Assignment-1 Questions:

(Note: All answers should include an attached screenshot as proof of execution)

1. What does CLI stand for, and how does it differ from GUI?

Ans:

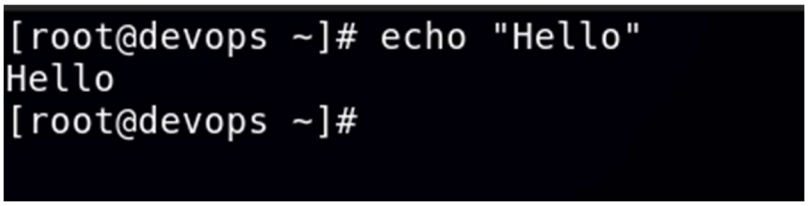
CLI stands for **Command-Line Interface.**

Feature	CLI (Command-Line Interface)	GUI (Graphical User Interface)
Interaction	Text-based commands	Visual elements (buttons, icons, menus)
Ease of Use	Requires knowledge of commands	User-friendly and intuitive
Remote Access	Can be accessed via SSH remotely	Requires remote desktop tools
Customization	Highly customizable through scripts	Limited customization options
Examples	Bash, PowerShell	Windows, macOS

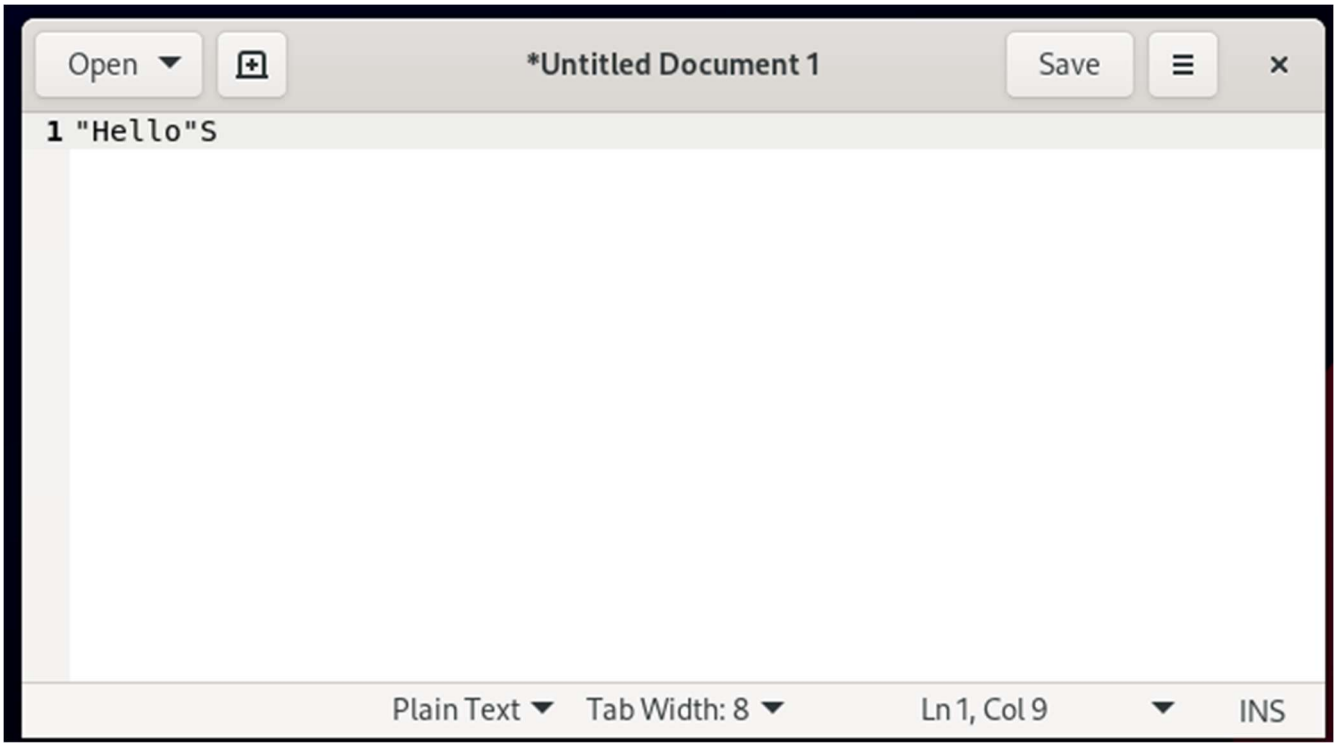
2. Open a terminal and execute a simple command such as **echo "Hello"**. Can you perform a similar action in a GUI? What are the advantages of using a CLI compared to a GUI?

Ans:

In Terminal



In GUI



3. To convert a minimal CLI-based Linux interface into a GUI-based one, which packages are typically required? Find them

Ans:

rpm -qa | grep -E 'xorg|gnome|kde|xfce|lxde|plasma|lightdm|gdm|sddm'

```
[root@devops ~]# rpm -qa | grep -E 'xorg|gnome|kde|xfce|lxde|plasma|lightdm|gdm|sddm'
gnome-control-center-filesystem-40.0-23.el9_0.1.noarch
xorg-x11-server-utils-7.7-44.el9.x86_64
xorg-x11-xauth-1.1-10.el9.x86_64
xorg-x11-server-common-1.20.11-10.el9.x86_64
gnome-video-effects-0.5.0-7.el9.noarch
gnome-menus-3.36.0-8.el9.x86_64
libblockdev-utils-2.25-11.el9.x86_64
xorg-x11-xinit-1.4.0-11.el9.x86_64
libblockdev-2.25-11.el9.x86_64
libblockdev-fs-2.25-11.el9.x86_64
libblockdev-loop-2.25-11.el9.x86_64
libblockdev-part-2.25-11.el9.x86_64
libblockdev-swap-2.25-11.el9.x86_64
libblockdev-lvm-2.25-11.el9.x86_64
lockdev-1.0.4-0.37.20111007git.el9.x86_64
libblockdev-mdraid-2.25-11.el9.x86_64
xorg-x11-server-Xwayland-21.1.3-2.el9.x86_64
pinentry-gnome3-1.1.1-8.el9.x86_64
xorg-x11-drv-wacom-serial-support-1.0.0-1.el9.x86_64
xorg-x11-drv-libinput-1.0.1-3.el9.x86_64
xorg-x11-server-Xorg-1.20.11-10.el9.x86_64
libblockdev-crypto-2.25-11.el9.x86_64
gnome-desktop3-40.4-1.el9.x86_64
gnome-settings-daemon-40.0.1-6.el9.x86_64
gnome-session-40.1.1-6.el9.x86_64
libgnomekbd-3.26.1-7.el9.x86_64
gnome-autoar-0.4.1-2.el9.x86_64
gnome-bluetooth-libs-3.34.5-3.el9.x86_64
gnome-keyring-40.0-3.el9.x86_64
gnome-keyring-pam-40.0-3.el9.x86_64
gnome-remote-desktop-40.0-7.el9.x86_64
gnome-bluetooth-3.34.5-3.el9.x86_64
gnome-color-manager-3.36.0-7.el9.x86_64
gnome-terminal-3.40.3-1.el9.x86_64
gnome-online-accounts-3.40.0-2.el9.x86_64
gnome-control-center-40.0-23.el9_0.1.x86_64
gnome-tour-40.1-1.el9.x86_64
gdm-40.1-13.el9_0.4.x86_64
gnome-session-wayland-session-40.1.1-6.el9.x86_64
gnome-session-xsession-40.1.1-6.el9.x86_64
gnome-shell-extension-background-logo-40.0~rc-4.el9.noarch
gnome-shell-40.9-2.el9.x86_64
gnome-shell-extension-common-40.6-1.el9.noarch
gnome-shell-extension-apps-menu-40.6-1.el9.noarch
gnome-shell-extension-launch-new-instance-40.6-1.el9.noarch
gnome-shell-extension-places-menu-40.6-1.el9.noarch
gnome-shell-extension-window-list-40.6-1.el9.noarch
gnome-classic-session-40.6-1.el9.noarch
chrome-gnome-shell-10.1-14.el9.x86_64
gnome-initial-setup-40.4-1.el9_0.1.x86_64
gnome-terminal-nautilus-3.40.3-1.el9.x86_64
gnome-calculator-40.1-2.el9.x86_64
gnome-system-monitor-40.1-2.el9.x86_64
gnome-software-41.4-1.el9.x86_64
gnome-characters-40.0-3.el9.x86_64
gnome-disk-utility-40.2-2.el9.x86_64
gnome-font-viewer-40.0-3.el9.x86_64
gnome-screenshot-40.0-3.el9.x86_64
gnome-logs-3.36.0-6.el9.x86_64
xorg-x11-drv-evdev-2.10.6-12.el9.x86_64
xorg-x11-drv-fbdev-0.5.0-11.el9.x86_64
xorg-x11-drv-vmware-13.2.1-18.el9.x86_64
xorg-x11-drv-wacom-1.0.0-1.el9.x86_64
xorg-x11-utils-7.5-40.el9.x86_64
xorg-x11-xinit-session-1.4.0-11.el9.x86_64
gnome-user-docs-40.0-3.el9.noarch
[root@devops ~]# S
```

These are all the packages that are required to access the packages that are required to convert a minimal CLI-based Linux interface into a GUI-based one

4. What are terminals in Linux? How many virtual terminals are available on your system, and which key combination is used to access them?

Ans:

A terminal in Linux is a text-based interface that allows users to interact with the operating system by entering commands. It provides access to the shell, which executes commands.

Linux supports two types of terminals:

1. Virtual Terminals (TTYs)
2. Pseudo Terminals (PTs)

Linux provides 6 virtual terminals (TTY1 to TTY6) by default

Ctrl + Alt + F1 to access TTY1

Ctrl + Alt + F2 to access TTY2

Ctrl + Alt + F3 to TTY3, and so on up to F6

5. Write the commands to check a file and a directory in a long listing format. How can you determine whether it is a file or a directory?

Ans:

The Command is " ls -l <path>". It is used to get the list of all the directories and files in long list format

The " **d** " at the start of each row shows that it is a Directory and " – " tell us that it is a File

```
[root@devops ~]# ls -l
total 24
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Desktop
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Documents
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Downloads
-rw-r--r--. 1 root root   41 Jan 22 13:44 error.txt
-rw-r--r--. 2 root root  527 Jan 22 13:39 file1.txt
-rw-r--r--. 1 root root  126 Jan 22 13:25 file2.txt
-rw-r--r--. 1 root root 3647 Jan 22 13:37 history.txt
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Music
-rw-r--r--. 1 root root   47 Jan 22 13:44 output.txt
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Pictures
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Public
drwxr-xr-x. 2 root root   25 Jan 22 13:36 redirection
-rw-r--r--. 1 root root  764 Jan 22 14:08 system_info_banao
drwxr-xr-x. 2 root root   28 Jan 22 15:06 techno_root
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Templates
drwxr-xr-x. 2 root root    6 Jan 20 14:46 Videos
[root@devops ~]#
```

6. Which Linux commands are used to view the content of files and directories? Write the commands.

Ans:

The command that is used to view the content of the file is “ls <path>”. It give us the list of all available files and directory in the certain directory

The command “cat <filename>” is used to print the content of the entire file unto the terminal

```
[root@devops ~]# ls
Desktop    Downloads  file1.txt  history.txt  output.txt  Public       system_info_banao  Templates
Documents  error.txt  file2.txt  Music        Pictures    redirection  techno_root        Videos
[root@devops ~]# cat file2.txt
Hello World!

Devops is operations and development
devops tools are used for deployment

Devops
DevOps
devOps
devops


techno
[root@devops ~]#
```

7. Change your current location to the **/etc/yum.repos.d** directory.
    a. Using the relative path method, create a file named **xyz.repo** under **the /etc/yum.repos.d/** directory.
    b. Using the absolute path method, create a file named **xyz.conf** under the **/etc/rsyslog.d/** directory.
    c. What differences did you observe between using a relative path and an absolute path?

Ans:

```
[root@devops ~]# cd /etc/yum.repos.d
[root@devops yum.repos.d]# touch xyz.repo
[root@devops yum.repos.d]# touch /etc/rsyslog.d/xyz.conf
[root@devops yum.repos.d]#
```

The Major Difference between using the Absolute path and relative path is that if we are already present in a directory, and we want to create the file , we have to give path Relative to the location. But if we Use absolute path we don’t have to worry about the current working directory, and we can just give the path of the file from the start “/”

8. List all files, including hidden ones, in the **/usr/bin/** directory with details like file permissions. Save the output to a file named **output.txt** in the **/mnt** directory. Write the command.

Ans:

```
[root@devops ~]# ls -a -l /usr/bin/ > /mnt/output.txt
[root@devops ~]# cat /mnt/output.txt
total 216856
dr-xr-xr-x.  2 root root       49152 Jan 20 14:28 .
drwxr-xr-x. 12 root root         144 Jan 20 14:23 ..
-rwxr-xr-x.  1 root root       53520 Aug 10  2021 [
-rwxr-xr-x.  1 root root       33416 Nov  1  2021 ac
-rwxr-xr-x.  1 root root       24480 Jan  3  2022 aconnect
-rwxr-xr-x.  1 root root       29080 Jan 24  2022 addr2line
```

ls -a -l /usr/bin/ > /mnt/ouput.txt

9. Create the parent directories **/Techno/Udaipur/Rajasthan/India/Asia/Earth/Solar** using one command. Then, check the full structure with details in a long listing format. Write the commands.

Ans:

mkdir -p /Techno/Udaipur/Rajasthan/India/Asia/Earth/Solar

ls -lR /Techno

```
[root@devops ~]# mkdir -p /Techno/Udaipur/Rajasthan/India/Asia/Earth/Solar
ls -lR /Techno
/Techno:
total 0
drwxr-xr-x. 3 root root 23 Jan 23 14:45 Udaipur

/Techno/Udaipur:
total 0
drwxr-xr-x. 3 root root 19 Jan 23 14:45 Rajasthan

/Techno/Udaipur/Rajasthan:
total 0
drwxr-xr-x. 3 root root 18 Jan 23 14:45 India

/Techno/Udaipur/Rajasthan/India:
total 0
drwxr-xr-x. 3 root root 19 Jan 23 14:45 Asia

/Techno/Udaipur/Rajasthan/India/Asia:
total 0
drwxr-xr-x. 3 root root 19 Jan 23 14:45 Earth

/Techno/Udaipur/Rajasthan/India/Asia/Earth:
total 0
drwxr-xr-x. 2 root root 6 Jan 23 14:45 Solar

/Techno/Udaipur/Rajasthan/India/Asia/Earth/Solar:
total 0
```

10. Create a file named "**Poem**" under the **/Techno/Udaipur/Rajasthan/** directory. Write the text **"Twinkle Twinkle Little Star"** into the file and save it. Perform all actions using the absolute path method.

Ans:

```
[root@devops ~]# touch /Techno/Udaipur/Rajasthan/Poem
[root@devops ~]# echo "Twinkle Twinkle Little Star" > /Techno/Udaipur/Rajasthan/Poem
[root@devops ~]# cat /Techno/Udaipur/Rajasthan/Poem
Twinkle Twinkle Little Star
```

Touch /Techno/Udaipur/Rajasthan/Poem

echo "Twinkle Twinkle Little Star" > /Techno/Udaipur/Rajasthan/Poem

cat /Techno/Udaipur/Rajasthan/Poem

11. Delete the **/Techno/Udaipur** directory, including its contents, using a single Linux command. Write the command.

Ans:

rm -rf /Techno/Udaipur

ls -l /Techno

```
[root@devops ~]# rm -rf /Techno/Udaipur
[root@devops ~]# ls -l /Techno
total 0
[root@devops ~]#
```

12. How can you view the manual page for the useradd command? From the manual page, identify which files are important for user administration.(Hint: Check the 'Files' Section)

Ans:

man useradd

```
FILES
       /etc/passwd
           User account information.

       /etc/shadow
           Secure user account information.

       /etc/group
           Group account information.

       /etc/gshadow
           Secure group account information.

       /etc/default/useradd
           Default values for account creation.

       /etc/shadow-maint/useradd-pre.d/*, /etc/shadow-maint/useradd-post.d/*
           Run-part files to execute during user addition. The environment variable ACTION will be populated with useradd and SUBJECT with the
           username.  useradd-pre.d will be executed prior to any user addition.  useradd-post.d will execute after user addition. If a script exits
           non-zero then execution will terminate.

       /etc/skel/
           Directory containing default files.

       /etc/subgid
           Per user subordinate group IDs.

       /etc/subuid
           Per user subordinate user IDs.

       /etc/login.defs
           Shadow password suite configuration.
```

13. You have two files: **Fruits.txt and Vegetables.txt**, each containing related content.
    a. Write content in fruits.txt using **vi.** (EX: **mango, apple, kiwi, grapes, cherry)**.
    b. Write content in vegetables.txt using **nano.** (Ex: **potato, tomato, onion, chilli, garlic**).
    c. the single command to Combine the contents of both files into a single file named **vegetarian** and display its content.

Ans:

```
[root@devops ~]# vi Fruits.txt
[root@devops ~]# cat Fruits.txt
mango
apple
kiwi
grapes
cherry

[root@devops ~]# nano Vegetables.txt
[root@devops ~]# cat V
Vegetables.txt  Videos/
[root@devops ~]# cat Vegetables.txt
potato
tomato
onion
chilli
garlic
[root@devops ~]# cat Fruits.txt Vegetables.txt > vegetarian
[root@devops ~]# cat vegetarian
mango
apple
kiwi
grapes
cherry

potato
tomato
onion
chilli
garlic
[root@devops ~]#
```

14. Write the command to copy all files, including related sub-files, from **/var** to a new location **/tmp/data/.** The output should be displayed during the copying process.

Ans:

```
[root@devops ~]# cp -av /var /tmp/data/
'/var' -> '/tmp/data/'
'/var/empty' -> '/tmp/data/empty'
'/var/opt' -> '/tmp/data/opt'
'/var/kerberos' -> '/tmp/data/kerberos'
'/var/kerberos/krb5' -> '/tmp/data/kerberos/krb5'
'/var/kerberos/krb5/user' -> '/tmp/data/kerberos/krb5/user'
'/var/account' -> '/tmp/data/account'
'/var/account/pacct' -> '/tmp/data/account/pacct'
'/var/log' -> '/tmp/data/log'
'/var/log/private' -> '/tmp/data/log/private'
'/var/log/samba' -> '/tmp/data/log/samba'
'/var/log/samba/old' -> '/tmp/data/log/samba/old'
'/var/log/audit' -> '/tmp/data/log/audit'
'/var/log/audit/audit.log' -> '/tmp/data/log/audit/audit.log'
'/var/log/speech-dispatcher' -> '/tmp/data/log/speech-dispatcher'
'/var/log/README' -> '/tmp/data/log/README'
'/var/log/tallylog' -> '/tmp/data/log/tallylog'
'/var/log/wtmp' -> '/tmp/data/log/wtmp'
'/var/log/btmp' -> '/tmp/data/log/btmp'
'/var/log/lastlog' -> '/tmp/data/log/lastlog'
'/var/log/messages' -> '/tmp/data/log/messages'
'/var/log/secure' -> '/tmp/data/log/secure'
'/var/log/maillog' -> '/tmp/data/log/maillog'
'/var/log/spooler' -> '/tmp/data/log/spooler'
'/var/log/kdump.log' -> '/tmp/data/log/kdump.log'
'/var/log/vmware-vmusr-root.log' -> '/tmp/data/log/vmware-vmusr-root.log'
'/var/log/dnf.log' -> '/tmp/data/log/dnf.log'
'/var/log/dnf.librepo.log' -> '/tmp/data/log/dnf.librepo.log'
'/var/log/dnf.rpm.log' -> '/tmp/data/log/dnf.rpm.log'
```

It gave a long output as multiple files were copied to /tmp/data

15. Rename the **file "Vegetrian.txt"** to **"Veg.txt".** Write the command.

Ans:

mv Vegetrian.txt Veg.txt\

```
[root@devops ~]# mv Vegetrian.txt Veg.txt
[root@devops ~]# ls -l Veg.txt
-rw-r--r--. 1 root root 0 Jan 23 15:20 Veg.txt
[root@devops ~]#
```

16. Open the file **"/etc/passwd** and locate the following lines using less and more:

    a. Search for the text "**Root**" using the less command.

    b. Search for the word "**root**" using the grep command.

    c. What is the use difference between more and less commands?

Ans:

```
jerry:x:3030:1001:hello:/home/jerry:/bin/bash
nagios:x:977:977::/home/nagios:/sbin/nologin
~
~
Pattern not found  (press RETURN)
```

```
[root@devops ~]# grep "root" /etc/passwd
root:x:0:0:root:/root:/bin/bash
operator:x:11:0:operator:/root:/sbin/nologin
[root@devops ~]#
```

Use `more` when you just need to read forward in a file quickly.

Use `less` when you need to navigate, search, and analyze files in detail.

17. Perform the following tasks and write the commands to achieve them:
    a. Display the **top 7th** line of the /etc/passwd file.
    b. Display the **last 3** lines of the /etc/group file.
    c. Display the lines **11th to 15th** from the /etc/shadow file using a pipeline.
    d. Display **only the 16th** line of the /etc/passwd file.

Ans:

head -8 /etc/passwd | tail -1

tail -3 /etc/group

head -15 /etc/shadow | tail -5

sed -n '16p' /etc/passwd

```
[root@devops ~]# head -8 /etc/passwd | tail -1
halt:x:7:0:halt:/sbin:/sbin/halt
[root@devops ~]# tail -3 /etc/group
admin:x:1001:
dev:x:1002:jerry
nagios:x:977:
[root@devops ~]# head -15 /etc/shadow | tail -5

games:*:18849:0:99999:7:::
ftp:*:18849:0:99999:7:::
nobody:*:18849:0:99999:7:::
systemd-coredump:!!:20108::::::
dbus:!!:20108::::::
[root@devops ~]# sed -n '16p' /etc/passwd
polkitd:x:998:996:User for polkitd:/:/sbin/nologin
[root@devops ~]#
```

18. Perform the following tasks using the **grep** command on the **/etc/passwd** file:
    - **a.** Write a command to match and display lines containing the word **/sbin/nologin.**
    - **b.** Write a command to match and display lines containing the multiple words (**root, sbin,** and **/home**) simultaneously, ignoring typographical case errors. Save the output for all three matches into the file **/root/test**. Without loosing data.

```
[root@devops ~]# grep "/sbin/nologin" /etc/passwd
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:65534:65534:Kernel Overflow User:/:/sbin/nologin
systemd-coredump:x:999:997:systemd Core Dumper:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:998:996:User for polkitd:/:/sbin/nologin
tss:x:59:59:Account used for TPM access:/dev/null:/sbin/nologin
colord:x:997:993:User for colord:/var/lib/colord:/sbin/nologin
clevis:x:996:992:Clevis Decryption Framework unprivileged user:/var/cache/clevis:/usr/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
sssd:x:995:991:User for sssd:/:/sbin/nologin
libstoragemgmt:x:994:990:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
setroubleshoot:x:993:989:SELinux troubleshoot server:/var/lib/setroubleshoot:/sbin/nologin
pipewire:x:992:987:PipeWire System Daemon:/var/run/pipewire:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
geoclue:x:991:986:User for geoclue:/var/lib/geoclue:/sbin/nologin
flatpak:x:990:985:User for flatpak system helper:/:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
cockpit-ws:x:989:984:User for cockpit web service:/nonexisting:/sbin/nologin
cockpit-wsinstance:x:988:983:User for cockpit-ws instances:/nonexisting:/sbin/nologin
gnome-initial-setup:x:987:982::/run/gnome-initial-setup/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/usr/share/empty.sshd:/sbin/nologin
chrony:x:986:981::/var/lib/chrony:/sbin/nologin
dnsmasq:x:985:980:Dnsmasq DHCP and DNS server:/var/lib/dnsmasq:/sbin/nologin
tcpdump:x:72:72::/:/sbin/nologin
systemd-oom:x:978:978:systemd Userspace OOM Killer:/:/usr/sbin/nologin
nagios:x:977:977::/home/nagios:/sbin/nologin
[root@devops ~]# grep -i -e "root" -e "sbin" -e "/home" /etc/passwd >> /root/test
[root@devops ~]# cat /root/test
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
```

19. Replace Text Using **sed** Linux Commands
    a. Write the command to replace the word **localhost** with **localhost.localhost** in the file **/etc/hosts** without opening the file in an editor.
    b. The **/var/log/audit/audit.log** file contains audit log messages, some of which include the word "**success.**" Write the command to count how many lines contain the word success.

```
[root@devops ~]# sed -i 's/localhost/localhost.localhost/g' /etc/hosts
[root@devops ~]# grep -c "success" /var/log/audit/audit.log
679
[root@devops ~]#
```

20. Create a directory named "**demo**" on "**/root**".
    a. Create a file "**RedHat**" under the "demo" directory.
    b. Run the command "**vimtutor**" and save the output to the "RedHat" file.
    c. Now create a soft link of "RedHat" to "/etc/" location.
    d. Create a hard link of /var/log/messages to /etc/log.

```
[root@devops ~]# mkdir /root/demo
[root@devops ~]# touch /root/demo/RedHat
[root@devops ~]# vimtutor > /root/demo/RedHat
Vim: Warning: Output is not to a terminal
Vim: Warning: Output is not to a terminal
```

```
[root@devops ~]# ln -s /root/demo/RedHat /etc/RedHat_link
[root@devops ~]# ln /var/log/messages /etc/log
[root@devops ~]# ls -l /etc/RedHat_link
lrwxrwxrwx. 1 root root 17 Jan 23 15:45 /etc/RedHat_link -> /root/demo/RedHat
[root@devops ~]# ls -l /etc/log
-rw-------. 2 root root 1111836 Jan 23 15:45 /etc/log
[root@devops ~]#
```