executed. The output lists various metadata for the coreutils package, including its name, version (8.32), release (34.el9), architecture (x86_64), and a detailed description of its contents.

```
root@localhost [-] # rpm -qc coreutils
root@localhost [-] # rpm -qc coreutils
root@localhost [-] # rpm -qi coreutils
Name       : coreutils
Version    : 8.32
Release    : 34.el9
Architecture: x86_64
Install Date: Mon 20 Jan 2025 09:39:54 AM IST
Group      : Unspecified
Size       : 5966370
License    : GPLv3+
Signature  : RSA/SHA256, Thu 19 Jan 2023 03:47:19 PM IST, Key ID 199e2f91fd431d51
Source RPM : coreutils-8.32-34.el9.src.rpm
Build Date : Fri 06 Jan 2023 05:18:40 PM IST
Build Host : x86-64-01.build.eng.rdu2.redhat.com
Packager   : Red Hat, Inc. <http://bugzilla.redhat.com/bugzilla>
Vendor     : Red Hat, Inc.
URL        : https://www.gnu.org/software/coreutils/
Summary    : A set of basic GNU tools commonly used in shell scripts
Description:
These are the GNU core utilities.  This package is the combination of
the old GNU fileutils, sh-utils, and textutils packages.
root@localhost [-] #
```

Q8 : (A) Install bind & bind-utils packages using yum.

Ans : To install bind and bind-utils we will use these commands :

Commands : yum install -y bind bind-utils

A terminal window showing the command 'yum install -y bind bind-utils'. The output includes a warning about subscription management, a list of packages to be installed, their dependencies, and a transaction summary.

```
root@localhost [-] # yum install -y bind bind-utils
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manager to register.

Last metadata expiration check: 1:07:25 ago on Sat 01 Feb 2025 10:14:18 AM IST.
Package bind-utils-32:9.16.23-14.el9_3.x86_64 is already installed.
Dependencies resolved.
=====
Package                        Architecture      Version           Repository        Size
=====
Installing:
bind                           x86_64            32:9.16.23-14.el9_3  AppStream         506 k
Installing dependencies:
bind-dnssec-doc                noarch            32:9.16.23-14.el9_3  AppStream         48 k
python3-bind                   noarch            32:9.16.23-14.el9_3  AppStream         71 k
python3-ply                     noarch            3.11-14.el9         BaseOS            111 k
Installing weak dependencies:
bind-dnssec-utils              x86_64            32:9.16.23-14.el9_3  AppStream         119 k
=====
Transaction Summary
=====
Install 5 Packages

Total size: 855 k
Installed size: 2.5 M
Downloading Packages:
Running transaction check
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.
```

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:22
root@localhost:~

Downloading Packages:
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                : 1/1
  Installing                : python3-ply-3.11-14.el9.noarch      1/5
  Installing                : python3-bind-32:9.16.23-14.el9_3.noarch 2/5
  Installing                : bind-dnssec-doc-32:9.16.23-14.el9_3.noarch 3/5
  Installing                : bind-dnssec-utils-32:9.16.23-14.el9_3.x86_64 4/5
  Running scriptlet: bind-32:9.16.23-14.el9_3.x86_64      5/5
  Installing                : bind-32:9.16.23-14.el9_3.x86_64      5/5
  Running scriptlet: bind-32:9.16.23-14.el9_3.x86_64      5/5
  Verifying                : bind-32:9.16.23-14.el9_3.x86_64      1/5
  Verifying                : bind-dnssec-doc-32:9.16.23-14.el9_3.noarch 2/5
  Verifying                : bind-dnssec-utils-32:9.16.23-14.el9_3.x86_64 3/5
  Verifying                : python3-bind-32:9.16.23-14.el9_3.noarch 4/5
  Verifying                : python3-ply-3.11-14.el9.noarch      5/5
Installed products updated.

Installed:
bind-32:9.16.23-14.el9_3.x86_64          bind-dnssec-doc-32:9.16.23-14.el9_3.noarch
bind-dnssec-utils-32:9.16.23-14.el9_3.x86_64  python3-bind-32:9.16.23-14.el9_3.noarch
python3-ply-3.11-14.el9.noarch

Complete!
root@localhost [-] #
```

(B) Start & Enable it's service. (named.service)

Ans : To start and enable any the named service we will first start this service (named) and than we will enable it .

Commands :

systemctl start named

systemctl enable named

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:24
root@localhost:~ — systemctl status named

root@localhost [-] # systemctl start named
root@localhost [-] # systemctl enable named
Created symlink /etc/systemd/system/multi-user.target.wants/named.service → /usr/lib/systemd/system/named.service.
root@localhost [-] # systemctl status named
● named.service - Berkeley Internet Name Domain (DNS)
   Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; preset: disabled)
   Active: active (running) since Sat 2025-02-01 11:23:54 IST; 18s ago
     Main PID: 3935 (named)
        Tasks: 6 (limit: 10679)
       Memory: 22.0M
          CPU: 60ms
     CGroup: /system.slice/named.service
             └─3935 /usr/sbin/named -u named -c /etc/named.conf

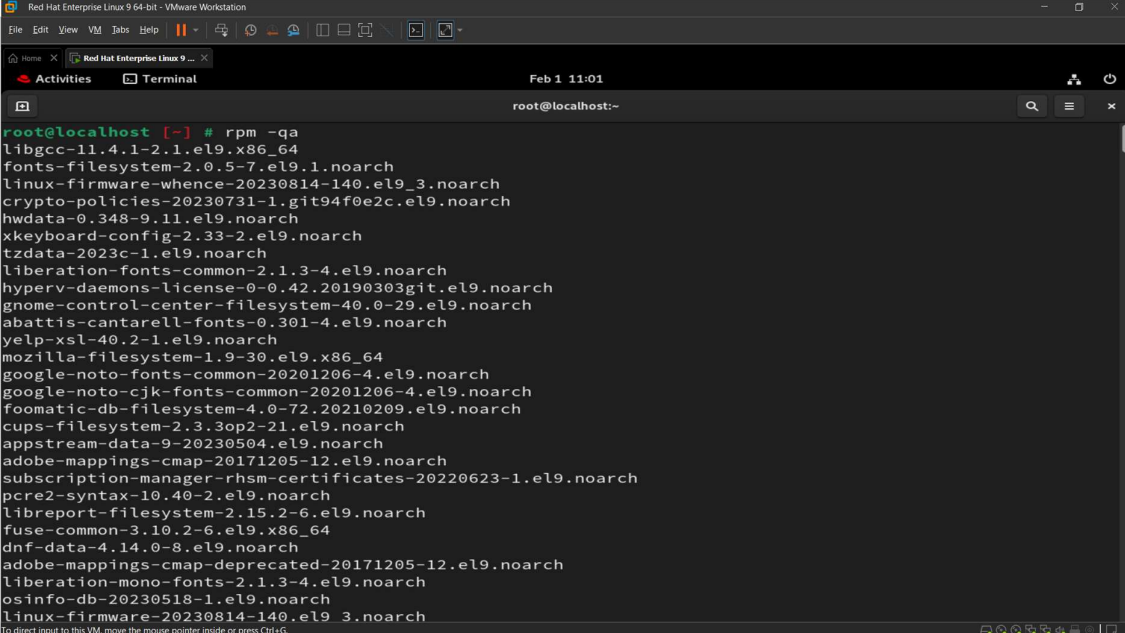
Feb 01 11:23:54 localhost.localdomain named[3935]: all zones loaded
Feb 01 11:23:54 localhost.localdomain named[3935]: running
Feb 01 11:23:54 localhost.localdomain systemd[1]: Started Berkeley Internet Name Domain (DNS).
Feb 01 11:23:55 localhost.localdomain named[3935]: resolver priming query complete
Feb 01 11:23:55 localhost.localdomain named[3935]: checkhints: b.root-servers.net/A (170.247.170.2) miss
Feb 01 11:23:55 localhost.localdomain named[3935]: checkhints: b.root-servers.net/A (199.9.14.201) extra
Feb 01 11:23:55 localhost.localdomain named[3935]: checkhints: b.root-servers.net/AAAA (2801:1b8:10::b)
Feb 01 11:23:55 localhost.localdomain named[3935]: checkhints: b.root-servers.net/AAAA (2001:500:200::1b)
Feb 01 11:23:55 localhost.localdomain named[3935]: managed-keys-zone: Initializing automatic trust anchor
Feb 01 11:23:55 localhost.localdomain named[3935]: managed-keys-zone: Initializing automatic trust anchor
lines 1-20/20 (END)
```


Q9 : What is the difference between dnf, yum, and rpm package management tools in RHEL- based systems?

Ans :

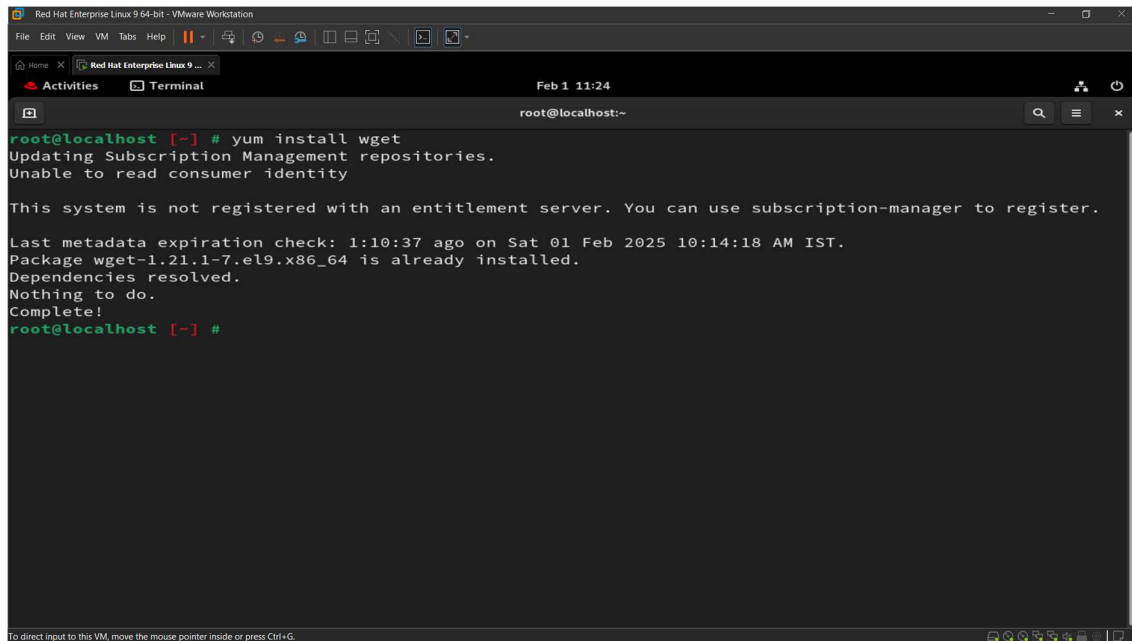
RPM : Redhat Package Manager which is used to install any packages from the internet , but in RPM if we have to install any package so before that we have to install the dependency which is used for that service and even we have to set the path while installing that package .

Command : rpm -qa # command to check all package using rpm



```
root@localhost [-] # rpm -qa
libgcc-11.4.1-2.1.el9.x86_64
fonts-filesystem-2.0.5-7.el9.1.noarch
linux-firmware-whence-20230814-140.el9_3.noarch
crypto-policies-20230731-1.git94f0e2c.el9.noarch
hwdata-0.348-9.11.el9.noarch
xkeyboard-config-2.33-2.el9.noarch
tzdata-2023c-1.el9.noarch
liberation-fonts-common-2.1.3-4.el9.noarch
hyperv-daemons-license-0-0.42.20190303git.el9.noarch
gnome-control-center-filesystem-40.0-29.el9.noarch
abattis-cantarell-fonts-0.301-4.el9.noarch
yelp-xsl-40.2-1.el9.noarch
mozilla-filesystem-1.9-30.el9.x86_64
google-noto-fonts-common-20201206-4.el9.noarch
google-noto-cjk-fonts-common-20201206-4.el9.noarch
foomatic-db-filesystem-4.0-72.20210209.el9.noarch
cups-filesystem-2.3.3op2-21.el9.noarch
appstream-data-9-20230504.el9.noarch
adobe-mappings-cmap-20171205-12.el9.noarch
subscription-manager-rhsm-certificates-20220623-1.el9.noarch
pcr2-syntax-10.40-2.el9.noarch
libreport-filesystem-2.15.2-6.el9.noarch
fuse-common-3.10.2-6.el9.x86_64
dnf-data-4.14.0-8.el9.noarch
adobe-mappings-cmap-deprecated-20171205-12.el9.noarch
liberation-mono-fonts-2.1.3-4.el9.noarch
osinfo-db-20230518-1.el9.noarch
linux-firmware-20230814-140.el9_3.noarch
```

YUM : It the yellow dog package which is used to install any package using yum command which is even fast in process and it is widely used in industry level.



```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:24
root@localhost:~

root@localhost [-] # yum install wget
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manager to register.

Last metadata expiration check: 1:10:37 ago on Sat 01 Feb 2025 10:14:18 AM IST.
Package wget-1.21.1-7.el9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
root@localhost [-] #
```

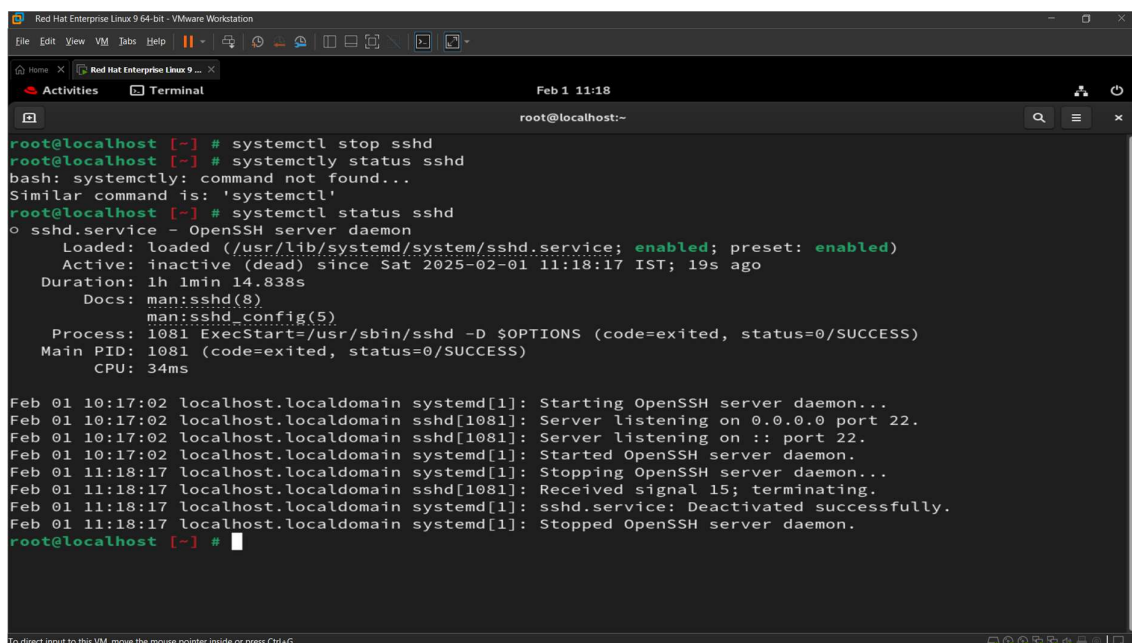
DNS : It is also a package manager which is used to install the package which is used to install and resolve dependency even more better than YUM.

Q10 :

A) What is the difference between systemctl stop and systemctl disable Commands?

Systemctl stop : Its is used to stop the service temporary while using the linux rhel.

Command : systemctl stop sshd



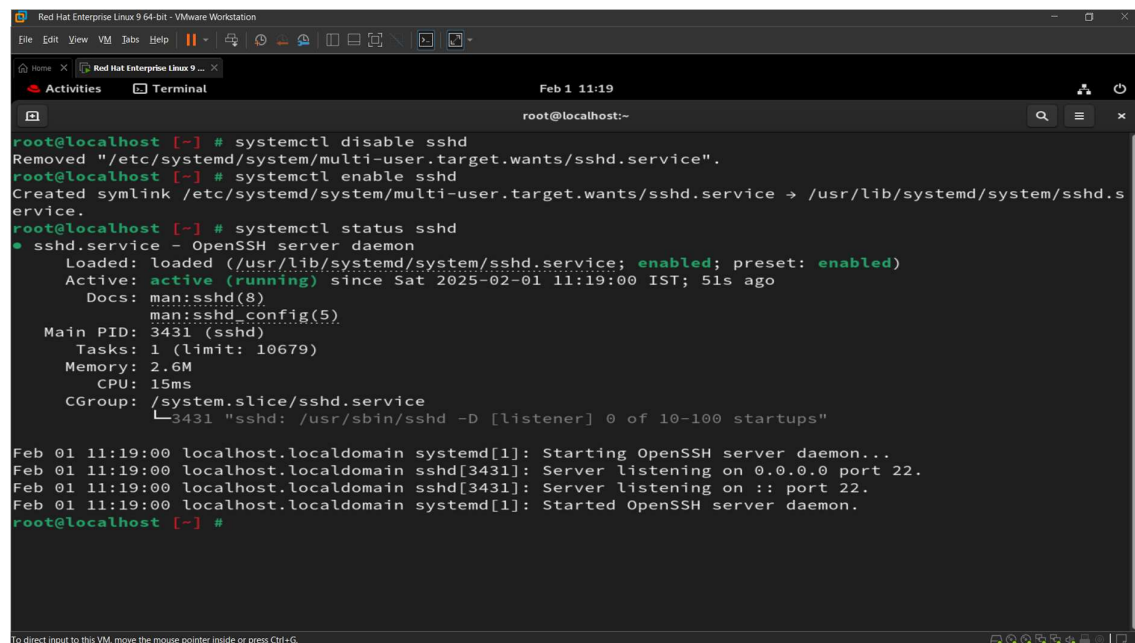
```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:18
root@localhost:~

root@localhost [-] # systemctl stop sshd
root@localhost [-] # systemctl status sshd
bash: systemctl: command not found...
Similar command is: 'systemctl'
root@localhost [-] # systemctl status sshd
o sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
   Active: inactive (dead) since Sat 2025-02-01 11:18:17 IST; 19s ago
     Duration: 1h 1min 14.838s
       Docs: man:sshd(8)
             man:sshd_config(5)
   Process: 1081 ExecStart=/usr/sbin/sshd -D $OPTIONS (code=exited, status=0/SUCCESS)
    Main PID: 1081 (code=exited, status=0/SUCCESS)
       CPU: 34ms

Feb 01 10:17:02 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Feb 01 10:17:02 localhost.localdomain sshd[1081]: Server listening on 0.0.0.0 port 22.
Feb 01 10:17:02 localhost.localdomain sshd[1081]: Server listening on :: port 22.
Feb 01 10:17:02 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Feb 01 11:18:17 localhost.localdomain systemd[1]: Stopping OpenSSH server daemon...
Feb 01 11:18:17 localhost.localdomain sshd[1081]: Received signal 15; terminating.
Feb 01 11:18:17 localhost.localdomain systemd[1]: sshd.service: Deactivated successfully.
Feb 01 11:18:17 localhost.localdomain systemd[1]: Stopped OpenSSH server daemon.
root@localhost [-] #
```

Systemctl disable : It always prevent service from starting at boot

Command : Systemctl disable sshd



A terminal window titled "Red Hat Enterprise Linux 9 64-bit - VMware Workstation" showing the following commands and output:

```
root@localhost [-] # systemctl disable sshd
Removed "/etc/systemd/system/multi-user.target.wants/sshhd.service".
root@localhost [-] # systemctl enable sshd
Created symlink /etc/systemd/system/multi-user.target.wants/sshhd.service → /usr/lib/systemd/system/sshhd.service.
root@localhost [-] # systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshhd.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-01 11:19:00 IST; 51s ago
     Docs: man:sshhd(8)
           man:sshhd_config(5)
  Main PID: 3431 (sshd)
    Tasks: 1 (limit: 10679)
   Memory: 2.6M
      CPU: 15ms
  CGroup: /system.slice/sshhd.service
          └─3431 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

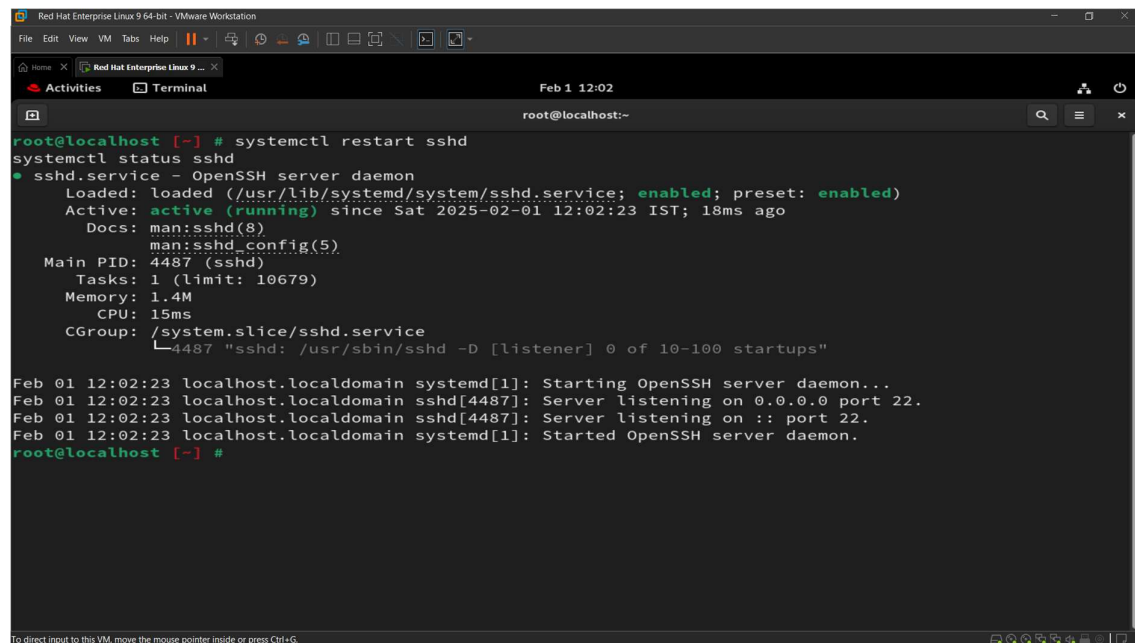
Feb 01 11:19:00 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Feb 01 11:19:00 localhost.localdomain sshd[3431]: Server listening on 0.0.0.0 port 22.
Feb 01 11:19:00 localhost.localdomain sshd[3431]: Server listening on :: port 22.
Feb 01 11:19:00 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
root@localhost [-] #
```

(B) Write the command to restart the sshd service and verify its status afterward.

Command:

systemctl restart sshd

systemctl status sshd



A terminal window titled "Red Hat Enterprise Linux 9 64-bit - VMware Workstation" showing the following commands and output:

```
root@localhost [-] # systemctl restart sshd
systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshhd.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-01 12:02:23 IST; 18ms ago
     Docs: man:sshhd(8)
           man:sshhd_config(5)
  Main PID: 4487 (sshd)
    Tasks: 1 (limit: 10679)
   Memory: 1.4M
      CPU: 15ms
  CGroup: /system.slice/sshhd.service
          └─4487 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Feb 01 12:02:23 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Feb 01 12:02:23 localhost.localdomain sshd[4487]: Server listening on 0.0.0.0 port 22.
Feb 01 12:02:23 localhost.localdomain sshd[4487]: Server listening on :: port 22.
Feb 01 12:02:23 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
root@localhost [-] #
```

Q11 : 11. What are jobs. (Processes)

Ans : Jobs are the tasks which are running in the background or foreground while performing any task and some common commands which we use to access jobs are bg,fg,jobs

Commands :

#jobs


sleep 800&

fg %2

(Press CTRL + Z to stop)

bg %2

jobs



```
root@localhost [-] # sleep 800&
[1] 4006
root@localhost [-] # sleep 801&
[2] 4011
root@localhost [-] # bg %2
bash: bg: job 2 already in background
root@localhost [-] # fg %2
sleep 801
^C
root@localhost [-] # jobs
[1]+  Running                  sleep 800 &
root@localhost [-] # bg %2
bash: bg: %2: no such job
root@localhost [-] # sleep 700&
[2] 4032
root@localhost [-] # fg %2
sleep 700
^Z
[2]+  Stopped                  sleep 700
root@localhost [-] # jobs
[1]-  Running                  sleep 800 &
[2]+  Stopped                  sleep 700
root@localhost [-] # bg %2
[2]+  sleep 700 &
root@localhost [-] # jobs
[1]-  Running                  sleep 800 &
[2]+  Running                  sleep 700 &
root@localhost [-] #
```

Q12 :

(A) What is the difference b/w ps -aux and top.

Ans :

- **ps -aux** is used to display a static snapshot of process and check which process are running in foreground and background.

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal
Feb 1 11:35
root@localhost:~

root@localhost [~] # ps-aux
bash: ps-aux: command not found...
root@localhost [~] # ps -aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.9 174752 17040 ?        Ss   10:16   0:03 /usr/lib/systemd/systemd rhgb --switch
root           2  0.0  0.0      0     0 ?        S    10:16   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   10:16   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   10:16   0:00 [rcu_par_gp]
root           5  0.0  0.0      0     0 ?        I<   10:16   0:00 [slub_flushwq]
root           6  0.0  0.0      0     0 ?        I<   10:16   0:00 [netns]
root          10  0.0  0.0      0     0 ?        I<   10:16   0:00 [mm_percpu_wq]
root          12  0.0  0.0      0     0 ?        I    10:16   0:00 [rcu_tasks_kthre]
root          13  0.0  0.0      0     0 ?        I    10:16   0:00 [rcu_tasks_rude_]
root          14  0.0  0.0      0     0 ?        I    10:16   0:00 [rcu_tasks_trace]
root          15  0.0  0.0      0     0 ?        S    10:16   0:00 [ksoftirqd/0]
root          16  0.0  0.0      0     0 ?        S    10:16   0:00 [pr/tty0]
root          17  0.0  0.0      0     0 ?        I    10:16   0:00 [rcu_preempt]
root          18  0.0  0.0      0     0 ?        S    10:16   0:00 [migration/0]
root          19  0.0  0.0      0     0 ?        S    10:16   0:00 [idle_inject/0]
root          21  0.0  0.0      0     0 ?        S    10:16   0:00 [cpuhp/0]
root          22  0.0  0.0      0     0 ?        S    10:16   0:00 [cpuhp/1]
root          23  0.0  0.0      0     0 ?        S    10:16   0:00 [idle_inject/1]
root          24  0.0  0.0      0     0 ?        S    10:16   0:01 [migration/1]
root          25  0.0  0.0      0     0 ?        S    10:16   0:00 [ksoftirqd/1]
root          30  0.0  0.0      0     0 ?        S    10:16   0:00 [kdevtmpfs]
root          31  0.0  0.0      0     0 ?        I<   10:16   0:00 [inet_frag_wq]
root          32  0.0  0.0      0     0 ?        S    10:16   0:00 [kauditd]
root          34  0.0  0.0      0     0 ?        S    10:16   0:00 [khungtaskd]
root          35  0.0  0.0      0     0 ?        S    10:16   0:00 [oom_reaper]

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

- **top** command is used to show the active running process which are updating or real time monitoring of the process while using the system.

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal
Feb 1 11:35
root@localhost:~ — top

top - 11:35:25 up 1:18, 2 users, load average: 0.00, 0.03, 0.09
Tasks: 298 total, 1 running, 297 sleeping, 0 stopped, 0 zombie
%Cpu(s): 2.9 us, 5.9 sy, 0.0 ni, 91.2 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 1731.6 total, 119.2 free, 1298.5 used, 487.4 buff/cache
MiB Swap: 2048.0 total, 1809.2 free, 238.8 used, 433.2 avail Mem

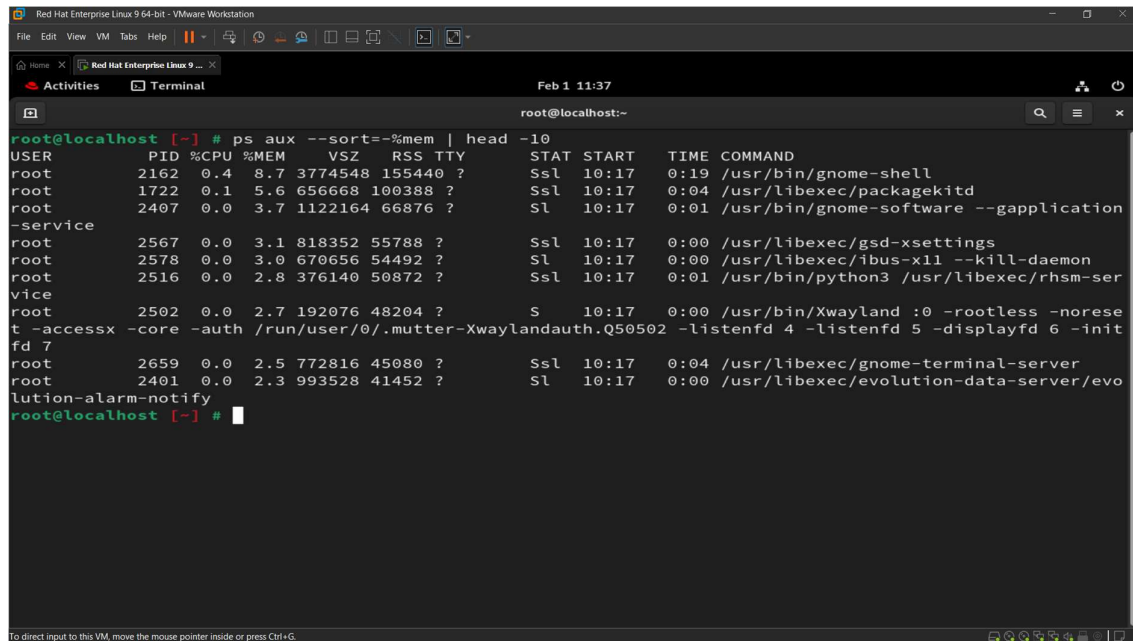
  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
 2564 root       20   0 526568 12732 6068 S   6.2   0.7   0:01.93 ibus-daemon
    1 root       20   0 174752 17040 8880 S   0.0   1.0   0:03.69 systemd
    2 root       20   0      0      0     0 S   0.0   0.0   0:00.02 kthreadd
    3 root       0 -20     0      0     0 I   0.0   0.0   0:00.00 rcu_gp
    4 root       0 -20     0      0     0 I   0.0   0.0   0:00.00 rcu_par_gp
    5 root       0 -20     0      0     0 I   0.0   0.0   0:00.00 slub_flushwq
    6 root       0 -20     0      0     0 I   0.0   0.0   0:00.00 netns
   10 root       0 -20     0      0     0 I   0.0   0.0   0:00.00 mm_percpu_wq
   12 root       20   0      0      0     0 I   0.0   0.0   0:00.00 rcu_tasks_kthre
   13 root       20   0      0      0     0 I   0.0   0.0   0:00.00 rcu_tasks_rude_
   14 root       20   0      0      0     0 I   0.0   0.0   0:00.00 rcu_tasks_trace
   15 root       20   0      0      0     0 S   0.0   0.0   0:00.10 ksoftirqd/0
   16 root       20   0      0      0     0 S   0.0   0.0   0:00.04 pr/tty0
   17 root       20   0      0      0     0 I   0.0   0.0   0:00.20 rcu_preempt
   18 root       rt    0      0      0     0 S   0.0   0.0   0:00.01 migration/0
   19 root      -51   0      0      0     0 S   0.0   0.0   0:00.00 idle_inject/0
   21 root       20   0      0      0     0 S   0.0   0.0   0:00.00 cpuhp/0
   22 root       20   0      0      0     0 S   0.0   0.0   0:00.00 cpuhp/1
   23 root      -51   0      0      0     0 S   0.0   0.0   0:00.00 idle_inject/1
   24 root       rt    0      0      0     0 S   0.0   0.0   0:01.10 migration/1
   25 root       20   0      0      0     0 S   0.0   0.0   0:00.01 ksoftirqd/1

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

(B) How to filter out processes by memroy utilization.

Ans : To filter out the process by memory utilization we will use ps aux which will give snapshot and use pipeline with head command to diplay top 10 process.

Command : ps aux --sort=-%mem | head -10



```
root@localhost [~] # ps aux --sort=-%mem | head -10
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root          2162  0.4  8.7 3774548 155440 ?        Ssl   10:17   0:19 /usr/bin/gnome-shell
root          1722  0.1  5.6 656668 100388 ?        Ssl   10:17   0:04 /usr/libexec/packagekitd
root          2407  0.0  3.7 1122164 66876 ?         Sl    10:17   0:01 /usr/bin/gnome-software --gapplication
--service
root          2567  0.0  3.1 818352 55788 ?        Ssl   10:17   0:00 /usr/libexec/gsd-xsettings
root          2578  0.0  3.0 670656 54492 ?        Ssl   10:17   0:00 /usr/libexec/ibus-x11 --kill-daemon
root          2516  0.0  2.8 376140 50872 ?        Ssl   10:17   0:01 /usr/bin/python3 /usr/libexec/rhsm-ser
vice
root          2502  0.0  2.7 192076 48204 ?        S     10:17   0:00 /usr/bin/Xwayland :0 -rootless -norese
t -accessx -core -auth /run/user/0/.mutter-Xwaylandauth.Q50502 -listenfd 4 -listenfd 5 -displayfd 6 -init
fd 7
root          2659  0.0  2.5 772816 45080 ?        Ssl   10:17   0:04 /usr/libexec/gnome-terminal-server
root          2401  0.0  2.3 993528 41452 ?        Sl    10:17   0:00 /usr/libexec/evolution-data-server/evo
lution-alarm-notify
root@localhost [~] #
```

Q13 :

(A) What is the default signal to terminate a process.

Ans : The default signal to terminate a process it shows (SIGTERM (15))

(B) What is the signal to forcefully terminate a process.

Ans : The signal we receive while forcefully terminating a process is (SIGKILL (9)).

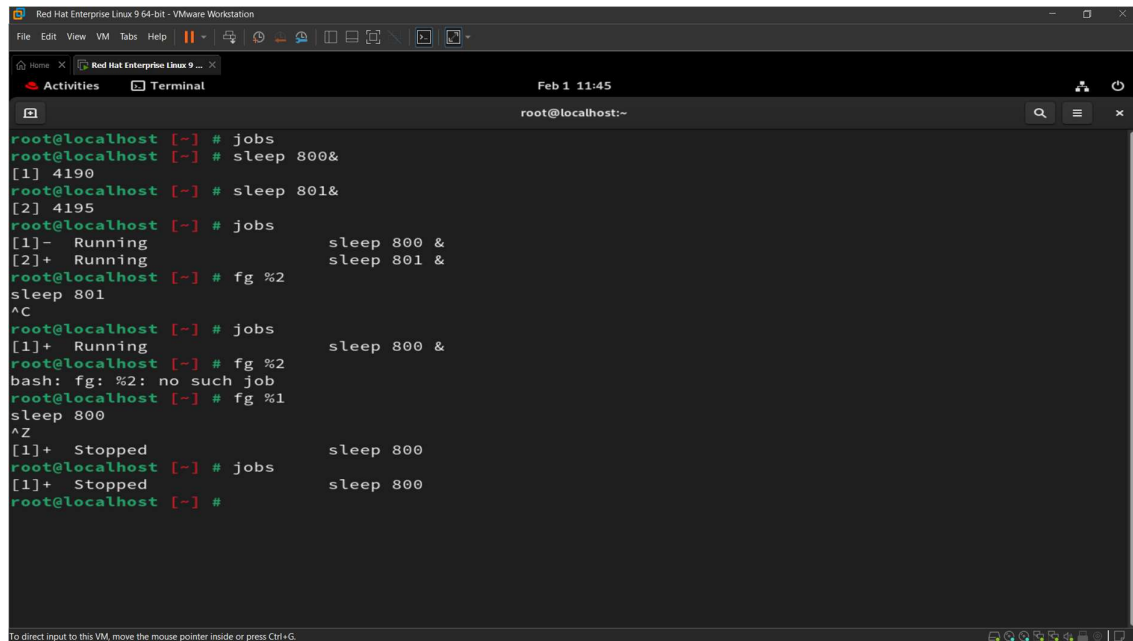
Q14 :

(A) Write shortcut keys to interrupt a process.

Ans : There are two shortcut keys while interrupting a process are :

CTRL + Z : Interrupt / Stop

CTRL + C : Suspend

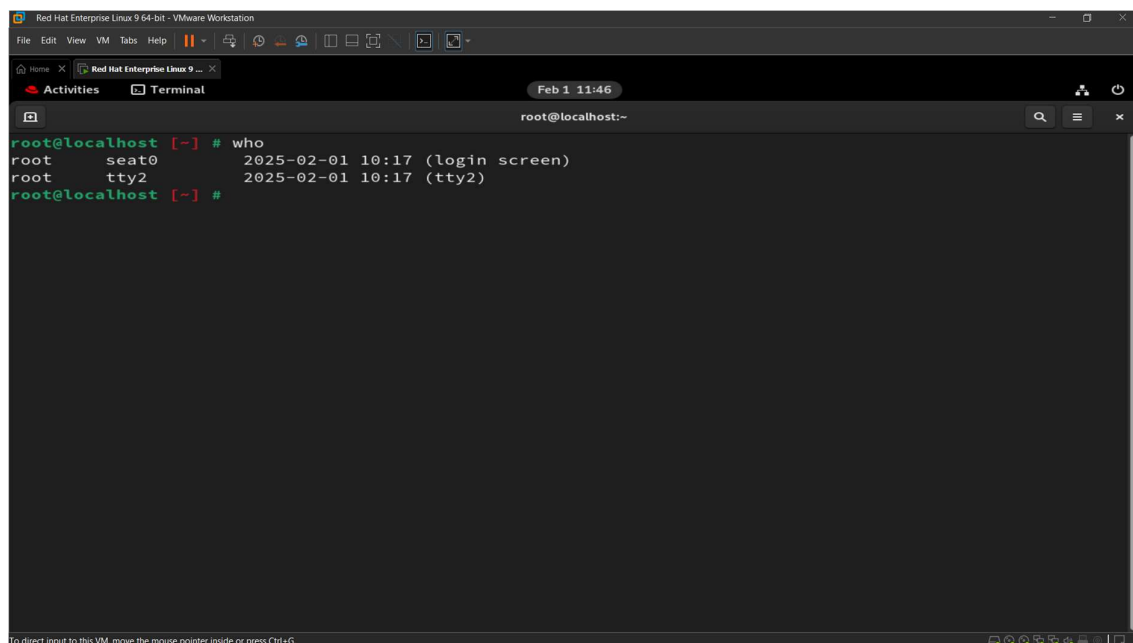


```
root@localhost [-] # jobs
root@localhost [-] # sleep 800&
[1] 4190
root@localhost [-] # sleep 801&
[2] 4195
root@localhost [-] # jobs
[1]-  Running                  sleep 800 &
[2]+  Running                  sleep 801 &
root@localhost [-] # fg %2
sleep 801
^C
root@localhost [-] # jobs
[1]+  Running                  sleep 800 &
root@localhost [-] # fg %2
bash: fg: %2: no such job
root@localhost [-] # fg %1
sleep 800
^Z
[1]+  Stopped                  sleep 800
root@localhost [-] # jobs
[1]+  Stopped                  sleep 800
root@localhost [-] #
```

(B) How to display that how many users are logged into system.

Ans : To check how many users are logged into system we will use who command which tells the details who are logged into a system at a current moment.

Command : who



```
root@localhost [-] # who
root    seat0    2025-02-01 10:17 (login screen)
root    tty2     2025-02-01 10:17 (tty2)
root@localhost [-] #
```

Q15 :

(A) What is zombie process.

Ans : A zombie process is a type of process that has completed execution but remains in the process table. It is very rare process which is seen while using the system.

(B) How to kill all process running by a particular user .

Ans : To kill all process of particular user we will use (`pkill -u username`) which will kill all the process of that user

Command :

`useradd harsh`

`su - harsh`

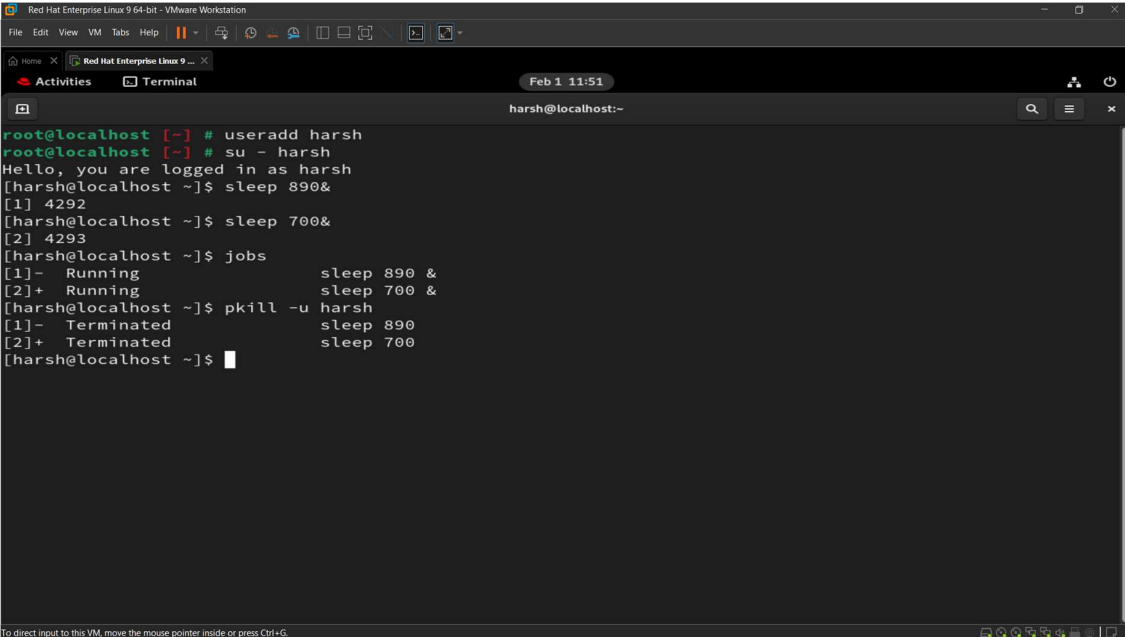
`sleep 800&`

`sleep 801&`

`jobs`

`pkill -u harsh`

`jobs`

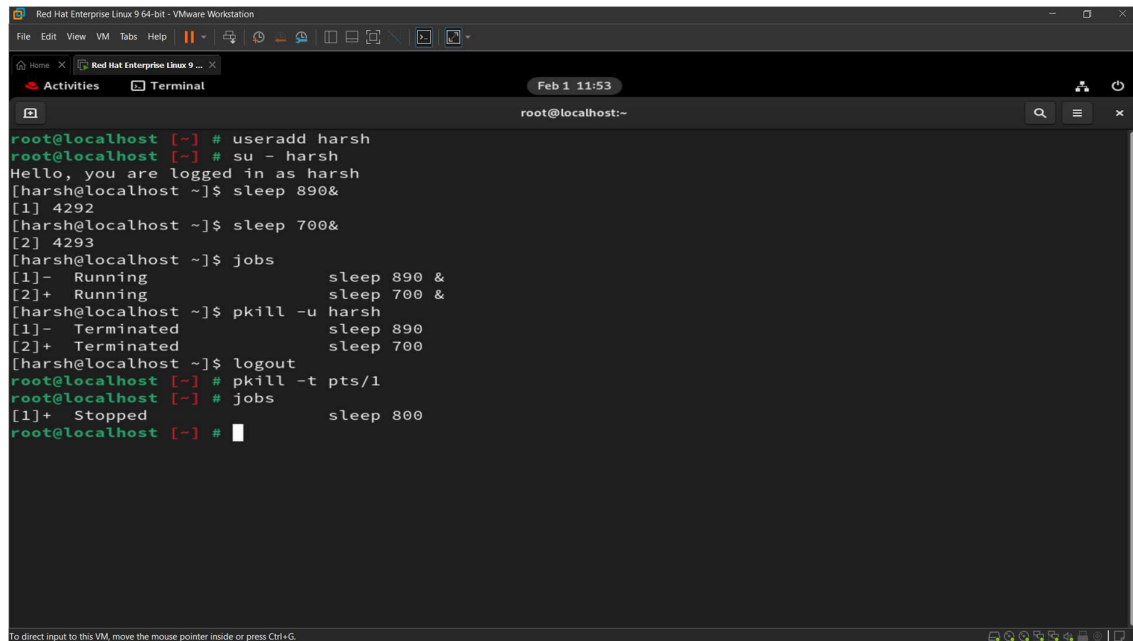


```
root@localhost [-] # useradd harsh
root@localhost [-] # su - harsh
Hello, you are logged in as harsh
[harsh@localhost ~]$ sleep 890&
[1] 4292
[harsh@localhost ~]$ sleep 700&
[2] 4293
[harsh@localhost ~]$ jobs
[1]-  Running                  sleep 890 &
[2]+  Running                  sleep 700 &
[harsh@localhost ~]$ pkill -u harsh
[1]-  Terminated              sleep 890
[2]+  Terminated              sleep 700
[harsh@localhost ~]$
```

(C) How to kill all process running in a particular terminal .

Ans : To kill all the process in the terminal we follow this command (`pkill -t pts/1`)

Command : `pkill -t pts/1`



```
root@localhost [-] # useradd harsh
root@localhost [-] # su - harsh
Hello, you are logged in as harsh
[harsh@localhost ~]$ sleep 890&
[1] 4292
[harsh@localhost ~]$ sleep 700&
[2] 4293
[harsh@localhost ~]$ jobs
[1]-  Running                  sleep 890 &
[2]+  Running                  sleep 700 &
[harsh@localhost ~]$ pkill -u harsh
[1]-  Terminated              sleep 890
[2]+  Terminated              sleep 700
[harsh@localhost ~]$ logout
root@localhost [-] # pkill -t pts/1
root@localhost [-] # jobs
[1]+  Stopped                  sleep 800
root@localhost [-] #
```

Q6 : 6. You are required to configure the AlmaLinux 9 repository on your system using the following repository URLs: • AppStream: https://repo.almalinux.org/almalinux/9/AppStream/x86_64/os • BaseOS: https://repo.almalinux.org/almalinux/9/BaseOS/x86_64/os Before configuring the new repositories, ensure that all existing repositories are removed from the system.

Ans :

Commands :

rm -rf /etc/yum.repos.d/*

cd /etc/yum.repos.d/

vim /etc/yum.repos.d/alma-appstream.repo

vim /etc/yum.repos.d/alma-baseos.repo

yum repolist

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:55
root@localhost:/etc/yum.repos.d

root@localhost [-] # rm -rf /etc/yum.repos.d/*
root@localhost [-] # echo -e "[AppStream]\nname=AlmaLinux AppStream\nbaseurl=https://repo.almalinux.org/almalinux/9/AppStream/x86_64/os\nenabled=1\ngpgcheck=0" > /etc/yum.repos.d/almalinux-9-appstream.repo
root@localhost [-] # echo -e "[BaseOS]\nname=AlmaLinux BaseOS\nbaseurl=https://repo.almalinux.org/almalinux/9/BaseOS/x86_64/os\nenabled=1\ngpgcheck=0" > /etc/yum.repos.d/almalinux-9-baseos.repo
root@localhost [-] # cd /etc/yum.repos.d/
root@localhost [/etc/yum.repos.d] # ls
almalinux-9-appstream.repo  almalinux-9-baseos.repo
root@localhost [/etc/yum.repos.d] # cat almalinux-9-appstream.repo
[AppStream]
name=AlmaLinux AppStream
baseurl=https://repo.almalinux.org/almalinux/9/AppStream/x86_64/os
enabled=1
gpgcheck=0
root@localhost [/etc/yum.repos.d] # cat almalinux-9-baseos.repo
[BaseOS]
name=AlmaLinux BaseOS
baseurl=https://repo.almalinux.org/almalinux/9/BaseOS/x86_64/os
enabled=1
gpgcheck=0
root@localhost [/etc/yum.repos.d] #
```

```
Red Hat Enterprise Linux 9 64-bit - VMware Workstation
File Edit View VM Tabs Help
Activities Terminal Feb 1 11:56
root@localhost:/etc/yum.repos.d

root@localhost [-] # echo -e "[BaseOS]\nname=AlmaLinux BaseOS\nbaseurl=https://repo.almalinux.org/almalinux/9/BaseOS/x86_64/os\nenabled=1\ngpgcheck=0" > /etc/yum.repos.d/almalinux-9-baseos.repo
root@localhost [-] # echo -e "[AppStream]\nname=AlmaLinux AppStream\nbaseurl=https://repo.almalinux.org/almalinux/9/AppStream/x86_64/os\nenabled=1\ngpgcheck=0" > /etc/yum.repos.d/almalinux-9-appstream.repo
root@localhost [-] # cd /etc/yum.repos.d/
root@localhost [/etc/yum.repos.d] # ls
almalinux-9-appstream.repo  almalinux-9-baseos.repo
root@localhost [/etc/yum.repos.d] # cat almalinux-9-appstream.repo
[AppStream]
name=AlmaLinux AppStream
baseurl=https://repo.almalinux.org/almalinux/9/AppStream/x86_64/os
enabled=1
gpgcheck=0
root@localhost [/etc/yum.repos.d] # cat almalinux-9-baseos.repo
[BaseOS]
name=AlmaLinux BaseOS
baseurl=https://repo.almalinux.org/almalinux/9/BaseOS/x86_64/os
enabled=1
gpgcheck=0
root@localhost [/etc/yum.repos.d] # yum repolist
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manager to register.

repo id                                repo name
AppStream                              AlmaLinux AppStream
BaseOS                                 AlmaLinux BaseOS
root@localhost [/etc/yum.repos.d] #
```

