Linux Commands

Linux:

Linux is a family of open-source, Unix-like operating systems based on the Linux kernel, created by **Linus Torvalds in 1991**, and used in various devices and applications, including smartphones, servers, and supercomputers.

The **Linux Kernel** communicates directly with hardware and handles system processes. **Linux Distributions** are versions of Linux that include the kernel and additional software.

Popular Linux distributions:

- Ubuntu
- Debian
- Fedora
- Linux Mint
- Arch Linux
- Android (based on the Linux kernel)

Key Features and Characteristics:

- **Open-Source:** The code is freely available for anyone to use, modify, and distribute.
- **Unix-like:** Linux follows the Unix philosophy, which emphasizes modularity, simplicity, and user control.
- **Kernel:** The Linux kernel is the core of the operating system, responsible for managing hardware resources and interacting with software.
- **Distributions:** Linux is not a single operating system, but rather a family of distributions (distros) that build upon the Linux kernel and include a user interface, utilities, and other software.
- **Versatility:** Linux is used in a wide range of applications, including:

  - ➢ **Servers:** Hosting websites, databases, and other applications.
  - ➢ **Desktops:** Providing a powerful and customizable user experience.
  - ➢ **Embedded Systems and Super Computers.**

- **Security:** Linux is known for its strong security features, making it a popular choice for servers and other critical systems.
- **Community:** The Linux community is large and active, providing extensive documentation, support, and resources.

Commands:

1. **pwd:** Prints the current working directory.
2. **ls:** Lists contents of the current directory.
3. **ls -al**: Lists the information about files and directories including hidden files and file permissions.

```
sri@sri-VirtualBox:~$ pwd
/home/sri
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Desktop      Downloads                 Music          Pictures
askinput.sh     Documents    moveFileCOntent.sh  newfile1.txt  predefined.sh
sri@sri-VirtualBox:~$ ls -al
total 136
drwxr-x---  17 sri   sri    4096 Mar 13 12:53 .
drwxr-xr-x   3 root root    4096 Jan  9  2024 ..
-rw-rw-r--   1 sri   sri      99 Mar 12 18:46 argsnparams.sh
-rw-rw-r--   1 sri   sri      82 Mar 12 18:43 askinput.sh
-rw-------   1 sri   sri    4529 Mar 13 12:54 .bash_history
-rw-r--r--   1 sri   sri     220 Jan  9  2024 .bash_logout
-rw-r--r--   1 sri   sri    3771 Jan  9  2024 .bashrc
drwx------  11 sri   sri    4096 Dec 27 22:21 .cache
drwx------  13 sri   sri    4096 Dec 30 22:03 .config
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Desktop
drwxr-xr-x   2 sri   sri    4096 Mar  2  2024 Documents
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Downloads
-rw-------   1 sri   sri   12288 Mar  9  2024 .exp6a.sh.swp
drwx------   2 sri   sri    4096 Mar 11 16:01 .gnupg
-rw-------   1 sri   sri      20 Mar 12 18:20 .lesshst
drwx------   3 sri   sri    4096 Jan  9  2024 .local
-rw-rw-r--   1 sri   sri     113 Mar 12 19:03 moveFileCOntent.sh
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Music
-rw-rw-r--   1 sri   sri      72 Mar 12 19:04 newfile1.txt
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Pictures
-rw-rw-r--   1 sri   sri     152 Mar 12 18:50 predefined.sh
drwxrwxr-x   2 sri   sri    4096 Mar 11 14:45 priya
-rw-r--r--   1 sri   sri     807 Jan  9  2024 .profile
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Public
-rw-rw-r--   1 sri   sri      88 Mar 13 12:52 removeFiles.sh
-rw-rw-r--   1 sri   sri     111 Mar 12 18:36 script.sh
drwx------   5 sri   sri    4096 Dec 30 22:02 snap
drwx------   2 sri   sri    4096 Mar  2  2024 .ssh
-rw-r--r--   1 sri   sri       0 Mar 11 16:56 .sudo_as_admin_successful
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Templates
-rw-rw-r--   1 sri   sri      50 Mar 12 18:38 variable.sh
drwxr-xr-x   2 sri   sri    4096 Jan  9  2024 Videos
```

4. **cd <directory>:** Changes the current directory.
5. **cd ..** : Moves back to the previous directory.
6. **mkdir <directory>:** Creates a new directory.
7. **touch <filename>:** Creates a new file.
8. **cat <filename>:** Displays the content of a file.
9. **cat > <filename>:** Edits the content of a file. It also creates file if the file doesn't exist.
10. **cat >> <filename>:** Appends the content to a file.
11. **vi <filename>:** Edits a file using vi editor. Also creates if file doesn't exist.
    o Press i to start editing, then press Esc, followed by :wq! to save and exit, or :q! to exit without saving.
12. **rm <filename>:** deletes a file.
13. **rm -rf <directory>:** Deletes a directory and its contents recursively.
14. **rmdir <directory>:** Removes an empty directory.

15. **find \<directoryPath\> -name \<filename\>:** Searches for a file or directory in the specified path.
16. **clear:** To clear the screen.

```
sri@sri-VirtualBox:~$ mkdir linuxCommands
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Desktop    Downloads       moveFileCOntent.sh  newfile1.t
askinput.sh     Documents  linuxCommands   Music               Pictures
sri@sri-VirtualBox:~$ cd linuxCommands
sri@sri-VirtualBox:~/linuxCommands$ ls
sri@sri-VirtualBox:~/linuxCommands$ touch file1.txt
sri@sri-VirtualBox:~/linuxCommands$ ls
file1.txt
sri@sri-VirtualBox:~/linuxCommands$ cd ..
sri@sri-VirtualBox:~$ vi file2.txt
sri@sri-VirtualBox:~$ cat file2.txt
hi this is file1
1
2
3

sri@sri-VirtualBox:~$ cat >> file2.txt
hi we are using cat >> <filename>
^Z
[4]+  Stopped                 cat >> file2.txt
sri@sri-VirtualBox:~$ cat file2.txt
hi this is file1
1
2
3

hi we are using cat >> <filename>
sri@sri-VirtualBox:~$ cat > file3.txt
hi this is file3
^Z
[5]+  Stopped                 cat > file3.txt
sri@sri-VirtualBox:~$ cat file3.txt
hi this is file3
sri@sri-VirtualBox:~$ rm file3.txt
sri@sri-VirtualBox:~$ rm -rf linuxCommands
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Desktop    Downloads   moveFileCOntent.sh  newfile1.txt
askinput.sh     Documents  file2.txt   Music               Pictures
sri@sri-VirtualBox:~$
```

File Content:

1. **cp \<filename\> \<path\>:** Copies the content of a file to a specific location.
2. **cp \<file1\> \<file2\>:** Copies the first file content to second file.
3. **mv \<oldfile\> \<newfile\>:** Moves the content from old file to new file or renames a file.
4. **cat \<filename\>:** Displays file content.
5. **head -n 3 \<filename\>:** Displays the first 3 lines of a file.
6. **tail -n 3 \<filename\>:** Displays the last 3 lines of a file.
7. **sed -n 3,6p \<filename\>:** Prints the lines from 3 to 6 from a file.

```
sri@sri-VirtualBox:~$ cp file1.txt file2.txt
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1        file1.txt        Music
askinput.sh     Documents   file2.txt        newfile1.txt
Desktop         Downloads   moveFileCOntent.sh  Pictures
sri@sri-VirtualBox:~$ cat file2.txt
hi,this is file1.
sri@sri-VirtualBox:~$ cp file1.txt /home/sri/dir1/file2.txt
sri@sri-VirtualBox:~$ cat /home/sri/dir1/file2.txt
hi,this is file1.
sri@sri-VirtualBox:~$ mv file2.txt file3.txt
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1        file1.txt        Music
askinput.sh     Documents   file3.txt        newfile1.txt
Desktop         Downloads   moveFileCOntent.sh  Pictures
sri@sri-VirtualBox:~$ cat file3.txt
hi,this is file1.
```

```
sri@sri-VirtualBox:~$ cat file1.txt
hi,this is file1.
1
2
3
4
5
6
7
sri@sri-VirtualBox:~$ head -n 3 file1.txt
hi,this is file1.
1
2
sri@sri-VirtualBox:~$ tail -n 4 file1.txt
4
5
6
7
sri@sri-VirtualBox:~$ sed -n 3,6p file1.txt
2
3
4
5
```

Multiple files/folders:

1. **mkdir -p <dir1/dir2/dir3>:** Creates nested directories.
2. **rmdir -p <dir1/dir2/dir3>:** Deletes nested directories if they are empty.
3. **mkdir <directory>{1..10}:** Creates multiple directories {eg: dir1,dir2,dir3,…dir10}
4. **rmdir <directory>{1..10}:** Removes multiple directories.
5. **touch file{1..10}:** Creates multiple files like file1,file2,…file10.
6. **rm file{1..10}:** Deletes multiple files.

```
sri@sri-VirtualBox:~$ mkdir -p /home/sri/folder1/folder2/folder3
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1        file1.txt  moveFileCOntent.sh  Pictures
askinput.sh     Documents   file3.txt  Music               predefined.sh
Desktop         Downloads   folder1    newfile1.txt        Public
sri@sri-VirtualBox:~$ cd folder1
sri@sri-VirtualBox:~/folder1$ ls
folder2
sri@sri-VirtualBox:~/folder1$ cd folder2
sri@sri-VirtualBox:~/folder1/folder2$ ls
folder3
sri@sri-VirtualBox:~/folder1/folder2$ cd ..
sri@sri-VirtualBox:~/folder1$ cd ..
sri@sri-VirtualBox:~$ rmdir -p /home/sri/folder1/folder2/folder3
rmdir: failed to remove directory '/home/sri': Permission denied
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1        file1.txt           Music         predefined.s
askinput.sh     Documents   file3.txt           newfile1.txt  Public
Desktop         Downloads   moveFileCOntent.sh  Pictures      removeFiles.
```

```
sri@sri-VirtualBox:~$ mkdir folder{1..10}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt  folder10  folder4  folder7
askinput.sh     Documents     file3.txt  folder2   folder5  folder8
Desktop         Downloads     folder1    folder3   folder6  folder9
sri@sri-VirtualBox:~$ rmdir folder{1..10}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt             Music         prec
askinput.sh     Documents     file3.txt             newfile1.txt  Publ
Desktop         Downloads     moveFileCOntent.sh    Pictures      remc
sri@sri-VirtualBox:~$ touch file{1..5}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1      file3      file5
askinput.sh     Documents     file1.txt  file3.txt  moveFileCOntent.
Desktop         Downloads     file2      file4      Music
sri@sri-VirtualBox:~$ rm file{1..5}
sri@sri-VirtualBox:~$ ls
argsnparams.sh  dir1          file1.txt             Music         prec
askinput.sh     Documents     file3.txt             newfile1.txt  Publ
Desktop         Downloads     moveFileCOntent.sh    Pictures      remc
```

System Management:

1. **whoami:** Displays the current user.
2. **hostname:** Displays the system's hostname.
3. **uname -a:** Displays detailed information about the system.
4. **date:** Shows the current date and time.
5. **top:** Displays real-time information about system processes.
6. **df -h:** Shows available disk space in human readable format.
7. **du -h:** Displays disk usage in human readable format.
8. **man <command>:** Displays the manual page for a command.
9. **cal <year>:** Displays the calendar for a specified year.
10. **cal <mon> <year>:** Displays the Calendar for a specified month in a specific year.

```
sri@sri-VirtualBox:~$ whoami
sri
sri@sri-VirtualBox:~$ hostname
sri-VirtualBox
sri@sri-VirtualBox:~$ uname -a
Linux sri-VirtualBox 6.2.0-26-generic #26~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu
 Jul 13 16:27:29 UTC 2 x86_64 x86_64 x86_64 GNU/Linux
sri@sri-VirtualBox:~$ date
Thursday 13 March 2025 08:38:45 PM IST
sri@sri-VirtualBox:~$
```

```
Azureuser@Adhitya-ubuntu-vm:~$ cal mar 2025
      March 2025
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
```

File permissions:

❖ There are 3 file permissions –
- ○ Read - r-4
- ○ Write - w-2
- ○ Execute - x-1

❖ There are three levels for a file.
- ○ User level – u
- ○ Group level – g
- ○ Other level – o

1. **chmod u+r <filename>:** Grants read permissions to the specified file in user level.
2. **chmod u-r <filename>:** revokes read permissions to a file in user level.
3. **chmod 777 <filename>:** Grants all permissions to a file.

1. echo $RANDOM: Prints a random number.
2. echo $((RANDOM%10)): Generates a random number between 0-9.
3. echo $((10+RANDOM%10)): Generates random number between 10-19.

```
sri@sri-VirtualBox:~$ echo $RANDOM
10897
sri@sri-VirtualBox:~$ echo $((RANDOM%10))
9
sri@sri-VirtualBox:~$ echo $((RANDOM%10))
4
sri@sri-VirtualBox:~$ echo $((10+RANDOM%10))
18
sri@sri-VirtualBox:~$ echo $((10+RANDOM%10))
16
```

Shell Scripting:

✓ In Linux, the shell scripting will be done by using "bash script".
✓ In Windows, it is "Power Shell scripting".
✓ Bash extension is ".sh"
✓ Every script must start with " #!"(shebang) followed by " /bin/bash".

Commands:
  ○ **touch script.sh**: To create a bash script.
  ○ **vi script.sh:** To edit bash script.
  ○ **cat script.sh:** To print the script code.
  ○ **bash script.sh:** To run the script**.**

Examples:

❖ Greetings bash script:

#! /bin/bash

echo "Good Morning team"

sleep 2

echo "How are you?"

sleep3

echo "Hope you guys are doing good"

```
sri@sri-VirtualBox:~$ vi script.sh
sri@sri-VirtualBox:~$ cat script.sh
#! /bin/bash
echo "Good Morning team"
sleep 2
echo "How are you?"
sleep 3
echo "Hope you guys are doing good"

sri@sri-VirtualBox:~$ bash script.sh
Good Morning team
How are you?
Hope you guys are doing good
```

❖ Script to print User login information

#! /bin/bash

user=$(whoami)

date=$(date)

whereami=$(pwd)

echo "you are currently logged in as $user

and you are in $whereami directory.Today

is: $date"

```
sri@sri-VirtualBox:~$ vi moveFileCOntent.sh
sri@sri-VirtualBox:~$ cat moveFileCOntent.sh
#! /bin/bash
oldfile=$1
newfile=$2
mv $oldfile $newfile
echo "The file content of $oldfile is moved to $newfile"
sri@sri-VirtualBox:~$ bash moveFileCOntent.sh file2.txt file3.txt
The file content of file2.txt is moved to file3.txt
sri@sri-VirtualBox:~$ cat file3.txt
hi,this is file1.
1
2
3
4
```

❖ Move File Content using bash Script

```
#! /bin/bash
oldfile=$1
newfile=$2
mv $oldfile $newfile
echo "The file content of $oldfile is moved to
$newfile"
```

```
sri@sri-VirtualBox:~$ vi variable.sh
sri@sri-VirtualBox:~$ vi predefined.sh
sri@sri-VirtualBox:~$ cat predefined.sh
#! /ban/bash
user=$(whoami)
date=$(date)
whereami=$(pwd)
echo "you are currently logged in as $user and you are in $whereami directory.To
day is :$date"
sri@sri-VirtualBox:~$ bash predefined.sh
you are currently logged in as sri and you are in /home/sri directory.Today is :
Friday 14 March 2025 11:25:48 AM IST
```

❖ Remove files using bash script

```
#! /bin/bash
echo "Enter file to be removed."
read File
rm $File
echo "$File is removed"
```

```
sri@sri-VirtualBox:~$ vi removeFiles.sh
sri@sri-VirtualBox:~$ cat removeFiles.sh
#! /bin/bash
echo "Enter file to be removed"
read File
rm $File
echo "$File is removed"
sri@sri-VirtualBox:~$ bash removeFiles.sh
Enter file to be removed
file3.txt
rm: remove write-protected regular file 'file3.txt'? yes
file3.txt is removed
sri@sri-VirtualBox:~$ ls
argsnparams.sh  Documents         newfile1.txt   removeFiles.sh  variable.sh
askinput.sh     Downloads         Pictures       script.sh       Videos
Desktop         moveFileCOntent.sh predefined.sh  snap
dir1            Music             Public         Templates
```