

# **Linux Systems**

## **Introduction to Linux:**

## **Basics of Linux:**

## **Contents:**

1. Introduction to Linux
2. Basic CLI Commands
3. Understanding files in Linux
4. Filters & Redirection
5. Users & Groups
6. Sudo
7. Software Management
8. Services & Processes
9. Good to Know Commands for Devops
10. Server Management

There are Basically four areas to work on Linux

01. Commands – Syntax, helps & lots of commands
02. Files – Understanding, Editing, Filtering & Security
03. Software – Management
04. Server – Management

## **Open Source:**

Open-Source Software is the Software with source code that anyone can inspect, modify and enhance.

## **Linux Origins**

- **1984: The GNU Projects and the Free Software Foundations**
  - Creates open-source versions of Unix Utilities
  - Creates the General Public License
    - a. Software License enforcing open-source principles
- **1991: Linus Torvalds**
  - Creates an open-source UNIX – Like Kernel, released under the GPL
  - Ports some GNU utilities, Solicits assistance online

## **Today:**

- Linux Kernel + GNU Utilities = Complete, Open-Source Unix Like OS
- Packaged for target audiences for Distribution

## **Linux Principles**

- Everything is a File (Including Hardware)
- Small Single Purpose Programs
- Ability of Change the Programs for Complex Operations
- Avoid Captive User Interface
- Configuration data stored in text file

## **Why Linux?**

- It is an open source
- Community Support
- Support Wide Variety of Hardware
- Customization
- Most of Servers run on Linux
- Automation
- Security

# Architecture of Linux

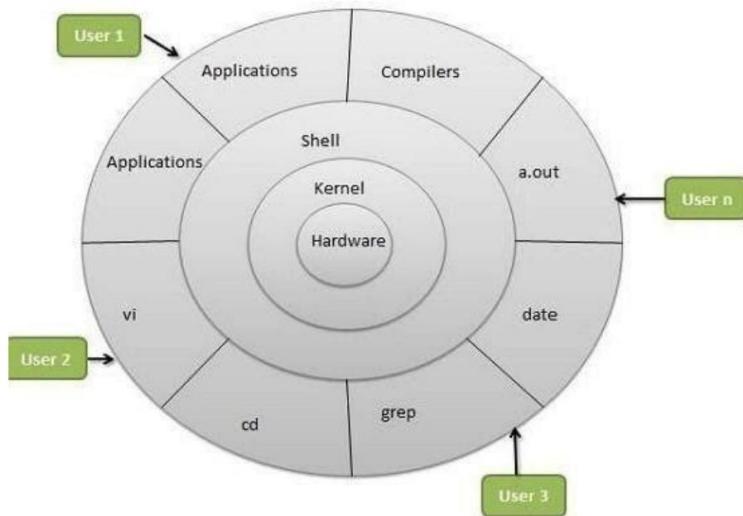


Fig. Linux Architecture

## Popular Linux Distros

- **Popular Desktop Linux OS**

- Ubuntu Linux
- Linux Mint
- Arch Linux
- Fedora
- Debian
- OpenSUSE

- **Popular Server Linux OS**

- Red Hat Enterprise Linux
- Ubuntu Server
- CentOS
- SUSE Enterprise Linux

## **Most used Linux distros currently in IT Industry**

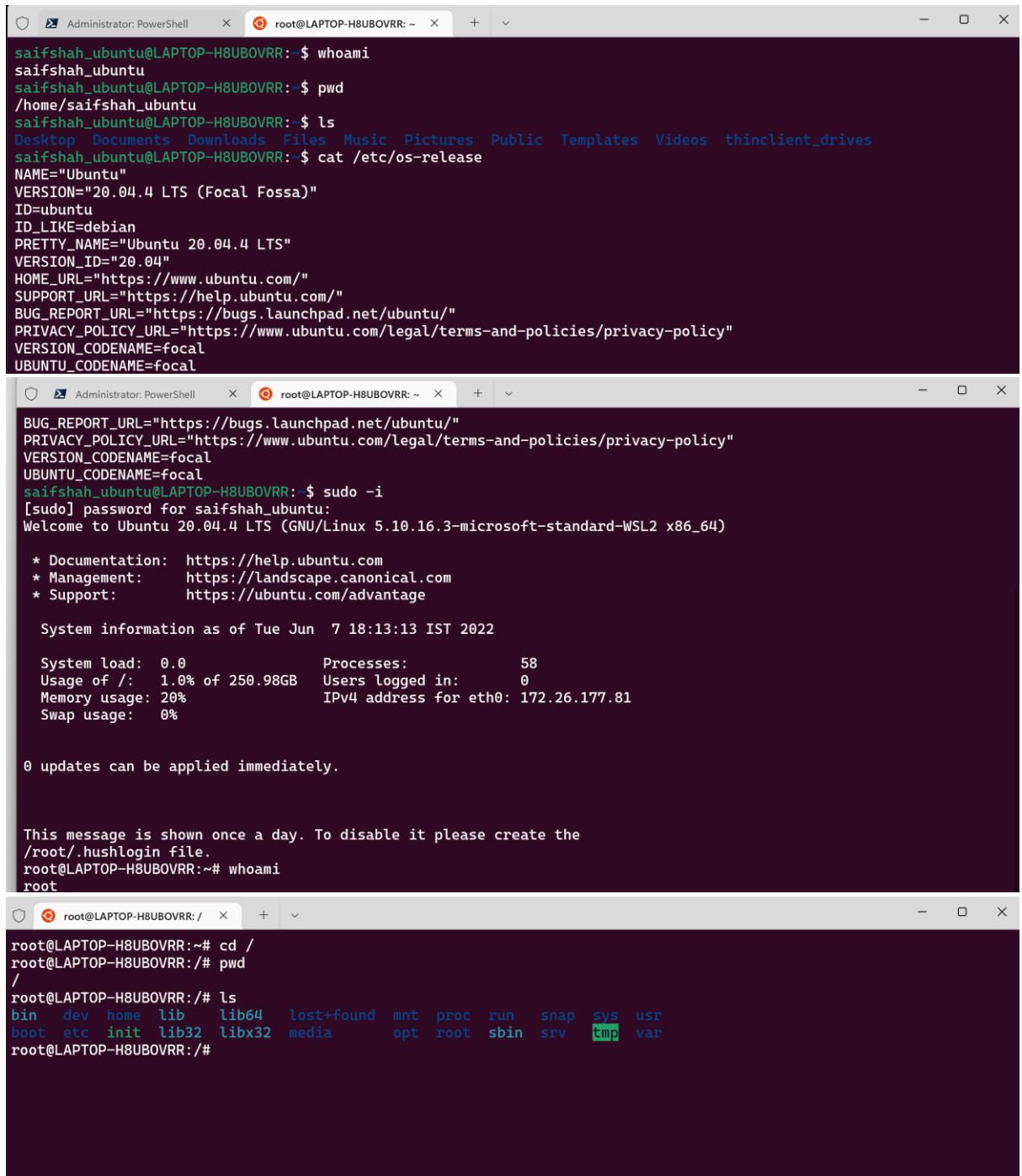
**RPM Based: RHEL, Oracle Linux & Centos**

**Debian Based: Ubuntu Server, Kali Server**

## **Some Important Directories**

- **Home Directories:** /root, /home/username
- **User Executables:** /bin, /usr/bin, /usr/local/bin
- **System Executables:** /sbin, /usr/sbin, /usr/local/sbin
- **Other Mountpoint:** /media, /mnt
- **Configuration:** /etc
- **Temporary Files:** /tmp
- **Kernels & Bootloaders:** /boot
- **Server Data:** /var, /srv
- **System Information:** /proc, /sys
- **Shared Libraries:** /lib, /usr/lib, /usr/local/lib

# Command and File Systems



```
Administrator: PowerShell  x  root@LAPTOP-H8UBOVRR: ~  x  +  v
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ whoami
saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ pwd
/home/saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ ls
Desktop  Documents  Downloads  Files  Music  Pictures  Public  Templates  Videos  thinclient_drives
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ cat /etc/os-release
NAME="Ubuntu"
VERSION="20.04.4 LTS (Focal Fossa)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 20.04.4 LTS"
VERSION_ID="20.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
VERSION_CODENAME=focal
UBUNTU_CODENAME=focal

Administrator: PowerShell  x  root@LAPTOP-H8UBOVRR: ~  x  +  v
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
VERSION_CODENAME=focal
UBUNTU_CODENAME=focal
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ sudo -i
[sudo] password for saifshah_ubuntu:
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

 System information as of Tue Jun  7 18:13:13 IST 2022

 System load:  0.0          Processes:           58
 Usage of /:   1.0% of 250.98GB  Users logged in:  0
 Memory usage: 20%          IPV4 address for eth0: 172.26.177.81
 Swap usage:   0%

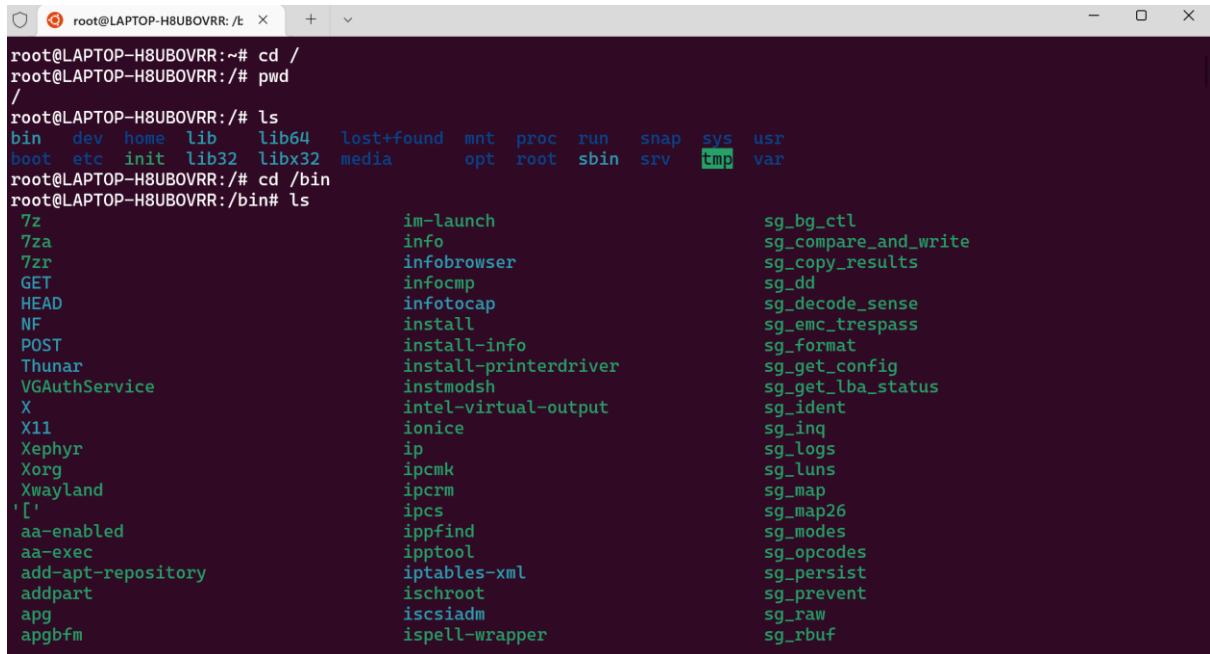
 0 updates can be applied immediately.

 This message is shown once a day. To disable it please create the
 /root/.hushlogin file.
root@LAPTOP-H8UBOVRR:~# whoami
root

Administrator: PowerShell  x  root@LAPTOP-H8UBOVRR: /  x  +  v
root@LAPTOP-H8UBOVRR:~# cd /
root@LAPTOP-H8UBOVRR:/# pwd
/
root@LAPTOP-H8UBOVRR:/# ls
bin  dev  home  lib  lib64  lost+found  mnt  proc  run  snap  sys  usr
boot  etc  init  lib32  libx32  media      opt  root  sbin  srv  tmp  var
root@LAPTOP-H8UBOVRR:/#
```

Fig. Basics Commands

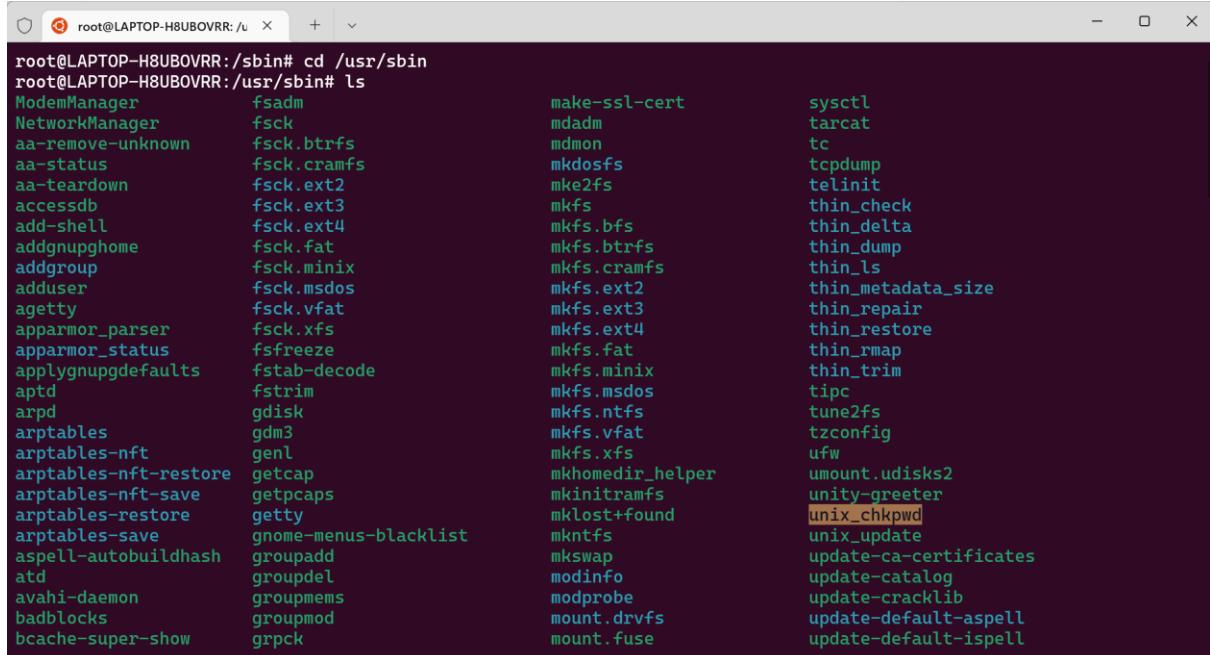
## User Executables: /bin, /usr/bin, /usr/local/bin



```
root@LAPTOP-H8UBOVRR:~# cd /
root@LAPTOP-H8UBOVRR:/# pwd
/
root@LAPTOP-H8UBOVRR:/# ls
bin  dev  home  lib  lib64  lost+found  mnt  proc  run  snap  sys  usr
boot  etc  init  lib32  libx32  media      opt  root  sbin  srv  tmp  var
root@LAPTOP-H8UBOVRR:/# cd /bin
root@LAPTOP-H8UBOVRR:/bin# ls
7z          im-launch          sg_bg_ctl
7za         info              sg_compare_and_write
7zr         infobrowser       sg_copy_results
GET         infocmp           sg_dd
HEAD        infotocap         sg_decode_sense
NF          install           sg_emc_trespass
POST        install-info       sg_format
Thunar      install-printerdriver
VGAuthService  instmodsh       sg_get_config
X           intel-virtual-output
X11         ionice            sg_get_lba_status
Xephyr      ip                sg_ident
Xorg        ipcmk            sg_inq
Xwayland    ipcrm            sg_logs
['          ipcs              sg_luns
aa-enabled  ippfind          sg_map
aa-exec     ippool            sg_map26
add-apt-repository  iptables-xml
addpart     ischroot          sg_modes
apg         iscsiadm         sg_opcodes
apgbfm     ispell-wrapper    sg_persist
               sg_raw
               sg_rbuf
```

Fig. User Executables

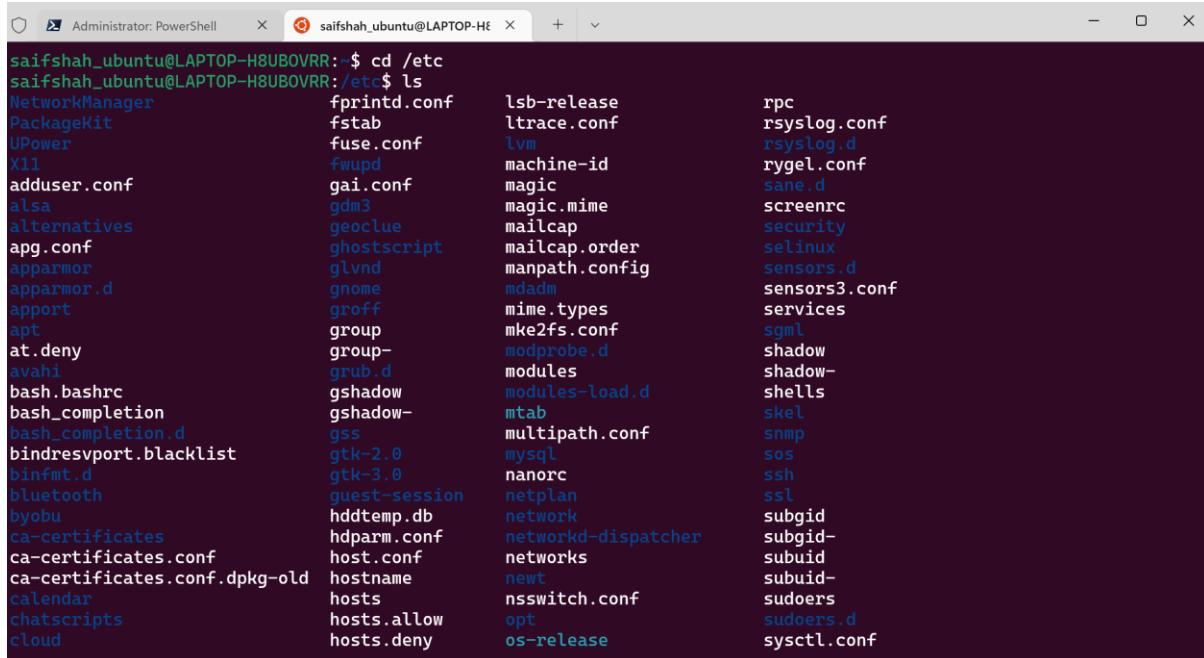
## System Executables: /sbin, /usr/sbin, /usr/local/sbin



```
root@LAPTOP-H8UBOVRR:/sbin# cd /usr/sbin
root@LAPTOP-H8UBOVRR:/usr/sbin# ls
ModemManager  fsadm          make-ssl-cert      sysctl
NetworkManager fsck           mdadm           tarcat
aa-remove-unknown fsck.btrfs   mdmon           tc
aa-status       fsck.cramfs   mkdosfs         tcpdump
aa-teardown    fsck.ext2     mke2fs          telinit
accessdb       fsck.ext3     mkfs             thin_check
add-shell      fsck.ext4     mkfs.bfs        thin_delta
addgnupghome   fsck.fat      mkfs.btrfs       thin_dump
addgroup       fsck.minix    mkfs.cramfs      thin_ls
adduser        fsck.msdos    mkfs.ext2        thin_metadata_size
agetty         fsck.vfat     mkfs.ext3        thin_repair
apparmor_parser fsck.xfs     mkfs.ext4        thin_restore
apparmor_status fsfreeze      mkfs.fat         thin_rmap
appLygnupgdefaults fstab-decode  mkfs.minix      thin_trim
aptd          fstrim        mkfs.msdos       tipc
arpd          gdisk         mkfs.ntfs        tune2fs
arpTables      gdm3          mkfs.vfat        tzconfig
arpTables-nft  genl          mkfs.xfs         ufw
arpTables-nft-restore getcap        mkhomedir_helper umount.udisks2
arpTables-nft-save  getpcaps     mkinitramfs   unity-greeter
arpTables-restore getty        mklost+found   unix_chkpwd
arpTables-save   gnome-menus-blacklist  mkntfs        unix_update
aspell-autobuildhash groupadd     mkswap         update-ca-certificates
atd           groupdel      modinfo         update-catalog
avahi-daemon   groupmems    modprobe        update-cracklib
badblocks     groupmod      mount.drvfs     update-default-aspell
bcache-super-show grpck        mount.fuse     update-default-ispell
```

Fig. System Executables

## Configuration: /etc



```
saifshah_ubuntu@LAPTOP-H8UBOVRR: $ cd /etc
saifshah_ubuntu@LAPTOP-H8UBOVRR:/etc$ ls
NetworkManager          fprintd.conf      lsb-release      rpc
PackageKit               fstab            ltrace.conf      rsyslog.conf
UPower                  fuse.conf        lvm             rsyslog.d
X11                     fwupd            machine-id      rygel.conf
adduser.conf             gai.conf          magic           sane.d
alsa                    gdm3             geoclue         screenrc
alternatives            ghostscript      mailcap         security
apg.conf                ghostscript      mailcap.order   selinux
apparmor                glvnd            gnome          sensors.d
apparmor.d              gnome            groff          sensors3.conf
apt                     group            group-         services
at.deny                 group-           grub.d         sgml
avahi                  gshadow          guest-session  shadow
bash.bashrc              gshadow-         gtk-2.0        shadow-
bash_completion          gss              gtk-3.0        shells
bash_completion.d       gss              guest-session  skel
bindresvport.blacklist  gtk-2.0         host.conf      snmp
binfmt.d                gtk-3.0         hostname      sos
bluetooth               host.conf        hosts          ssh
byobu                   hosts            hosts.allow    ssl
ca-certificates          hosts            hosts.deny    subgid
ca-certificates.conf    hosts            hosts.deny    subgid-
ca-certificates.conf.dpkg-old  hosts            hosts.deny    subuid
calendar               hosts            hosts.allow   subuid-
chatscripts            hosts            hosts.deny    sudoers
cloud                  hosts            hosts.deny    sudoers.d
cloud                  hosts            hosts.deny    sysctl.conf
```

Fig. Configuration

```
saifshah_ubuntu@LAPTOP-H8UBOVRR:/etc$ cat
/etc/hostname
```

LAPTOP-H8UBOVRR

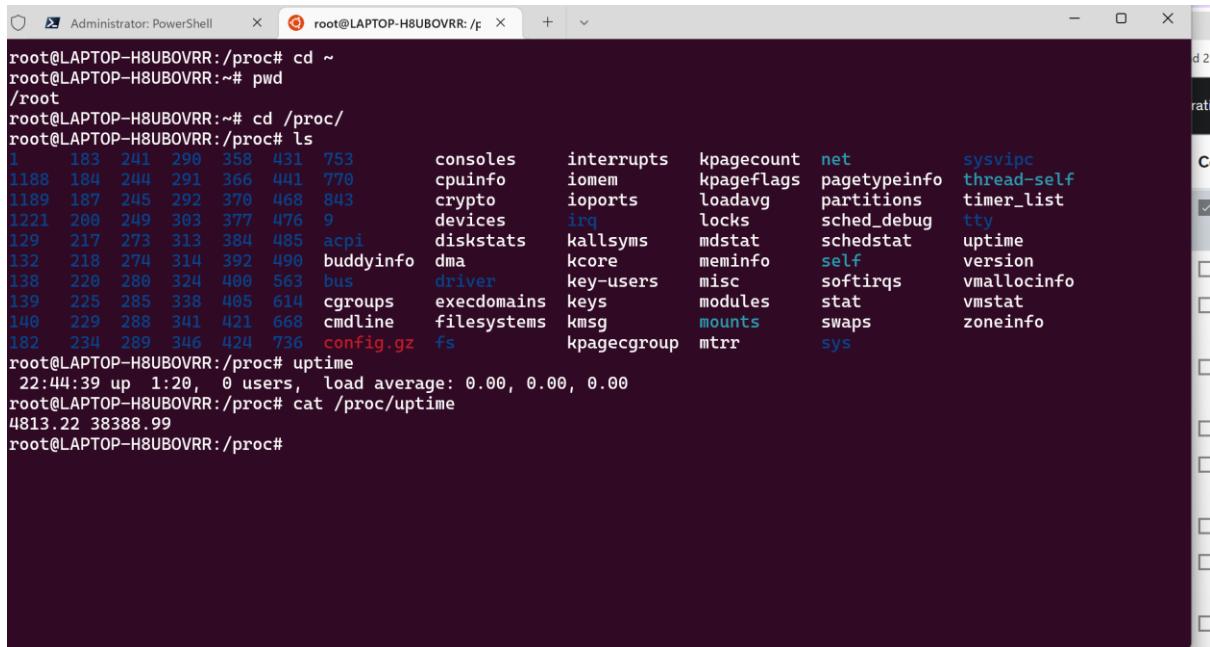
```
saifshah_ubuntu@LAPTOP-H8UBOVRR:/etc$ cd /tmp/
```

```
saifshah_ubuntu@LAPTOP-H8UBOVRR:/tmp$ ls
```

```
Temp-3e9ab343-1b3f-424b-b596-b9d0836a4786 ssh-
MLfaB9Iwy4kU ssh-Z7gY3c6CDnF7 ssh-r7C8ZJ5nt4HI
tmpoinmphoxpulse-PKdhtXMmr18n                 ssh-
Sr0LS7ijgWCQ ssh-fOExaGFZ42WE ssh-sW3dYgBkFVID
```

```
ssh-LTAzDJ4CwiiM          ssh-WULG7NyGwSQe ssh-
iShxOmGJWvkV tmpaddon
```

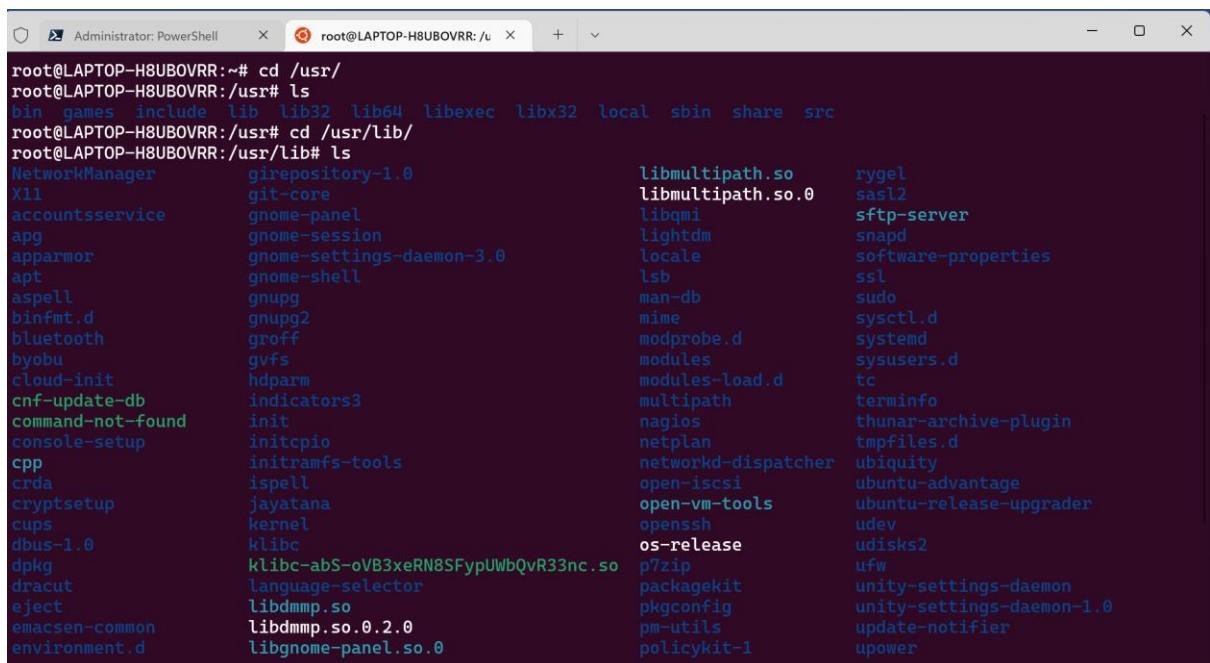
## System Information: /proc, /sys



```
Administrator: PowerShell root@LAPTOP-H8UBOVRR:~# cd ~
root@LAPTOP-H8UBOVRR:~# pwd
/root
root@LAPTOP-H8UBOVRR:~# cd /proc/
root@LAPTOP-H8UBOVRR:/proc# ls
1 183 241 290 358 431 753      consoles  interrupts  kpagecount  net      sysvipc
1188 184 244 291 366 441 770      cpuinfo   iomem      kpageflags pagetypeinfo  thread-self
1189 187 245 292 370 468 843      crypto    ioports   loadavg    partitions  timer_list
1221 200 249 303 377 476 9       devices   irq      locks      sched_debug  tty
129 217 273 313 384 485 acpi    diskstats kallsyms  mdstat    schedstat  uptime
132 218 274 314 392 490 buddyinfo dma      kcore     meminfo   self      version
138 220 280 324 400 563 bus     driver    key-users misc     modules   stat      vmallocinfo
139 225 285 338 405 614 cgroups  execdomains keys    mounts   swaps     sys      zoneinfo
140 229 288 341 421 668 cmdline   filesystems kmsg    mtrr      sys
182 234 289 346 424 736 config.gz fs      kpagecgroup
root@LAPTOP-H8UBOVRR:/proc# uptime
22:44:39 up 1:20, 0 users, load average: 0.00, 0.00, 0.00
root@LAPTOP-H8UBOVRR:/proc# cat /proc/uptime
4813.22 38388.99
root@LAPTOP-H8UBOVRR:/proc#
```

Fig. System Information

## Shared Libraries: /lib, /usr/lib, /usr/local/lib

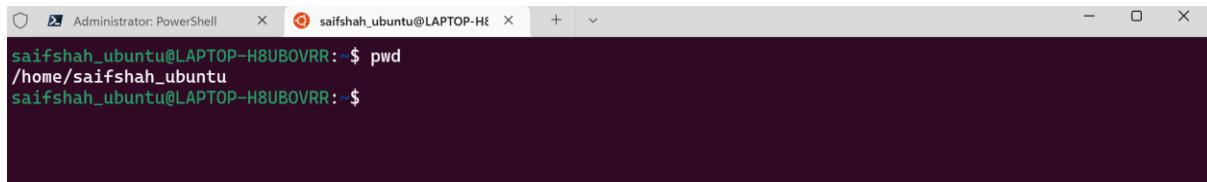


```
Administrator: PowerShell root@LAPTOP-H8UBOVRR:~# cd /usr/
root@LAPTOP-H8UBOVRR:/usr# ls
bin games include lib lib32 lib64 libexec libx32 local sbin share src
root@LAPTOP-H8UBOVRR:/usr# cd /usr/lib/
root@LAPTOP-H8UBOVRR:/usr/lib# ls
NetworkManager      girepository-1.0          libmultipath.so      rygel
X11                 git-core                  libmultipath.so.0    sasl2
accountsservice     gnome-panel             libqmi                sftp-server
apg                 gnome-session           lightdm              snapd
apparmor            gnome-settings-daemon-3.0  locale               software-properties
apt                 gnome-shell              lsb                  ssl
aspell              gnupg                  mime                sudo
binfmt.d            gnupg2                 modprobe.d          sysctl.d
bluetooth           groff                  modules              systemd
byobu               gvfs                  modules-load.d      sysusers.d
cloud-init          hdparm                 multipath           tc
cnf-update-db       indicators3           nagios              terminfo
command-not-found  init                  netplan              thunar-archive-plugin
console-setup       initcpio              networkd-dispatcher ubiquity
cpp                 initramfs-tools        open-iscsi           ubuntu-adantage
crda               ispell                 open-vm-tools       ubuntu-release-upgrader
cryptsetup          jayatana              openssh              udev
cups                kernel                os-release          udisks2
dbus-1.0            klibc                 p7zip               ufw
dpkg                klibc-abS-oVB3xeRN8SFypUWbQvR33nc.so  packagekit         unity-settings-daemon
dracut              language-selector      pkgconfig           unity-settings-daemon-1.0
eject               libdmmmp.so          pm-utils            update-notifier
emacsclient-common libdmmmp.so.0.2.0      policykit-1        upower
```

Fig. Shared Libraries

## Basic Commands:

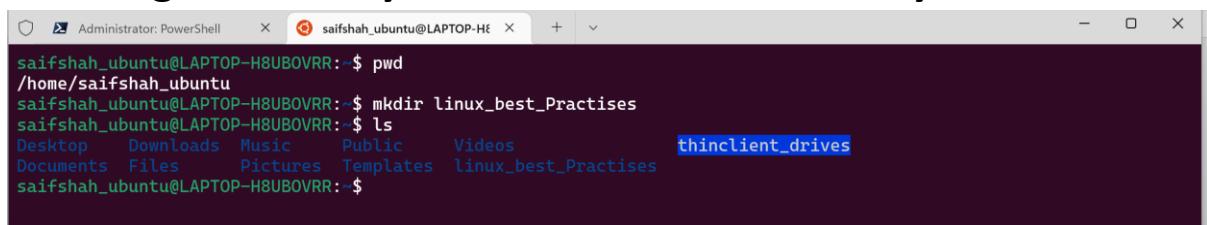
- Know where you are? Present Working Directory



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ pwd
/home/saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

Fig. present working directory

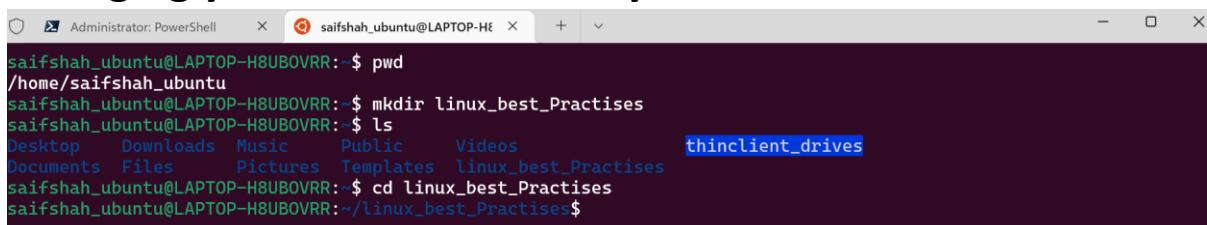
- Creating a directory Folders in Home Directory



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ pwd
/home/saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ mkdir linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ ls
Desktop  Downloads  Music  Public  Videos      thinclient_drives
Documents  Files  Pictures  Templates  linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

Fig. directory creation

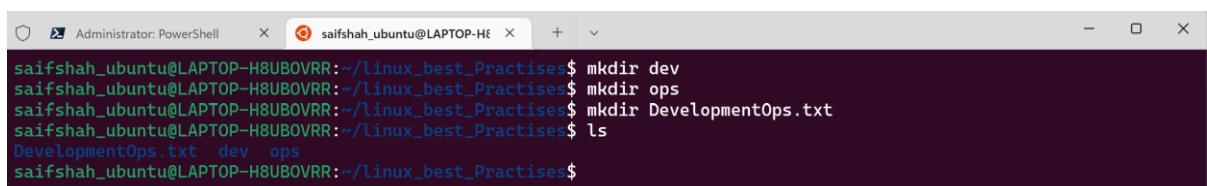
- Changing your Current directory to Linux Best Practises



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ pwd
/home/saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ mkdir linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ ls
Desktop  Downloads  Music  Public  Videos      thinclient_drives
Documents  Files  Pictures  Templates  linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ cd linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$
```

Fig. current directory to linux best practises

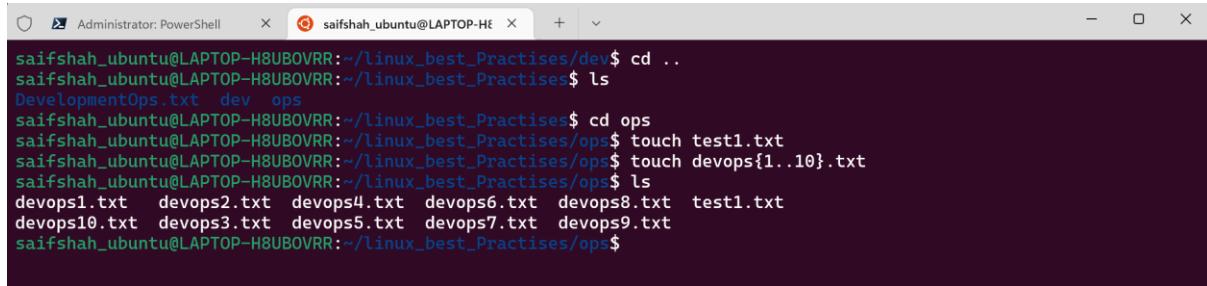
- Create some more directories and list them with “ls” command



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ mkdir dev
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ mkdir ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ mkdir DevelopmentOps.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
DevelopmentOps.txt  dev  ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$
```

Fig. Creating directory and listing with commands

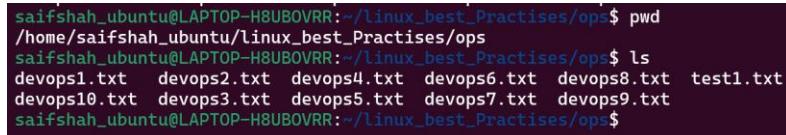
- Create some empty files with “touch” command and list them



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cd ..
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls
DevelopmentOps.txt dev ops
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ cd ops
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$ touch test1.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$ touch devops{1..10}.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$ ls
devops1.txt devops2.txt devops4.txt devops6.txt devops8.txt test1.txt
devops10.txt devops3.txt devops5.txt devops7.txt devops9.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$
```

Fig. Creating some empty files with “touch” command

- Reconfirm your location in your system



```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$ pwd
/home/saifshah_ubuntu/linux_best_Practises/ops
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$ ls
devops1.txt devops2.txt devops4.txt devops6.txt devops8.txt test1.txt
devops10.txt devops3.txt devops5.txt devops7.txt devops9.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/ops$
```

Fig. reconfirm your location in your system

## Absolute path and Relative path

### What is a path?

A path is a unique location to a file or a folder in a file system of an OS. A path to a file is a combination of / and alpha-numeric characters.

### What is an absolute path?

An absolute path is defined as the specifying the location of a file or directory from the root directory(/). In other words we can say absolute path is a complete path from start of actual filesystem from / directory. Some examples of absolute path

**Some examples of absolute path:**

**/var/ftp/pub**

**/etc/samba.smb.conf**

**/boot/grub/grub.conf**

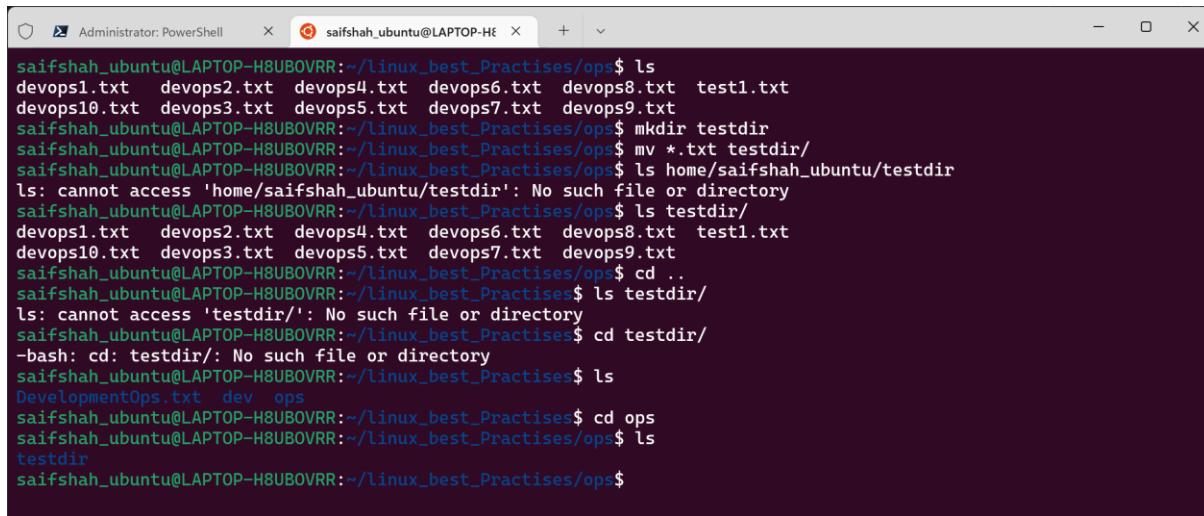
**If you see all these paths started from / directory which is a root directory for every Linux/Unix machines**

**What is the relative path?**

**Relative path is defined as path related to the present working directory(pwd). Suppose I am located in /home/saif\_shah and I want to change directory to /home/saif\_shah /linux-practices. I can use relative path concept to change directory to linux-practices and also ops directory.**

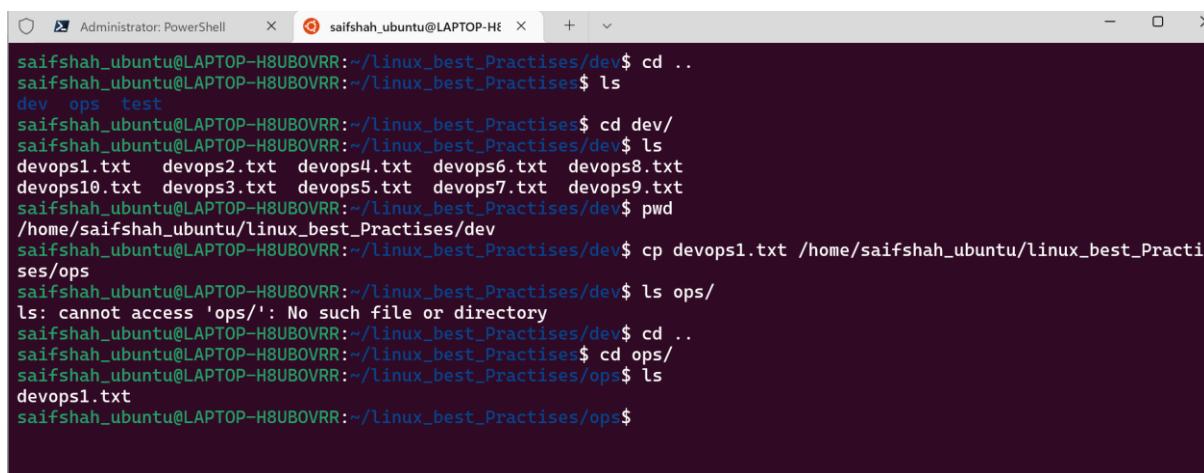
```
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ pwd
/home/saifshah_ubuntu
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ ls
Desktop  Downloads  Music  Public  Videos          thinclient_drives
Documents  Files  Pictures  Templates  linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ cd linux_best_Practises/
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
DevelopmentOps.txt  dev  ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ pwd
/home/saifshah_ubuntu/linux_best_Practises
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ cd ops/
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls
devops1.txt  devops2.txt  devops4.txt  devops6.txt  devops8.txt  test1.txt
devops10.txt  devops3.txt  devops5.txt  devops7.txt  devops9.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ pwd
/home/saifshah_ubuntu/linux_best_Practises/ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$
```

**Fig. Relative Path Examples**



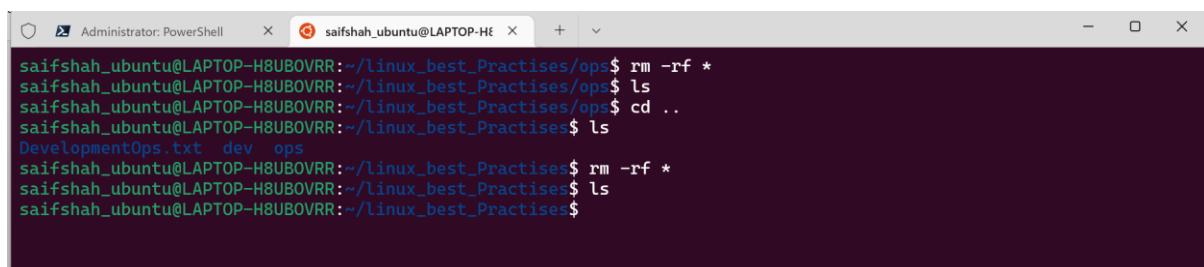
```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls
devops1.txt  devops2.txt  devops4.txt  devops6.txt  devops8.txt  test1.txt
devops10.txt  devops3.txt  devops5.txt  devops7.txt  devops9.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ mkdir testdir
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ mv *.txt testdir/
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls home/saifshah_ubuntu/testdir
ls: cannot access 'home/saifshah_ubuntu/testdir': No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls testdir/
devops1.txt  devops2.txt  devops4.txt  devops6.txt  devops8.txt  test1.txt
devops10.txt  devops3.txt  devops5.txt  devops7.txt  devops9.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ cd ..
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls testdir/
ls: cannot access 'testdir/': No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ cd testdir/
-bash: cd: testdir/: No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
DevelopmentOps.txt  dev  ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ cd ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls
testdir
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$
```

Fig. Moving files into another directory



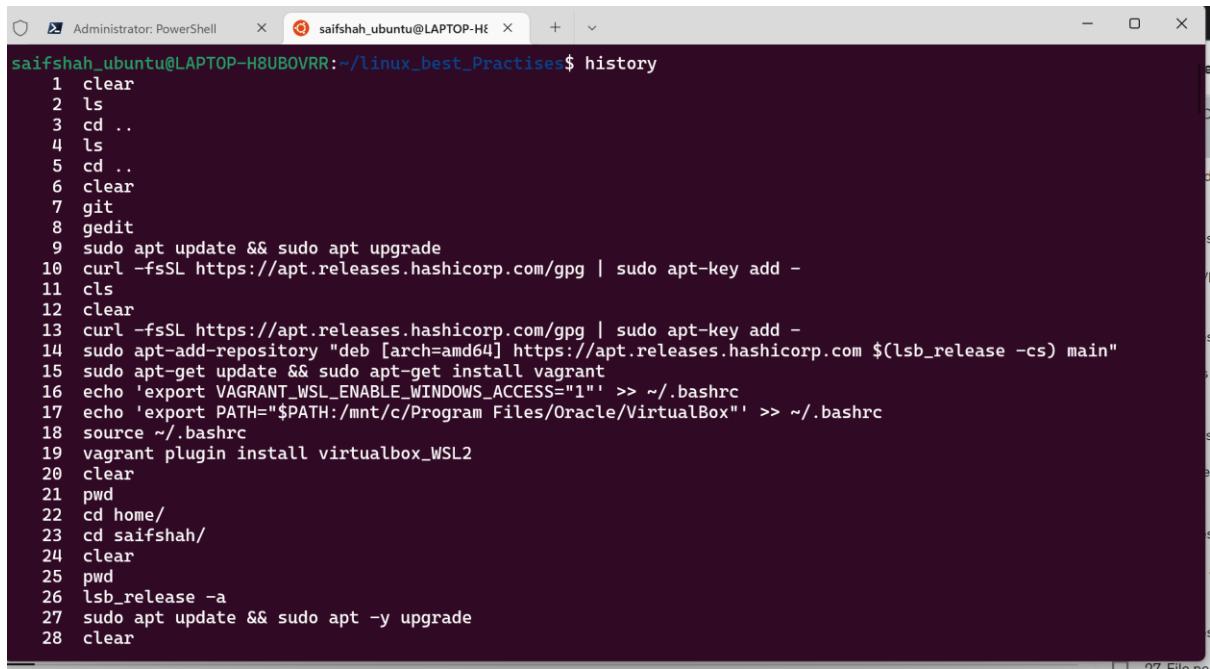
```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ cd ..
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
dev  ops  test
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ cd dev/
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ ls
devops1.txt  devops2.txt  devops4.txt  devops6.txt  devops8.txt
devops10.txt  devops3.txt  devops5.txt  devops7.txt  devops9.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ pwd
/home/saifshah_ubuntu/linux_best_Practises/dev
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ cp devops1.txt /home/saifshah_ubuntu/linux_best_Practises/ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ ls ops/
ls: cannot access 'ops/': No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ cd ..
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ cd ops/
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls
devops1.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$
```

Fig. Copying the Files from one directory to another



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ rm -rf *
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ ls
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/ops$ cd ..
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
DevelopmentOps.txt  dev  ops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ rm -rf *
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ ls
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$
```

Fig. Removing Everything from Files



```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ history
1 clear
2 ls
3 cd ..
4 ls
5 cd ..
6 clear
7 git
8 gedit
9 sudo apt update && sudo apt upgrade
10 curl -fsSL https://apt.releases.hashicorp.com/gpg | sudo apt-key add -
11 cls
12 clear
13 curl -fsSL https://apt.releases.hashicorp.com/gpg | sudo apt-key add -
14 sudo apt-add-repository "deb [arch=amd64] https://apt.releases.hashicorp.com $(lsb_release -cs) main"
15 sudo apt-get update && sudo apt-get install vagrant
16 echo 'export VAGRANT_WSL_ENABLE_WINDOWS_ACCESS="1"' >> ~/.bashrc
17 echo 'export PATH="$PATH:/mnt/c/Program Files/Oracle/VirtualBox"' >> ~/.bashrc
18 source ~/.bashrc
19 vagrant plugin install virtualbox_WSL2
20 clear
21 pwd
22 cd home/
23 cd saifshah/
24 clear
25 pwd
26 lsb_release -a
27 sudo apt update && sudo apt -y upgrade
28 clear
```

Fig. Shows Complete History

## Vim Editor

### VI Visual display editor

### VIM Visual display editor improved

This is command mode editor for files.

Other editors in Linux are emacs, gedit vi editor is most popular

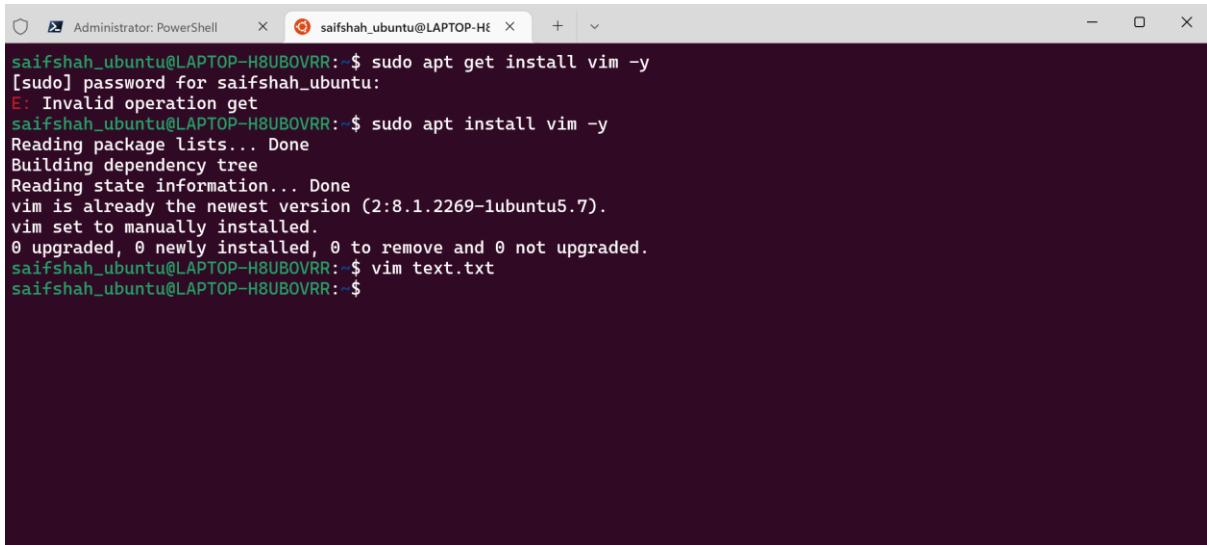
It has 3 modes:

**1 Command Mode**

**2 Insert mode (edit mode)**

**3 extended command mode**

**Note: When you open the vim editor, it will be in the command mode by default**

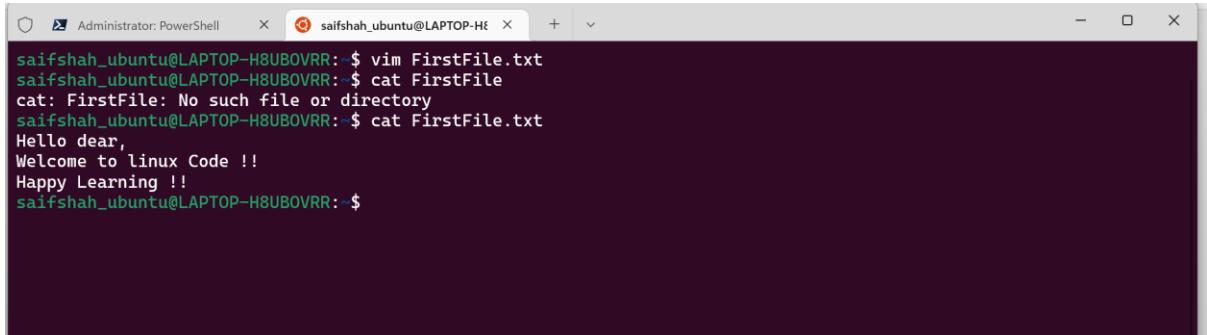


A screenshot of a terminal window titled 'saifshah\_ubuntu@LAPTOP-H8UBOVRR'. The window shows the following command sequence:

```
saifshah_ubuntu@LAPTOP-H8UBOVRR: $ sudo apt get install vim -y
[sudo] password for saifshah_ubuntu:
E: Invalid operation get
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ sudo apt install vim -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
vim is already the newest version (2:8.1.2269-1ubuntu5.7).
vim set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ vim text.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

Fig. Vim Complete Text File Editor Installation

**Creating First File of Linux:**



A screenshot of a terminal window titled 'saifshah\_ubuntu@LAPTOP-H8UBOVRR'. The window shows the following command sequence:

```
saifshah_ubuntu@LAPTOP-H8UBOVRR: $ vim FirstFile.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ cat FirstFile
cat: FirstFile: No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ cat FirstFile.txt
Hello dear,
Welcome to linux Code !!
Happy Learning !!
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

Fig. Successful Created First Linux File

## Creating Lines with: `se nu`

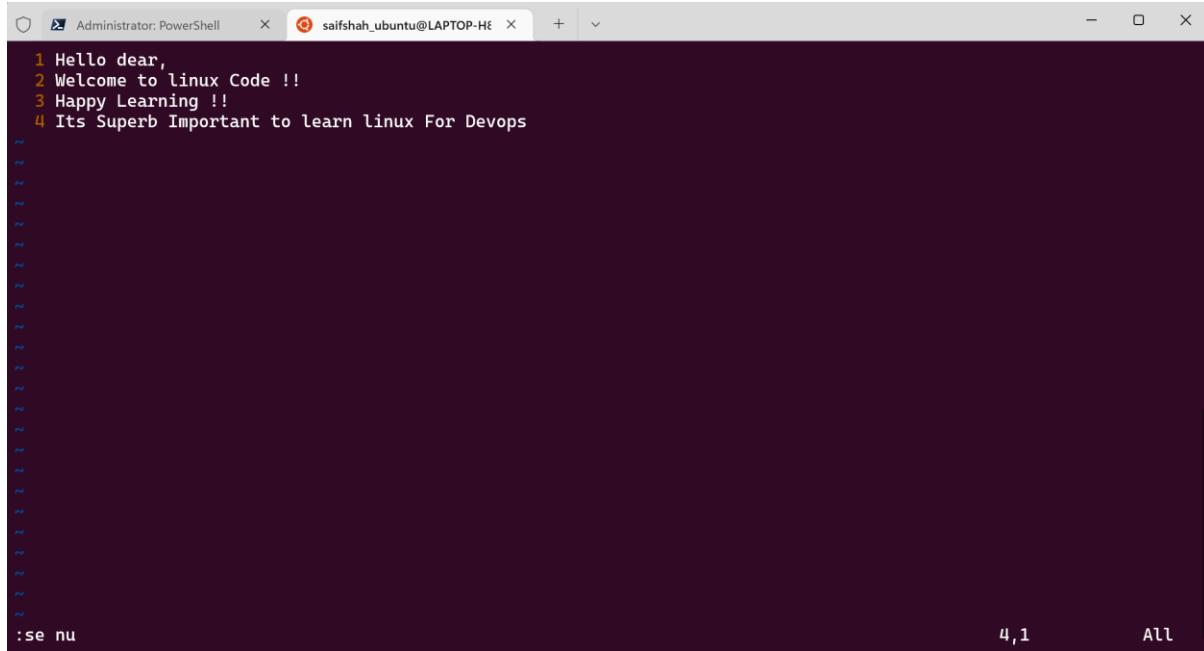
Fig. See all lines in Linux

## Copying Files with: `y`

```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-HE 1 Hello dear,  
2 Welcome to linux Code !!  
3 Happy Learning !!  
4 Happy Learning !!  
5 Its Superb Important to learn linux For Devops  
6 Its Superb Important to learn linux For Devops  
7 Happy Learning !!  
8 Its Superb Important to learn linux For Devops
```

## Fig. Copying Lines (Happy Learning!!)

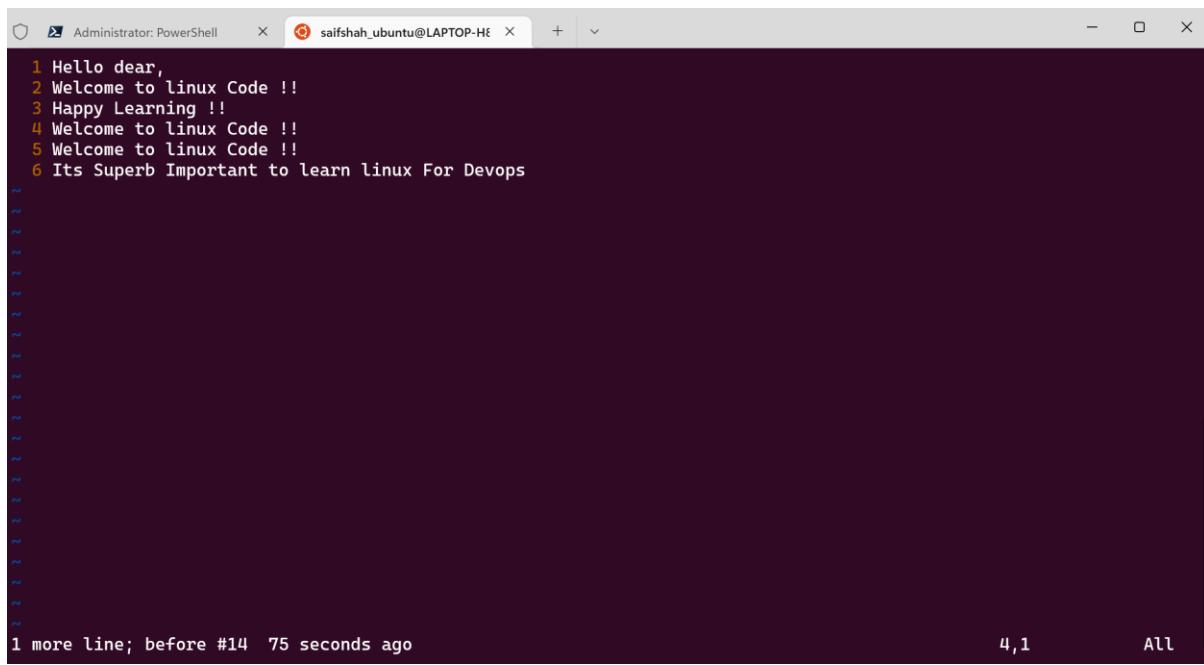
## Deleting lines with: d



A screenshot of a terminal window titled "Administrator: PowerShell". The window shows a list of numbered lines: 1 Hello dear, 2 Welcome to linux Code !! 3 Happy Learning !! 4 Its Superb Important to learn linux For Devops. The user has deleted the third and fourth lines using the command 'd'. The cursor is at the beginning of the fifth line. The status bar at the bottom shows ':se nu' on the left, '4,1' in the center, and 'All' on the right.

Fig. Deleting Files (Happy Learning which is twice)

## Undo Changes with: u



A screenshot of a terminal window titled "Administrator: PowerShell". The window shows a list of numbered lines: 1 Hello dear, 2 Welcome to linux Code !! 3 Happy Learning !! 4 Welcome to linux Code !! 5 Welcome to linux Code !! 6 Its Superb Important to learn linux For Devops. The user has deleted the third and fourth lines using the command 'd'. Then, they used the command 'u' to undo the deletion of the fourth line. The status bar at the bottom shows '1 more line; before #14 75 seconds ago' on the left, '4,1' in the center, and 'All' on the right.

Fig. Undo all Commands

- **Cut Paste: d - Cut p – Paste**

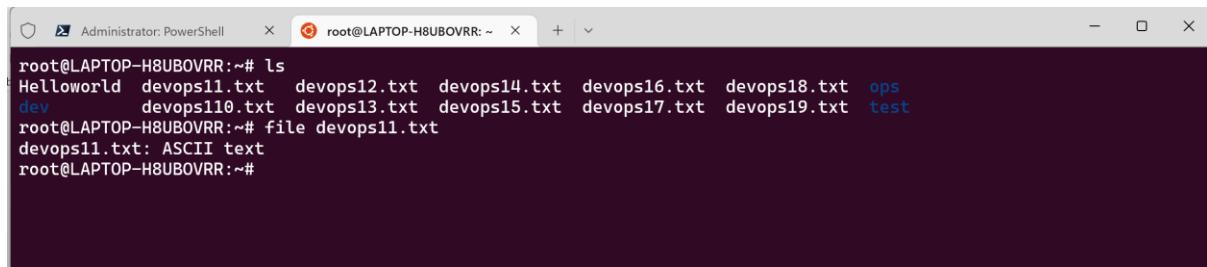
Fig. Cut paste Lines (Welcome to Linux Code)

→ **Searching: /**

Fig. Searching the word (dear) in Lines

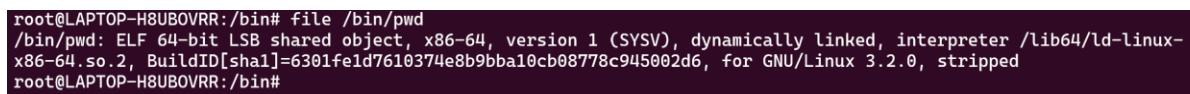
# File System in Linux

File Type	First Character in File Listing	Description
Regular file	-	Normal files such as text, data, or executable files
Directory	d	Files that are lists of other files
Link	l	A shortcut that points to the location of the actual file
Special file	c	Mechanism used for input and output, such as files in /dev
Socket	s	A special file that provides inter-process networking protected by the file system's access control
Pipe	p	A special file that allows processes to communicate with each other without using network socket semantics



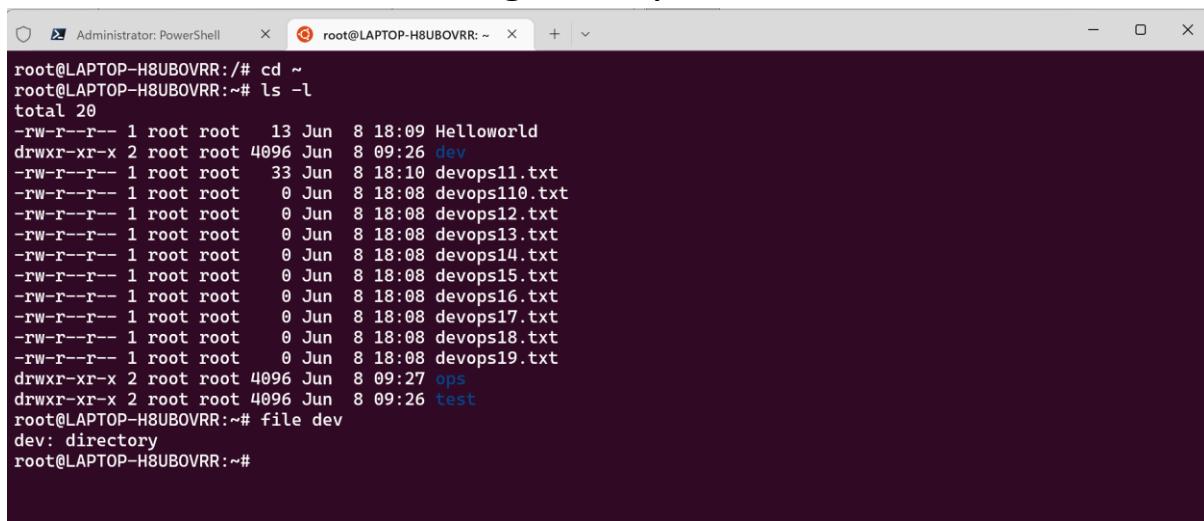
```
root@LAPTOP-H8UBOVRR:~# ls
Helloworld  devops11.txt  devops12.txt  devops14.txt  devops16.txt  devops18.txt  ops
dev          devops110.txt devops13.txt  devops15.txt  devops17.txt  devops19.txt  test
root@LAPTOP-H8UBOVRR:~# file devops11.txt
devops11.txt: ASCII text
root@LAPTOP-H8UBOVRR:~#
```

Fig. regular file



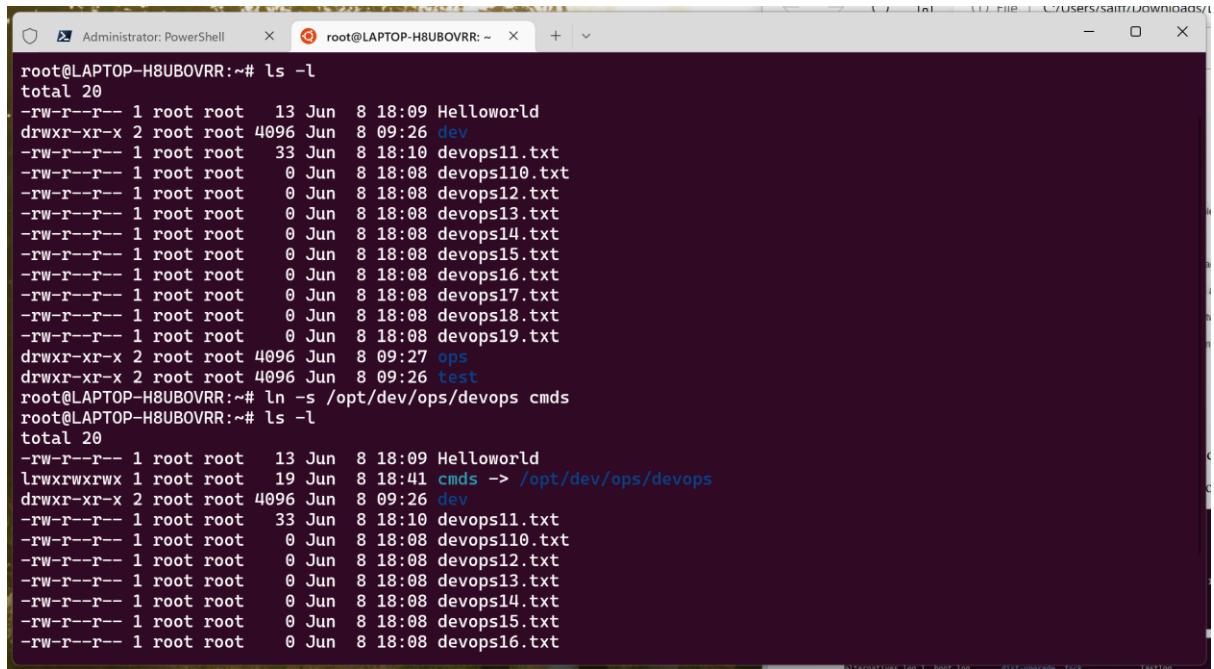
```
root@LAPTOP-H8UBOVRR:/bin# file /bin/pwd
/bin/pwd: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically linked, interpreter /lib64/ld-linux-x86-64.so.2, BuildID[sha1]=6301fe1d7610374e8b9bba10cb08778c945002d6, for GNU/Linux 3.2.0, stripped
root@LAPTOP-H8UBOVRR:/bin#
```

Fig. Binary File



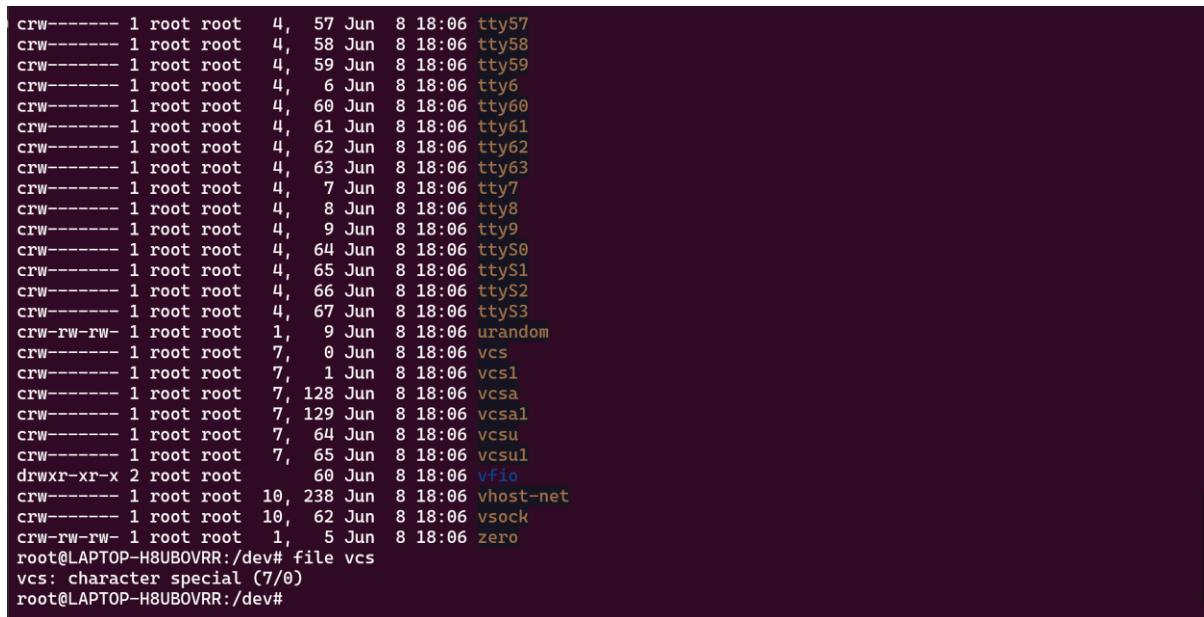
```
root@LAPTOP-H8UBOVRR:~# cd ~
root@LAPTOP-H8UBOVRR:~# ls -l
total 20
-rw-r--r-- 1 root root 13 Jun  8 18:09 Helloworld
drwxr-xr-x 2 root root 4096 Jun  8 09:26 dev
-rw-r--r-- 1 root root  33 Jun  8 18:10 devops11.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops110.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops12.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops13.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops14.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops15.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops16.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops17.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops18.txt
-rw-r--r-- 1 root root  0 Jun  8 18:08 devops19.txt
drwxr-xr-x 2 root root 4096 Jun  8 09:27 ops
drwxr-xr-x 2 root root 4096 Jun  8 09:26 test
root@LAPTOP-H8UBOVRR:~# file dev
dev: directory
root@LAPTOP-H8UBOVRR:~#
```

Fig. Directory File



```
Administrator:PowerShell      root@LAPTOP-H8UBOVRR:~      +  ~
root@LAPTOP-H8UBOVRR:~# ls -l
total 20
-rw-r--r-- 1 root root 13 Jun  8 18:09 Helloworld
drwxr-xr-x 2 root root 4096 Jun  8 09:26 dev
-rw-r--r-- 1 root root 33 Jun  8 18:10 devops11.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops110.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops16.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops17.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops18.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops19.txt
drwxr-xr-x 2 root root 4096 Jun  8 09:27 ops
drwxr-xr-x 2 root root 4096 Jun  8 09:26 test
root@LAPTOP-H8UBOVRR:~# ln -s /opt/dev/ops/devops cmd
root@LAPTOP-H8UBOVRR:~# ls -l
total 20
-rw-r--r-- 1 root root 13 Jun  8 18:09 Helloworld
lrwxrwxrwx 1 root root 19 Jun  8 18:41 cmd -> /opt/dev/ops/devops
drwxr-xr-x 2 root root 4096 Jun  8 09:26 dev
-rw-r--r-- 1 root root 33 Jun  8 18:10 devops11.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops110.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun  8 18:08 devops16.txt
```

Fig. Creates Linking in Files



```
crw----- 1 root root 4, 57 Jun  8 18:06 tty57
crw----- 1 root root 4, 58 Jun  8 18:06 tty58
crw----- 1 root root 4, 59 Jun  8 18:06 tty59
crw----- 1 root root 4, 6 Jun  8 18:06 tty6
crw----- 1 root root 4, 60 Jun  8 18:06 tty60
crw----- 1 root root 4, 61 Jun  8 18:06 tty61
crw----- 1 root root 4, 62 Jun  8 18:06 tty62
crw----- 1 root root 4, 63 Jun  8 18:06 tty63
crw----- 1 root root 4, 7 Jun  8 18:06 tty7
crw----- 1 root root 4, 8 Jun  8 18:06 tty8
crw----- 1 root root 4, 9 Jun  8 18:06 tty9
crw----- 1 root root 4, 64 Jun  8 18:06 ttyS0
crw----- 1 root root 4, 65 Jun  8 18:06 ttyS1
crw----- 1 root root 4, 66 Jun  8 18:06 ttyS2
crw----- 1 root root 4, 67 Jun  8 18:06 ttyS3
crw-rw-rw- 1 root root 1, 9 Jun  8 18:06 urandom
crw----- 1 root root 7, 0 Jun  8 18:06 vcs
crw----- 1 root root 7, 1 Jun  8 18:06 vcs1
crw----- 1 root root 7, 128 Jun  8 18:06 vcsa
crw----- 1 root root 7, 129 Jun  8 18:06 vcsa1
crw----- 1 root root 7, 64 Jun  8 18:06 vcsu
crw----- 1 root root 7, 65 Jun  8 18:06 vcsul
drwxr-xr-x 2 root root 60 Jun  8 18:06 vfio
crw----- 1 root root 10, 238 Jun  8 18:06 vhost-net
crw----- 1 root root 10, 62 Jun  8 18:06 vssock
crw-rw-rw- 1 root root 1, 5 Jun  8 18:06 zero
root@LAPTOP-H8UBOVRR:/dev# file vcs
vcs: character special (7/0)
root@LAPTOP-H8UBOVRR:/dev#
```

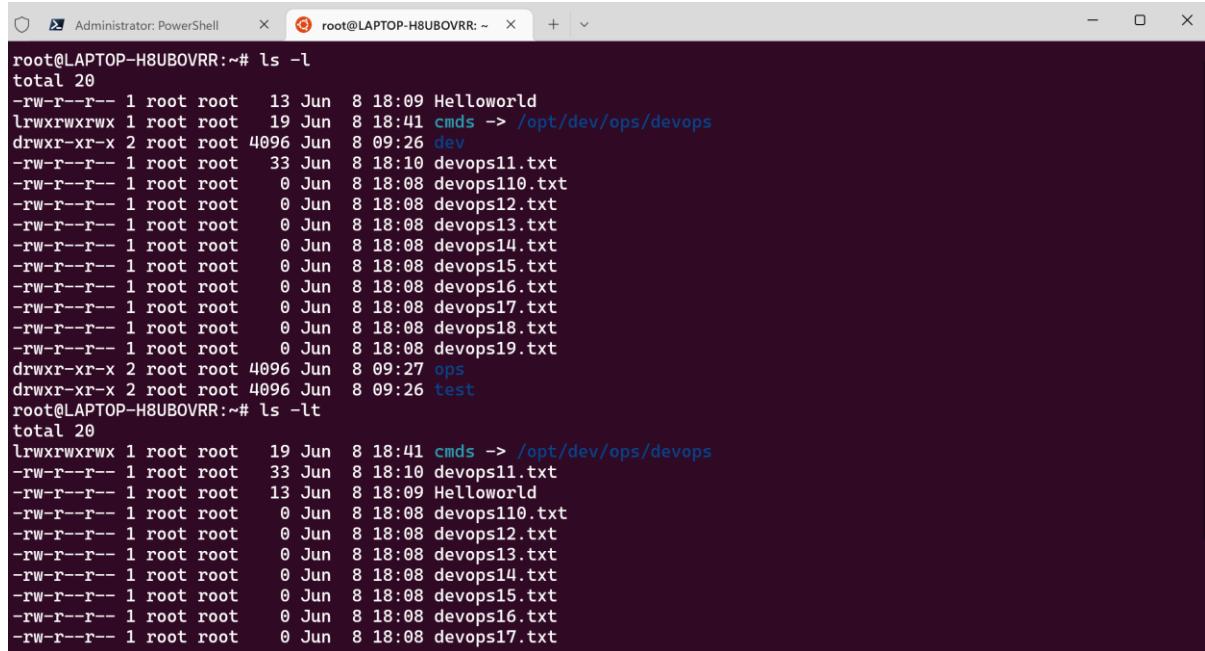
Fig. Character Files in dev directory



```
root@LAPTOP-H8UBOVRR:/dev# file ram9
ram9: block special (1/9)
root@LAPTOP-H8UBOVRR:/dev#
```

Fig. Block Files in dev directory

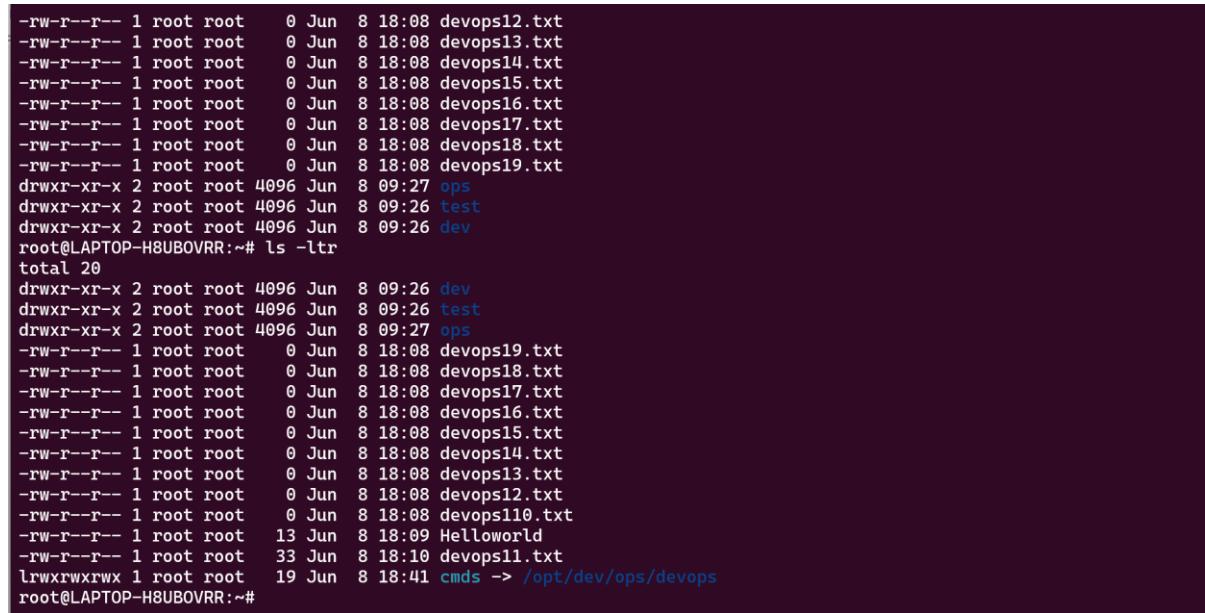
## Time Stamp in File: ls -lt



```
Administrator: PowerShell x root@LAPTOP-H8UBOVRR: ~ + - x
root@LAPTOP-H8UBOVRR:~# ls -l
total 20
-rw-r--r-- 1 root root 13 Jun 8 18:09 Helloworld
lrwxrwxrwx 1 root root 19 Jun 8 18:41 cmd -> /opt/dev/ops/devops
drwxr-xr-x 2 root root 4096 Jun 8 09:26 dev
-rw-r--r-- 1 root root 33 Jun 8 18:10 devops11.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops10.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops16.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops17.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops18.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops19.txt
drwxr-xr-x 2 root root 4096 Jun 8 09:27 ops
drwxr-xr-x 2 root root 4096 Jun 8 09:26 test
root@LAPTOP-H8UBOVRR:~# ls -lt
total 20
lrwxrwxrwx 1 root root 19 Jun 8 18:41 cmd -> /opt/dev/ops/devops
-rw-r--r-- 1 root root 33 Jun 8 18:10 devops11.txt
-rw-r--r-- 1 root root 13 Jun 8 18:09 Helloworld
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops10.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops16.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops17.txt
```

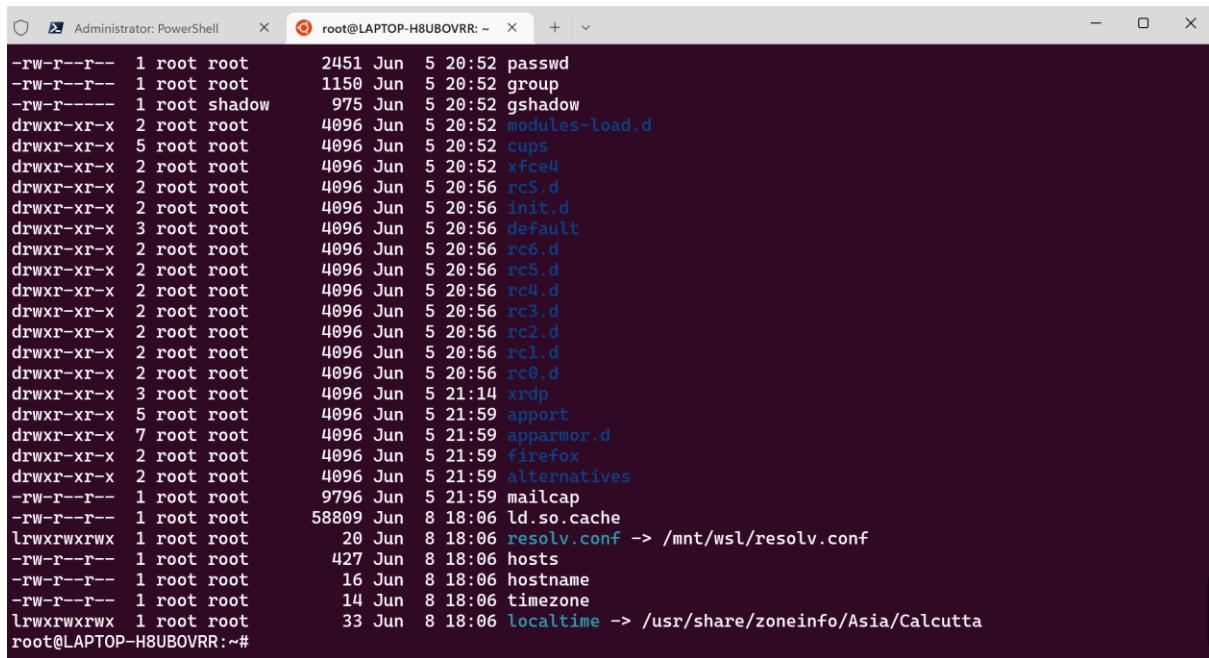
Fig. Timestamp file at Top

## Time Stamp in File Reverse ls-ltr



```
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops16.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops17.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops18.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops19.txt
drwxr-xr-x 2 root root 4096 Jun 8 09:27 ops
drwxr-xr-x 2 root root 4096 Jun 8 09:26 test
drwxr-xr-x 2 root root 4096 Jun 8 09:26 dev
root@LAPTOP-H8UBOVRR:~# ls -ltr
total 20
drwxr-xr-x 2 root root 4096 Jun 8 09:26 dev
drwxr-xr-x 2 root root 4096 Jun 8 09:26 test
drwxr-xr-x 2 root root 4096 Jun 8 09:27 ops
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops19.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops18.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops17.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops16.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops15.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops14.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops13.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops12.txt
-rw-r--r-- 1 root root 0 Jun 8 18:08 devops110.txt
-rw-r--r-- 1 root root 13 Jun 8 18:09 Helloworld
-rw-r--r-- 1 root root 33 Jun 8 18:10 devops11.txt
lrwxrwxrwx 1 root root 19 Jun 8 18:41 cmd -> /opt/dev/ops/devops
root@LAPTOP-H8UBOVRR:~#
```

Fig. Timestamp file at Bottom



```
-rw-r--r-- 1 root root 2451 Jun 5 20:52 passwd
-rw-r--r-- 1 root root 1150 Jun 5 20:52 group
-rw-r----- 1 root shadow 975 Jun 5 20:52 gshadow
drwxr-xr-x 2 root root 4096 Jun 5 20:52 modules-load.d
drwxr-xr-x 5 root root 4096 Jun 5 20:52 cups
drwxr-xr-x 2 root root 4096 Jun 5 20:52 xfce4
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rcS.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 init.d
drwxr-xr-x 3 root root 4096 Jun 5 20:56 default
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc6.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc5.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc4.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc3.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc2.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc1.d
drwxr-xr-x 2 root root 4096 Jun 5 20:56 rc0.d
drwxr-xr-x 3 root root 4096 Jun 5 21:14 xrdp
drwxr-xr-x 5 root root 4096 Jun 5 21:59 apport
drwxr-xr-x 7 root root 4096 Jun 5 21:59 apparmor.d
drwxr-xr-x 2 root root 4096 Jun 5 21:59 firefox
drwxr-xr-x 2 root root 4096 Jun 5 21:59 alternatives
-rw-r--r-- 1 root root 9796 Jun 5 21:59 mailcap
-rw-r--r-- 1 root root 58809 Jun 8 18:06 ld.so.cache
lrwxrwxrwx 1 root root 20 Jun 8 18:06 resolv.conf -> /mnt/wsl/resolv.conf
-rw-r--r-- 1 root root 427 Jun 8 18:06 hosts
-rw-r--r-- 1 root root 16 Jun 8 18:06 hostname
-rw-r--r-- 1 root root 14 Jun 8 18:06 timezone
lrwxrwxrwx 1 root root 33 Jun 8 18:06 localtime -> /usr/share/zoneinfo/Asia/Calcutta
root@LAPTOP-H8UBOVRR:~#
```

Fig: ls -ltr /etc/ Timestamp file at Bottom

## Changing the Host Name:

```
root@LAPTOP-H8UBOVRR:~# vim /etc/hostname
root@LAPTOP-H8UBOVRR:~# vim /etc/hostname
root@LAPTOP-H8UBOVRR:~# cat /etc/hostname
SAIF-PANJESHAH
root@LAPTOP-H8UBOVRR:~#
```

Fig. Host Name Changes

# Quiz:

 Good job!

Question 1:

What command is used to find file type

type <filepath>

check <filepath>

file <filepath>

filetype <filepath>

 Good job!

Question 2:

In -s <originalFilePath> <LinkFilePath> command is used to create soft link.

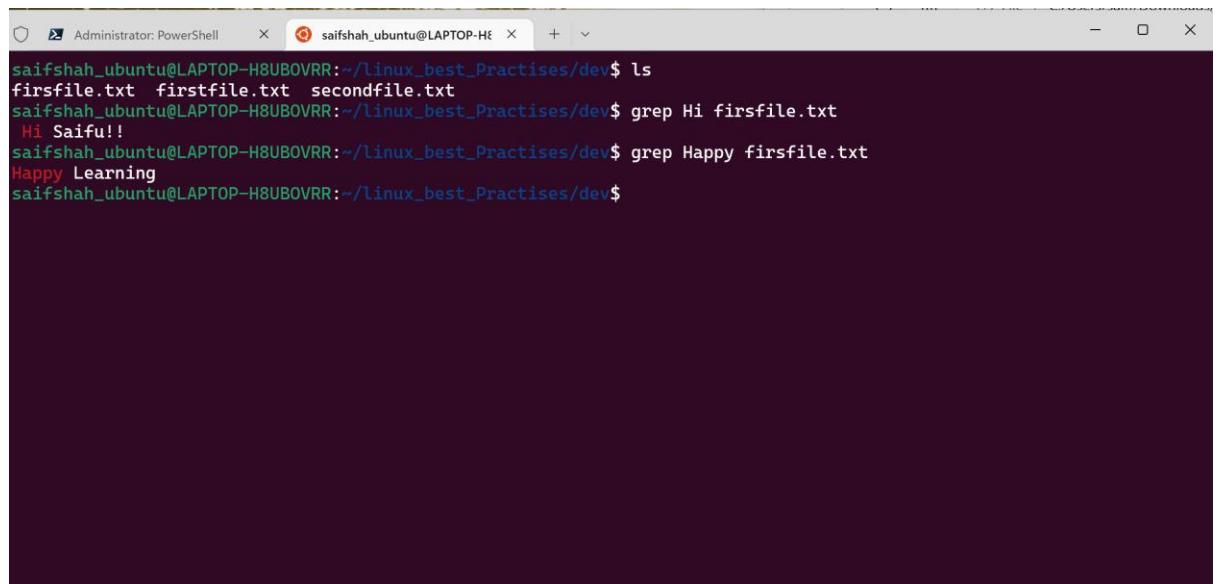
True

False

## Filters & IO redirections command

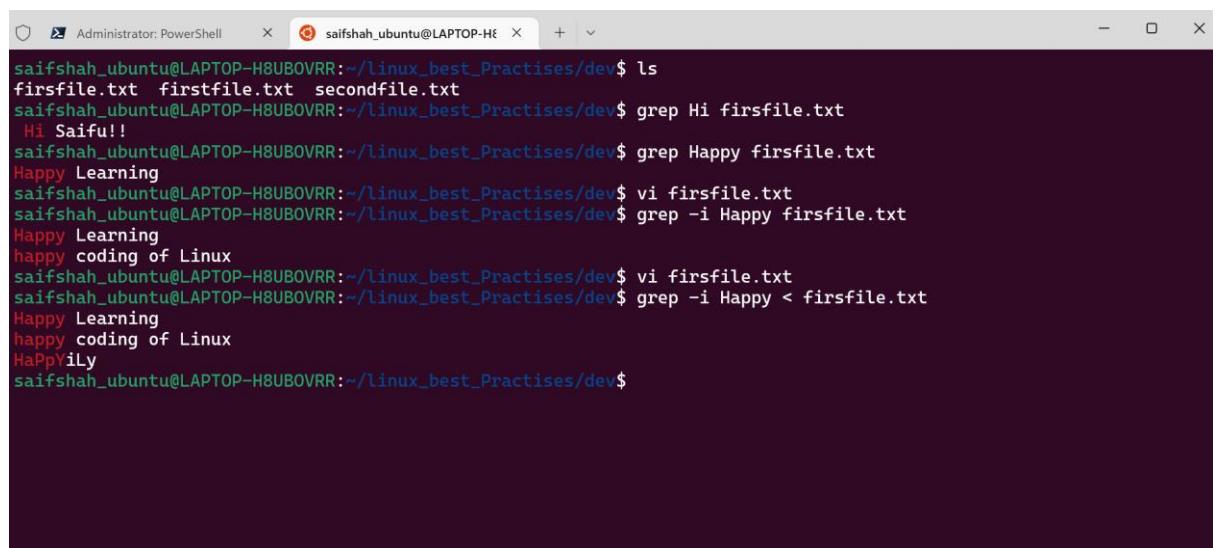
### Grep:

- Grep command is used to find texts from any text input



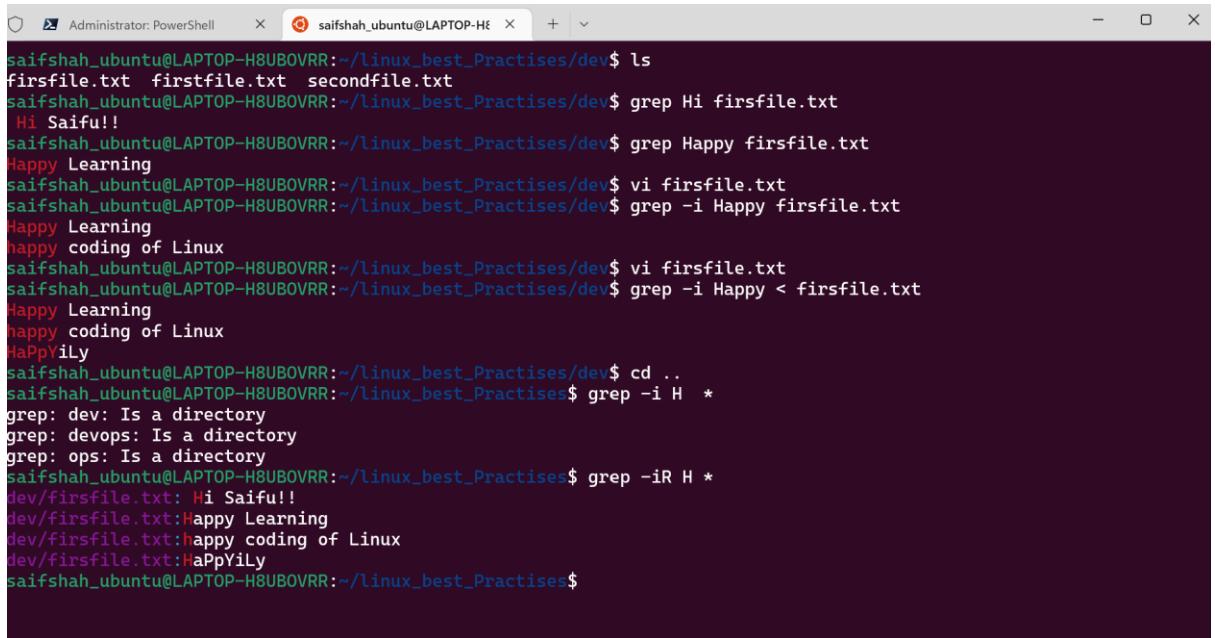
```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ ls
firsfile.txt firstfile.txt secondfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Hi firsfile.txt
Hi Saiful!
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Happy firsfile.txt
Happy Learning
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$
```

Fig. grep commands for finding text from any text input



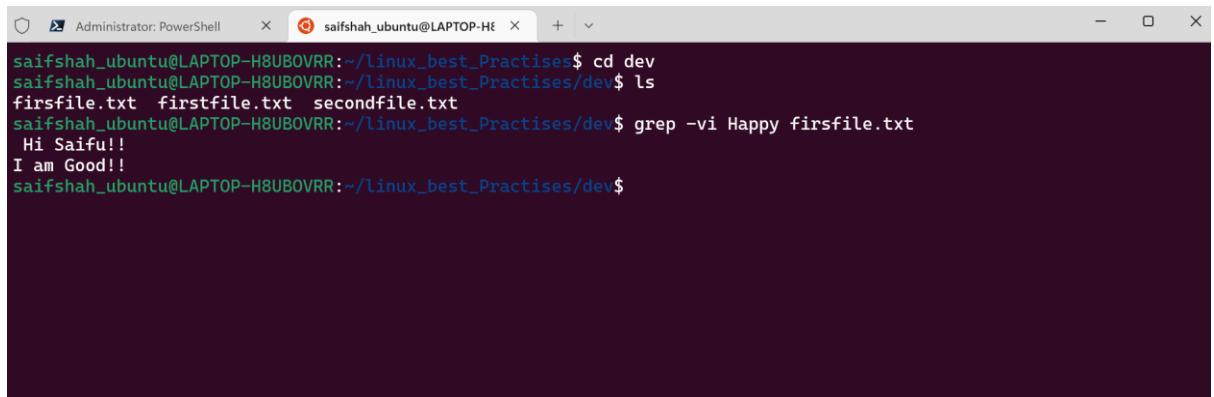
```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ ls
firsfile.txt firstfile.txt secondfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Hi firsfile.txt
Hi Saiful!
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Happy firsfile.txt
Happy Learning
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ vi firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep -i Happy firsfile.txt
Happy Learning
Happy Coding of Linux
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ vi firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep -i Happy < firsfile.txt
Happy Learning
Happy Coding of Linux
HaPpYiLy
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$
```

Fig. To ignores case sensitive in grep commands



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ ls
firsfile.txt firstfile.txt secondfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Hi firsfile.txt
Hi Saifu!!
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep Happy firsfile.txt
Happy Learning
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ vi firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep -i Happy firsfile.txt
Happy Learning
happy coding of Linux
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ vi firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep -i Happy < firsfile.txt
Happy Learning
happy coding of Linux
HaPpYiLy
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cd ..
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ grep -i H *
grep: dev: Is a directory
grep: devops: Is a directory
grep: ops: Is a directory
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ grep -iR H *
dev/firsfile.txt: Hi Saifu!!
dev/firsfile.txt:Happy Learning
dev/firsfile.txt:happy coding of Linux
dev/firsfile.txt:HaPpYiLy
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$
```

Fig. grep searching in the directory -iR commands



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ cd dev
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ ls
firsfile.txt firstfile.txt secondfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ grep -vi Happy firsfile.txt
Hi Saifu!!
I am Good!!
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$
```

Fig. Reverse Searching with -vi commands

## Reading the Content:

```
saifshah_ubuntu@LAPTOPH8UBOVRR:~/linux_best_Practices/dev$ less firstfile.txt
```

## Fig. Reading the Content and Searching for (Good)

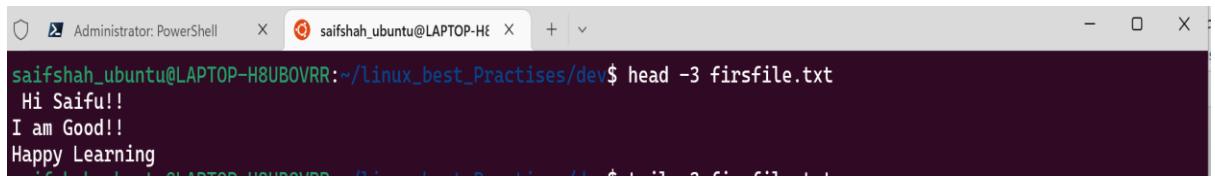
saifshah\_ubuntu@LAPTOP-H8UBOVRR:~/linux\_best\_Practises/dev\$ more firsfile.txt

```
Administrator: PowerShell x saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ less firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ ^C
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ less firsfile.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ more firsfile.txt
Hi Saifu!!
I am Good!!
Happy Learning
happy coding of Linux
HaPpYiLy
```

Fig. Reading the content with more command

head

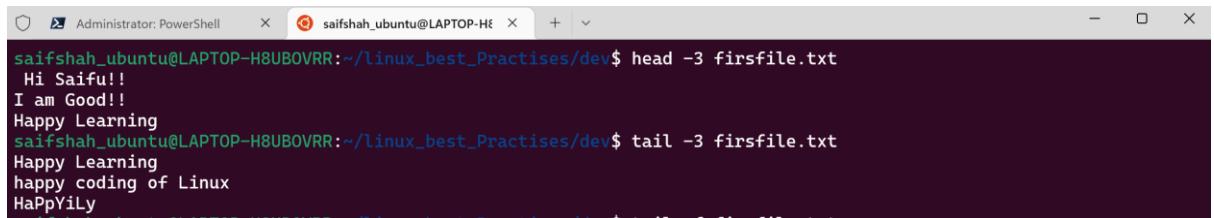
- **Head:** It's Used to display top 10 lines of files



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ head -3 firsfile.txt
Hi Saifu!!
I am Good!!
Happy Learning
```

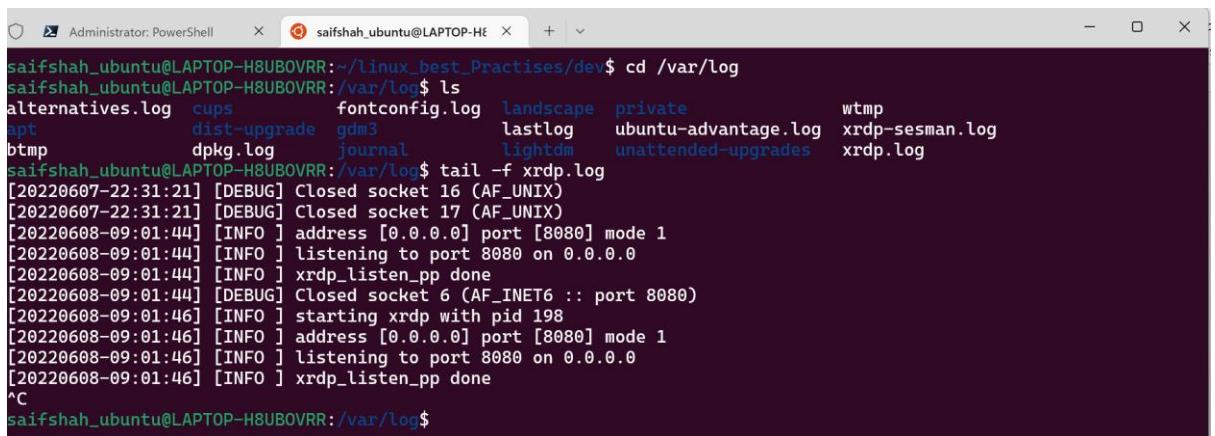
Fig. head to display first 3 lines from files

- **Tail:** It's Used to display last 10 lines of files



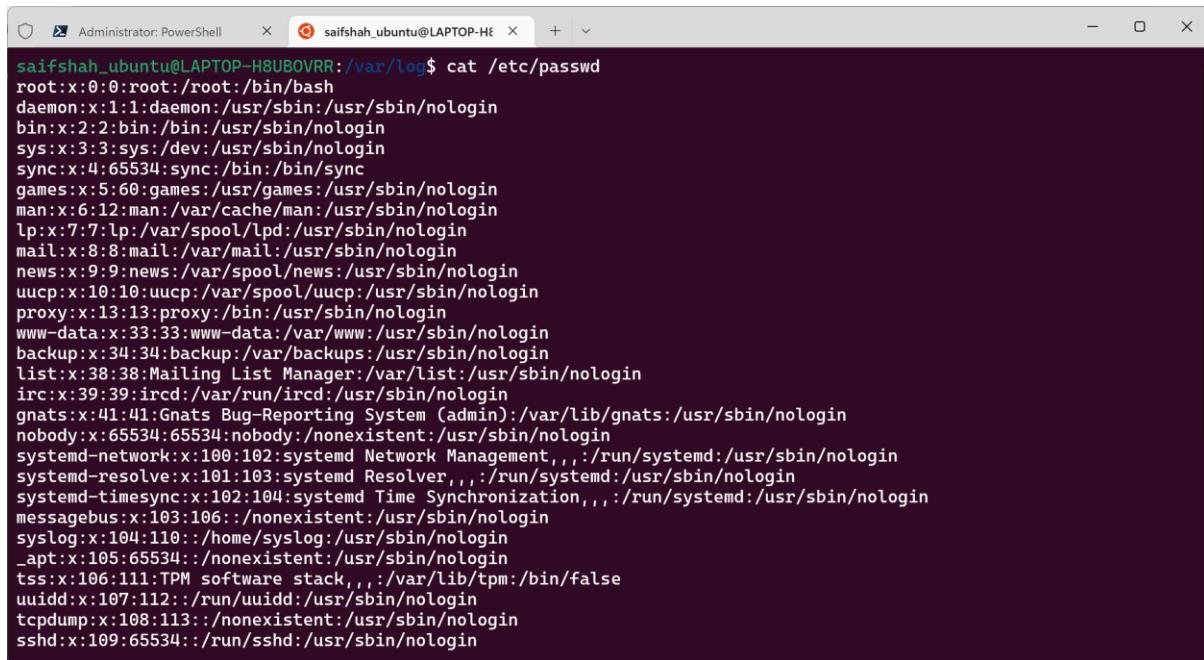
```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ head -3 firsfile.txt
Hi Saifu!!
I am Good!!
Happy Learning
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ tail -3 firsfile.txt
Happy Learning
happy coding of Linux
HaPpYiLy
```

Fig. tail to display last 3 lines from files



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/dev$ cd /var/log
saifshah_ubuntu@LAPTOP-H8UBOVRR:/var/log$ ls
alternatives.log  cups          fontconfig.log  landscape  private          wtmp
apt              dist-upgrade  gdm3          lastlog    ubuntu-advantage.log  xrdp-sesman.log
btmp             dpkg.log      journal        lightdm   unattended-upgrades  xrdp.log
saifshah_ubuntu@LAPTOP-H8UBOVRR:/var/log$ tail -f xrdp.log
[20220607-22:31:21] [DEBUG] Closed socket 16 (AF_UNIX)
[20220607-22:31:21] [DEBUG] Closed socket 17 (AF_UNIX)
[20220608-09:01:44] [INFO ] address [0.0.0.0] port [8080] mode 1
[20220608-09:01:44] [INFO ] listening to port 8080 on 0.0.0.0
[20220608-09:01:44] [INFO ] xrdp_listen_pp done
[20220608-09:01:44] [DEBUG] Closed socket 6 (AF_INET6 :: port 8080)
[20220608-09:01:46] [INFO ] starting xrdp with pid 198
[20220608-09:01:46] [INFO ] address [0.0.0.0] port [8080] mode 1
[20220608-09:01:46] [INFO ] listening to port 8080 on 0.0.0.0
[20220608-09:01:46] [INFO ] xrdp_listen_pp done
^C
saifshah_ubuntu@LAPTOP-H8UBOVRR:/var/log$
```

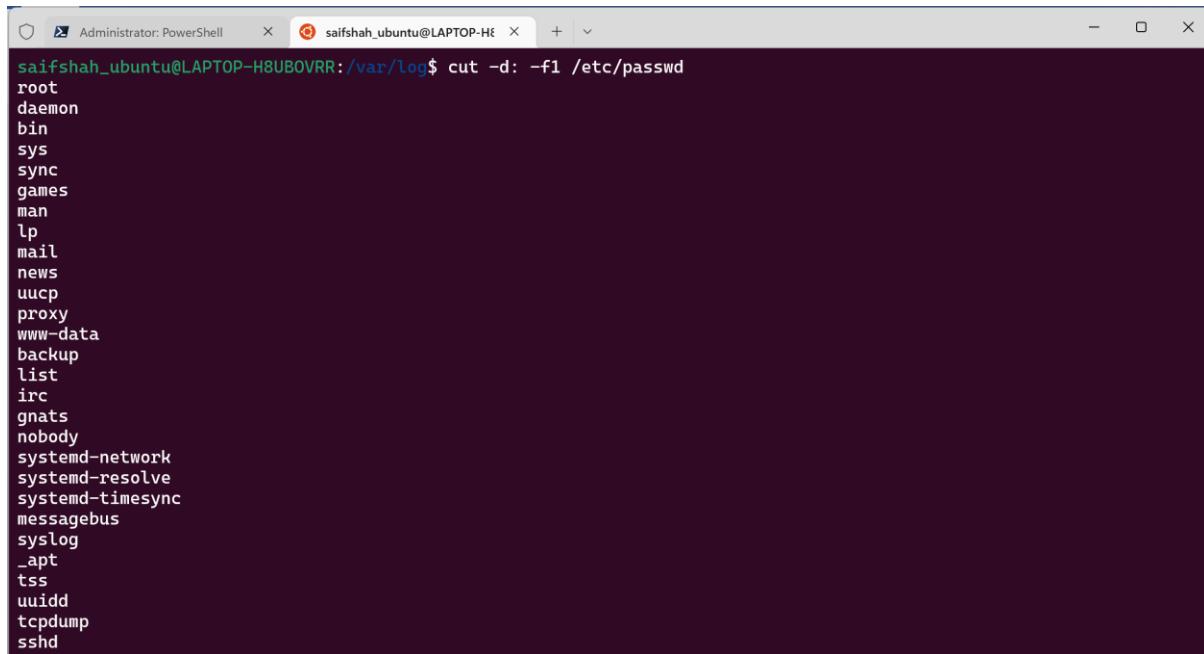
Fig. tail to check **-f** for newly added code in logs file



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:/var/log$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,,:/run/systemd:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,,:/var/lib/tpm:/bin/false
uuidd:x:107:112:/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:113:/nonexistent:/usr/sbin/nologin
sshd:x:109:65534:/run/sshd:/usr/sbin/nologin
```

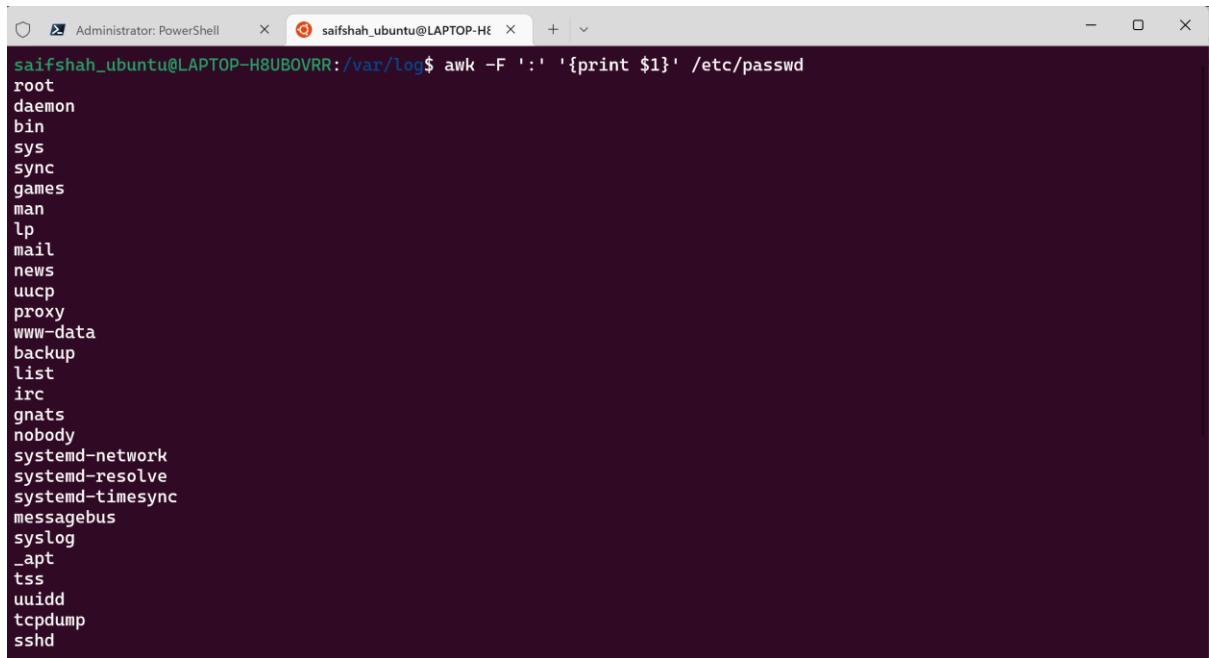
Fig. Shows full information of passwd file

**saifshah\_ubuntu@LAPTOP-H8UBOVRR:/var/log\$ cut -d: -f1  
/etc/passwd**



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:/var/log$ cut -d: -f1 /etc/passwd
root
daemon
bin
sys
sync
games
man
lp
mail
news
uucp
proxy
www-data
backup
list
irc
gnats
nobody
systemd-network
systemd-resolve
systemd-timesync
messagebus
syslog
_apt
tss
uuidd
tcpdump
sshd
```

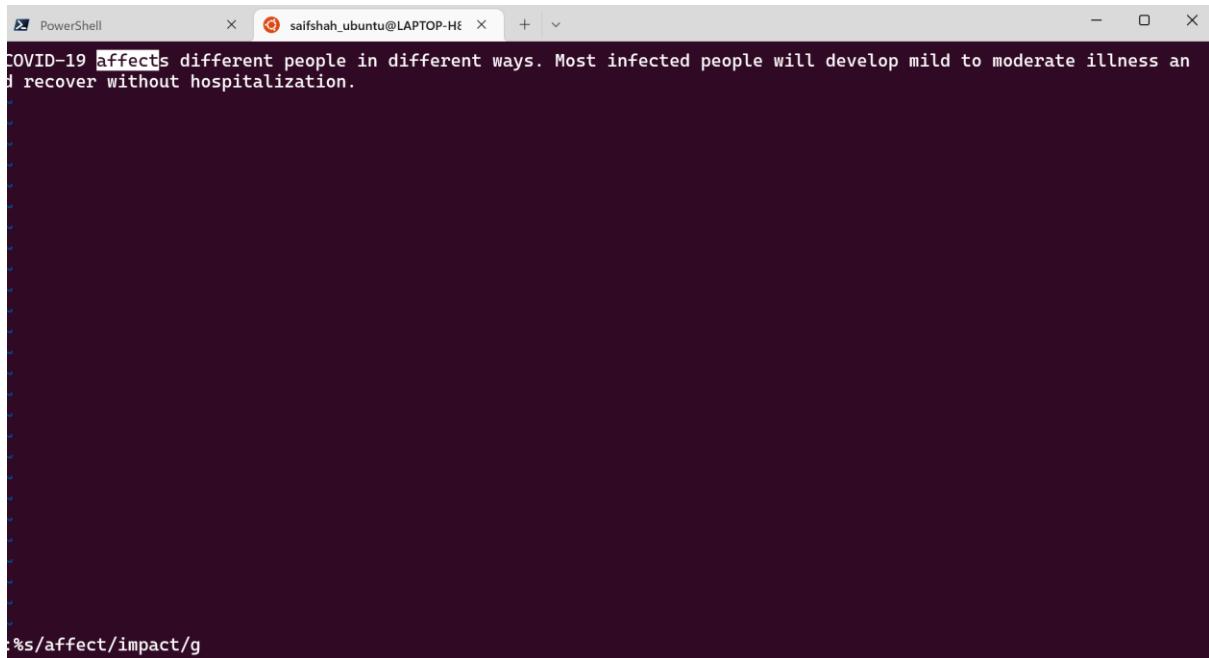
Fig. Shows first column of passwd file



```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/var/log$ awk -F ':' '{print $1}' /etc/passwd
root
daemon
bin
sys
sync
games
man
lp
mail
news
uucp
proxy
www-data
backup
list
irc
gnats
nobody
systemd-network
systemd-resolve
systemd-timesync
messagebus
syslog
_apt
tss
uuid
tcpdump
sshd
```

Fig. awk is useful when there is no separator in file

## Searching and Replacing File:



```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/Desktop/PowerShell/PowerShell
PS C:\Users\saifshah\Desktop\PowerShell> cat covid-19.txt
COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.

PS C:\Users\saifshah\Desktop\PowerShell> sed -i 's/affect/impact/g' covid-19.txt
PS C:\Users\saifshah\Desktop\PowerShell> cat covid-19.txt
COVID-19 impact different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
```

Fig. Searching the file

Fig. Replacing with enter

- **Sed:** It's stands for stream editor, which is used to search a word in the file & replace it with word required to be in the output

```
PowerShell saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cat Sample.txt
COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ sed 's/COVID-19/Coronavirus/g' Sample.txt
Coronavirus affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cat Sample.txt
COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ sed -i 's/COVID-19/Coronavirus/g' Sample.txt
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cat Sample.txt
Coronavirus affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ sed -i 's/Coronavirus/g' Sample.txt
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$ cat Sample.txt
    affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.
saifshah@LAPTOP-H8UB0VRR:~/linux_best_Practises/dev$
```

Fig. Stream Editor with all operations

## Quiz:



Good job!

Question 1:

`grep <text> * -R` command will search for the text in all the file, in all the subdirectories.

true

false



Good job!

Question 2:

What is the command to find last 20 lines of the file

head 20 <filepath>

tail <filepath>

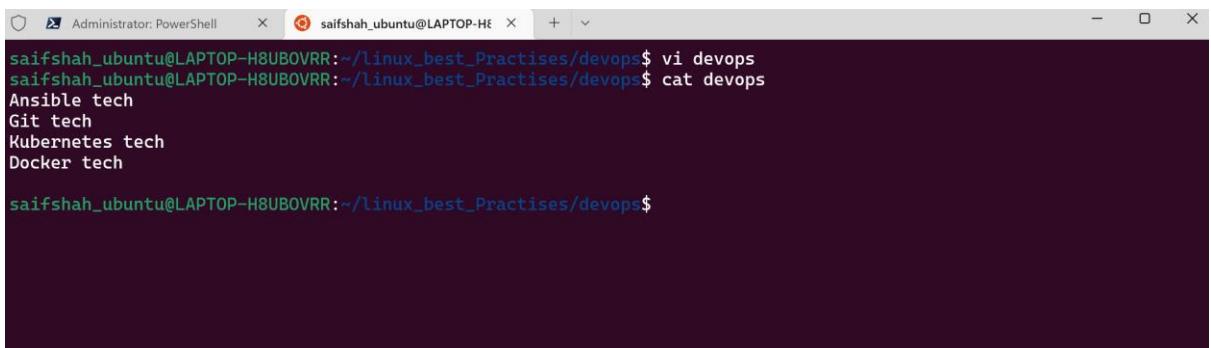
tail twenty <filepath>

tail 20 <filepath>

## IO redirections command

Redirection is a process where we can copy the output of any command(s), file(s) into a new file. There are two ways of redirecting the output into a file. Using **>** or **>>** filename after the command, and

⇒ Create a File name called devops tools with content

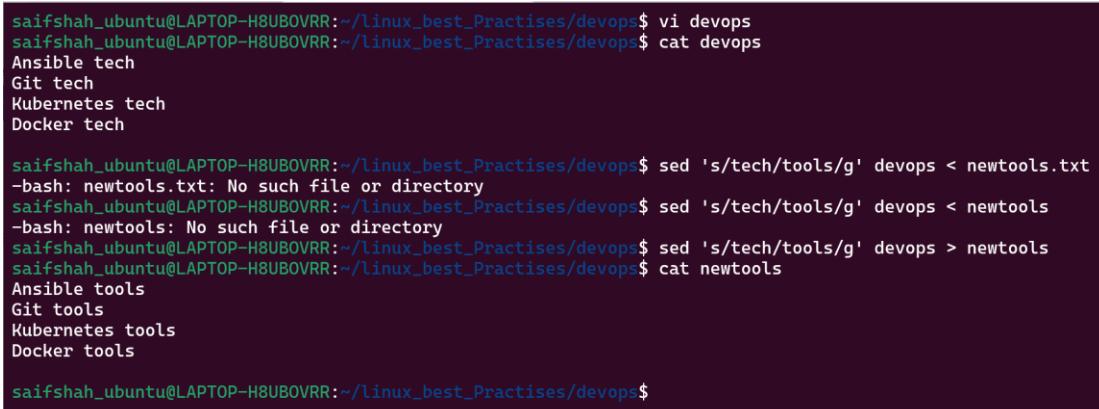


```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ vi devops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ cat devops
Ansible tech
Git tech
Kubernetes tech
Docker tech

saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$
```

Fig. Creating devops tool with content

⇒ Search for text “tech” replace it with “tools” and redirect the output into a new file



```
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ vi devops
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ cat devops
Ansible tech
Git tech
Kubernetes tech
Docker tech

saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ sed 's/tech/tools/g' devops < newtools.txt
-bash: newtools.txt: No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ sed 's/tech/tools/g' devops < newtools
-bash: newtools: No such file or directory
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ sed 's/tech/tools/g' devops > newtools
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ cat newtools
Ansible tools
Git tools
Kubernetes tools
Docker tools

saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$
```

Fig. Searching and replacing with IO redirection

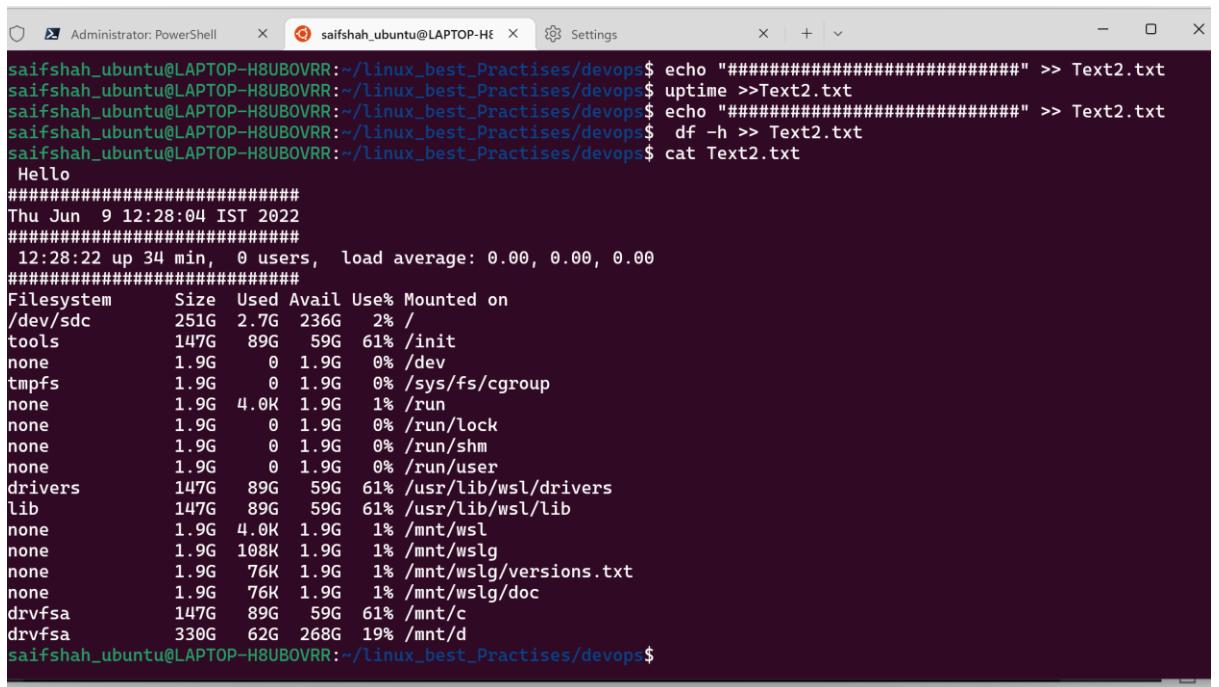
**Note: if the given file is not available a new file will be created automatically. If file already exists then it will overwrite contents of that file.**

## ⇒ Appending another output in same file with “>>”.

```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ tail -4 /etc/passwd
saned:x:120:129::/var/lib/saned:/usr/sbin/noLogin
colord:x:121:130:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
gdm:x:122:131:Gnome Display Manager:/var/lib/gdm3:/bin/false
lightdm:x:123:132:Light Display Manager:/var/lib/lightdm:/bin/false
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ tail -4 /etc/passwd >> newtools
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ cat newtools
Ansible tools
Git tools
Kubernetes tools
Docker tools

saned:x:120:129::/var/lib/saned:/usr/sbin/nologin
colord:x:121:130:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
gdm:x:122:131:Gnome Display Manager:/var/lib/gdm3:/bin/false
lightdm:x:123:132:Light Display Manager:/var/lib/lightdm:/bin/false
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$
```

Fig. Appending another output in same file



The screenshot shows a Windows PowerShell window with the title 'Administrator: PowerShell'. The command history and output are as follows:

```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ echo "#####" >> Text2.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ uptime >>Text2.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ echo "#####" >> Text2.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ df -h >> Text2.txt
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$ cat Text2.txt
Hello
#####
Thu Jun  9 12:28:04 IST 2022
#####
12:28:22 up 34 min,  0 users,  load average: 0.00, 0.00, 0.00
#####
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdc        251G  2.7G  236G  2% /
tools           147G  89G  59G  61% /init
none            1.9G   0   1.9G  0% /dev
tmpfs           1.9G   0   1.9G  0% /sys/fs/cgroup
none            1.9G  4.0K  1.9G  1% /run
none            1.9G   0   1.9G  0% /run/lock
none            1.9G   0   1.9G  0% /run/shm
none            1.9G   0   1.9G  0% /run/user
drivers         147G  89G  59G  61% /usr/lib/wsl/drivers
lib             147G  89G  59G  61% /usr/lib/wsl/lib
none            1.9G  4.0K  1.9G  1% /mnt/wsl
none            1.9G 108K  1.9G  1% /mnt/wslg
none            1.9G  76K  1.9G  1% /mnt/wslg/versions.txt
none            1.9G  76K  1.9G  1% /mnt/wslg/doc
drvfsa          147G  89G  59G  61% /mnt/c
drvfsa          330G  62G  268G 19% /mnt/d
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises/devops$
```

Fig. Basic Commands of Linux redirected

⇒ Redirecting only error to a file “2>>”.

```
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ uptimer 2>> Text3.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ cat Text3.txt

Command 'uptimer' not found, did you mean:

  command 'uptime' from deb procps (2:3.3.16-1ubuntu2.3)
  command 'uptimed' from deb uptimed (1:0.4.2-1)

Try: sudo apt install <deb name>
```

Fig. redirecting only errors

⇒ Redirecting all the output to a file “&>>”.

```
saifshah_ubuntu@LAPTOP-
H8UBOVRR:~/linux_best_Practises/devops$ freee -m &>>
Text3.txt
```

```
Administrator: PowerShell  saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ free -m &>> Text3.txt
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises/devops$ cat Text3.txt

Command 'uptimer' not found, did you mean:

  command 'uptime' from deb procps (2:3.3.16-1ubuntu2.3)
  command 'uptimed' from deb uptimed (1:0.4.2-1)

Try: sudo apt install <deb name>

Command 'updater' not found, did you mean:

  command 'uptimed' from deb uptimed (1:0.4.2-1)
  command 'uptime' from deb procps (2:3.3.16-1ubuntu2.3)

Try: sudo apt install <deb name>

Command 'freee' not found, did you mean:

  command 'free' from deb procps (2:3.3.16-1ubuntu2.3)

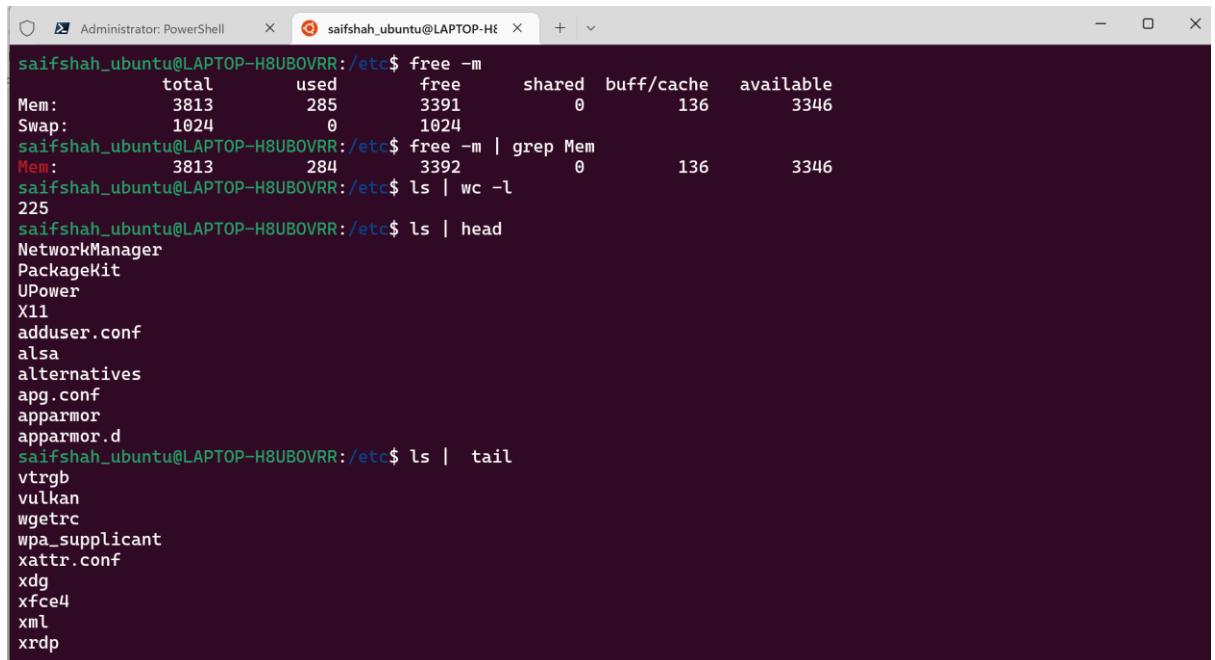
Try: sudo apt install <deb name>

          total        used        free      shared  buff/cache   available
Mem:       3813         292       3384          0        135       3339
Swap:      1024          0       1024
```

Fig. redirecting all output to the file

## Piping:

So far, we've dealt with sending data to and from files. Now we'll take a look at a mechanism for sending data from one program to another. It's called piping and the operator we use is (|). What this operator does is feed the output from the program on the left as input to the program on the right.

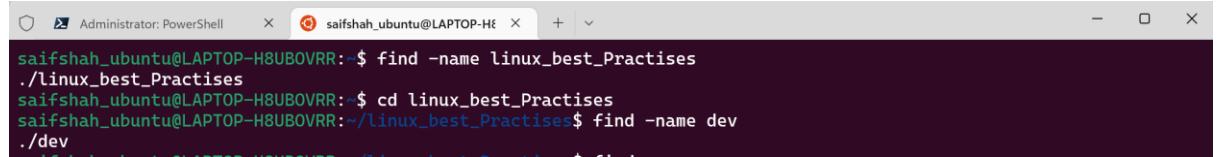


The screenshot shows a Windows PowerShell window with the title 'Administrator: PowerShell'. The command history is as follows:

```
Administrator: PowerShell x saifshah_ubuntu@LAPTOP-H8UB0VRR x + v
saifshah_ubuntu@LAPTOP-H8UB0VRR:/etc$ free -m
total        used        free      shared  buff/cache   available
Mem:       3813         285       3391          0        136       3346
Swap:      1024          0       1024
saifshah_ubuntu@LAPTOP-H8UB0VRR:/etc$ free -m | grep Mem
Mem:       3813         284       3392          0        136       3346
saifshah_ubuntu@LAPTOP-H8UB0VRR:/etc$ ls | wc -l
225
saifshah_ubuntu@LAPTOP-H8UB0VRR:/etc$ ls | head
NetworkManager
PackageKit
UPower
X11
adduser.conf
alsa
alternatives
apg.conf
apparmor
apparmor.d
saifshah_ubuntu@LAPTOP-H8UB0VRR:/etc$ ls | tail
vtrgb
vulkan
wgetrc
wpa_supplicant
xattr.conf
xdg
xfc4
xml
xrpd
```

Fig. Piping with all commands

**Find:** find command is used to find the files or directory's path, it is exactly the find option in windows where you can search for a file.



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VR:~$ find -name linux_best_Practices
./linux_best_Practices
saifshah_ubuntu@LAPTOP-H8UB0VR:~$ cd linux_best_Practices
saifshah_ubuntu@LAPTOP-H8UB0VR:~/linux_best_Practices$ find -name dev
./dev
```

Fig. find command

Options that can be used with find command:

Option	Usage
<b>-name</b>	For searching a file with its name
<b>-inum</b>	For searching a file with particular inode number
<b>-type</b>	For searching a particular type of file
<b>-user</b>	For files whose owner is a particular user
<b>-group</b>	For files belonging to particular group

## Quiz:



Good job!

2>> is to append standard ERROR not Output

Question 4:

2>> is to append standard Output to a file.

True

False



Good job!

Question 1:

Output redirection symbol is \_\_\_\_

>

<

=>

<=



Good job!

Question 2:

Input Redirection symbol is \_\_\_\_

>

<

<=

=>

## Users and Groups

### Users

#### Some Important Points related to Users:

- Users and groups are used to control access to files and resources
- Users login to the system by supplying their username and password
- Every file on the system is owned by a user and associated with a group
- Every process has an owner and group affiliation, and can only access the resources its owner or group can access
- Every user of the system is assigned a unique UserID number (the UID)
- Users name and UID are stored in **/etc/passwd**
- Users password is stored in **/etc/shadow** in encrypted form.
- Users are assigned a home directory and a program that is run when they login (**Usually a shell**)
- Users cannot read, write or execute each other's without permission.

## Type of User

TYPE	EXAMPLE	USER ID(ID)	GROUP ID(ID)	HOME DIR	SHELL
ROOT	root	0	0	/root	/bin/bash
REGULAR	Saifshah, ubuntu	1000 to 60000	1000 to 60000	/home/username	/bin/bash
SERVICE	ftp, ssh, apache	1 to 999	1 to 999	/var/ftp etc	/sbin/nologin

In Linux there are three types of users.

### **1. Super user or root user**

Super user or root user is the most powerful user. He is the administrator user.

### **2. System User**

System users are the users created by the software or applications. For Example, if we install Apache, it will create a user apache. These kinds of users are also known as system users.

### **3. Normal User**

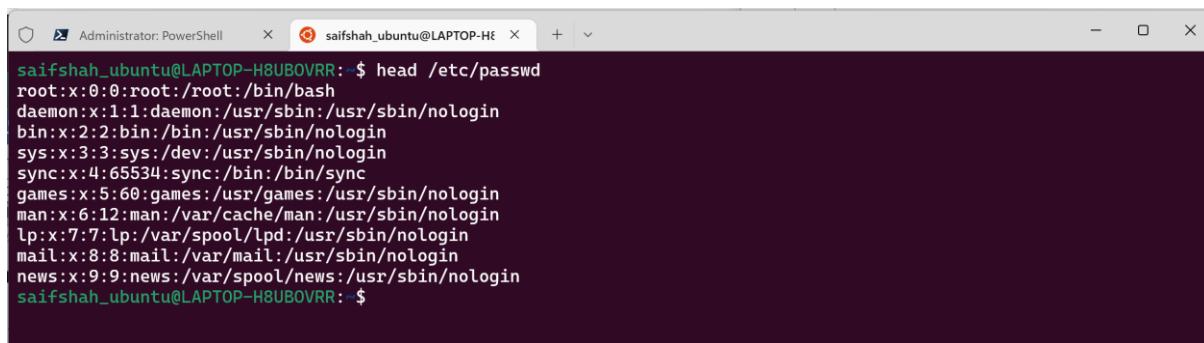
Normal users are the users created by the root user. They are normal users like saif, Sandeep, Amar, etc..

## Whenever a user is created in Linux things created by default:

- A home directory is created(home/username)
- A mail box is created(var/spool/mail)
- Unique UID & GID are given to user

## Passwd file

### 1. /etc/passwd



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~$ head /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

The above fields are

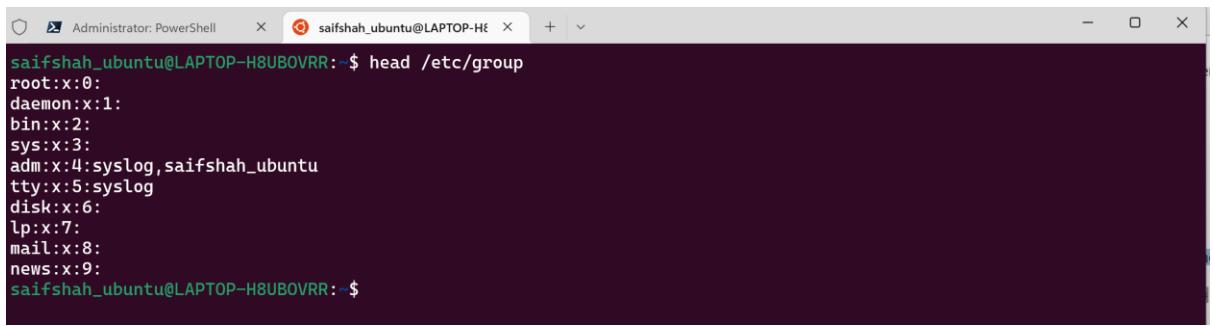
- **root** = name
- **x** = link to the password file i.e. /etc/shadow
- **0 or 1** = UID (user id)
- **0 or 1** = GID (group id)
- **root or daemon** = comments (brief information about user)
- **/root or /usr** = home directory of the user
- **/bin/bash or /sbin/nologin** = shell

## Group file

### 2. /etc/group

The file /etc/group stores group information. Each line in this file stores one group entry.

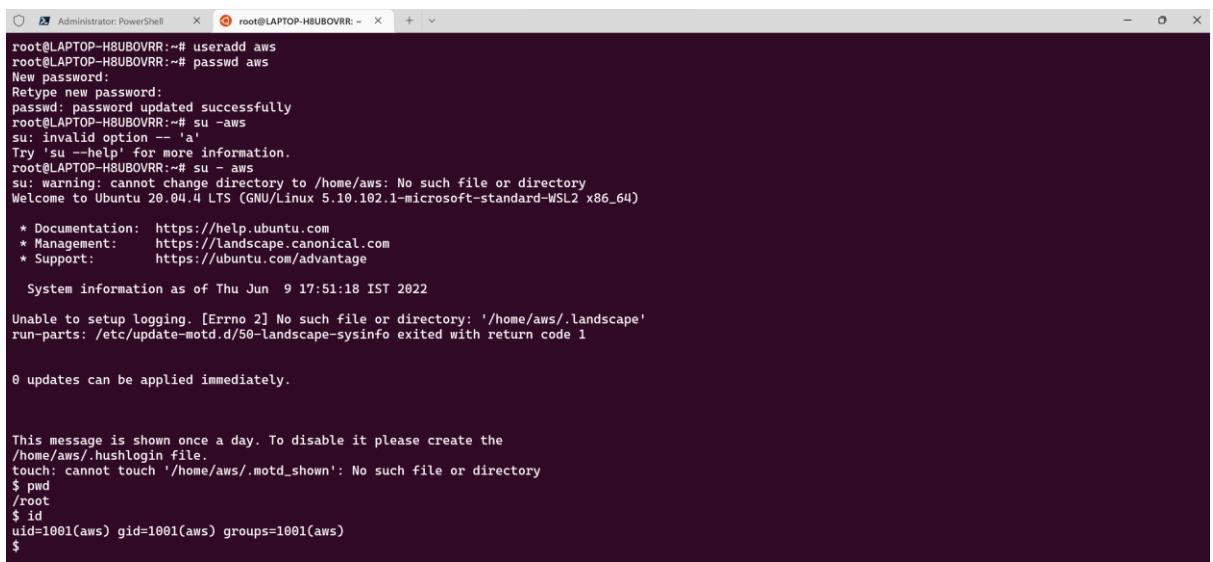
Group name, group password, GID, group member



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR:~$ head /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,saifshah_ubuntu
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
saifshah_ubuntu@LAPTOP-H8UB0VRR:~$
```

Fig. Group head

### ADD USER, SET PASSWORD & SWITCH TO USER



```
Administrator: PowerShell root@LAPTOP-H8UB0VRR:~# useradd aws
root@LAPTOP-H8UB0VRR:~# passwd aws
New password:
Retype new password:
passwd: password updated successfully
root@LAPTOP-H8UB0VRR:~# su -aws
su: invalid option -- 'a'
Try 'su --help' for more information.
root@LAPTOP-H8UB0VRR:~# su -aws
su: warning: cannot change directory to /home/aws: No such file or directory
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.10.102.1-microsoft-standard-WSL2 x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

 System information as of Thu Jun  9 17:51:18 IST 2022

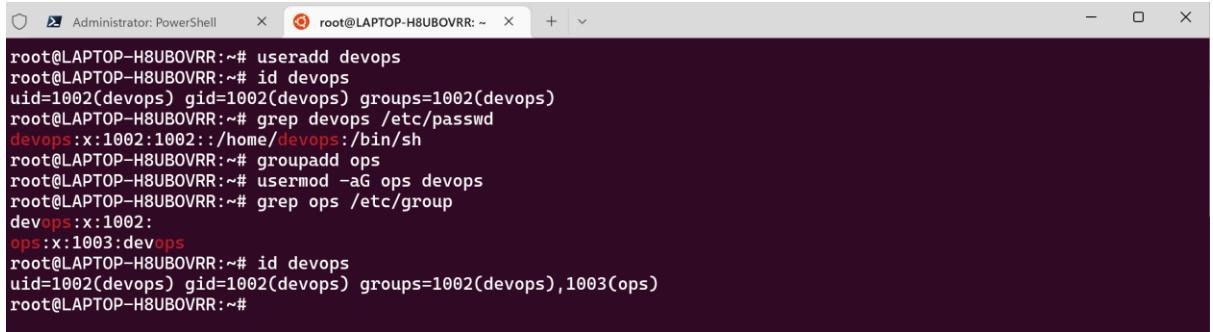
Unable to setup logging. [Errno 2] No such file or directory: '/home/aws/.landscape'
run-parts: /etc/update-motd.d/50-landscape-sysinfo exited with return code 1

0 updates can be applied immediately.

This message is shown once a day. To disable it please create the
/home/aws/.hushlogin file.
touch: cannot touch '/home/aws/.motd_shown': No such file or directory
$ pwd
/root
$ id
uid=1001(aws) gid=1001(aws) groups=1001(aws)
$
```

Fig. adding user, password setting and switch to user

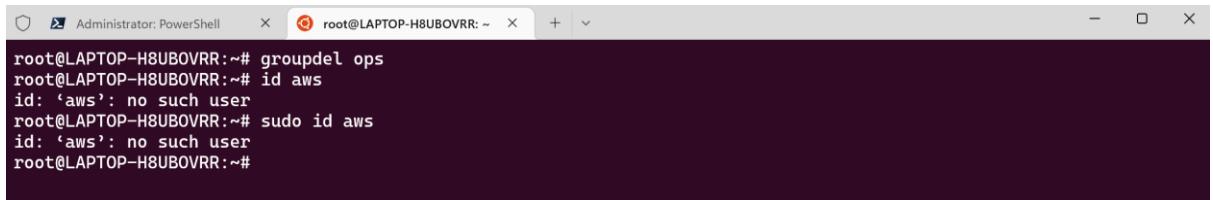
## ADD USER, GROUP & USER INTO GROUP



```
Administrator: PowerShell root@LAPTOP-H8UBOVRR:~# useradd devops
root@LAPTOP-H8UBOVRR:~# id devops
uid=1002(devops) gid=1002(devops) groups=1002(devops)
root@LAPTOP-H8UBOVRR:~# grep devops /etc/passwd
devops:x:1002:1002::/home/devops:/bin/sh
root@LAPTOP-H8UBOVRR:~# groupadd ops
root@LAPTOP-H8UBOVRR:~# usermod -aG ops devops
root@LAPTOP-H8UBOVRR:~# grep ops /etc/group
devops:x:1003:devops
root@LAPTOP-H8UBOVRR:~# id devops
uid=1002(devops) gid=1002(devops) groups=1002(devops),1003(ops)
root@LAPTOP-H8UBOVRR:~#
```

Fig. all commands check

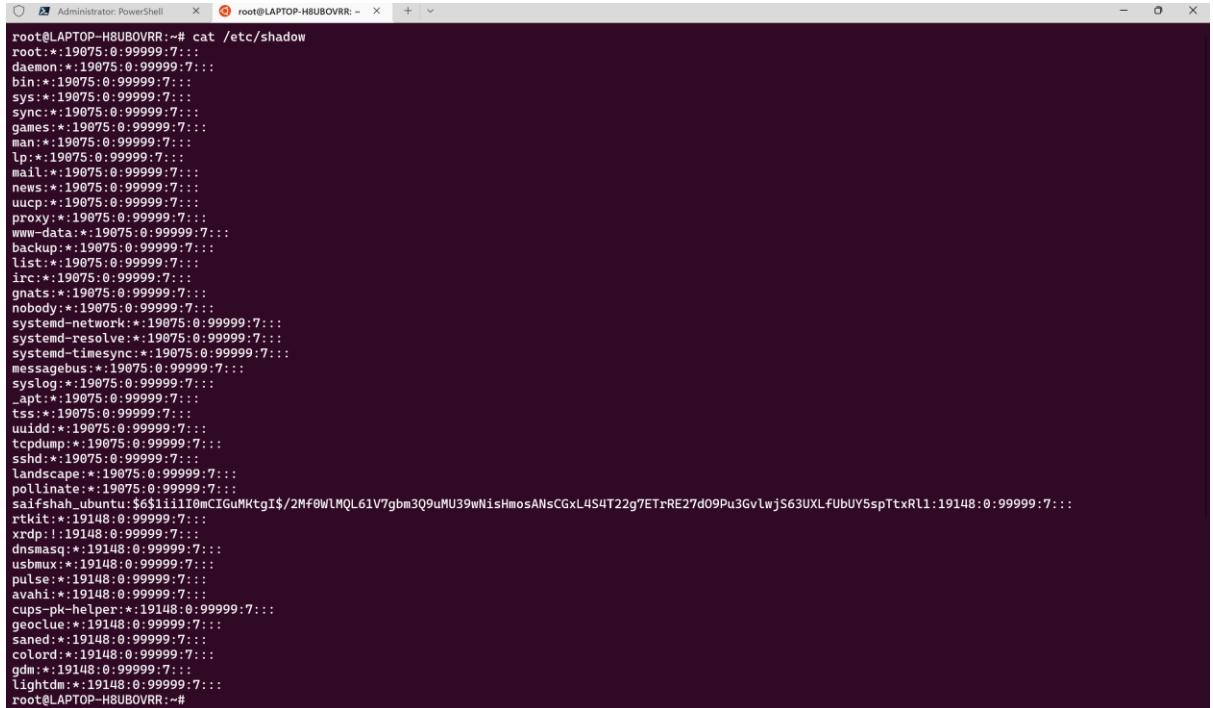
## DELETE USER and GROUP



```
Administrator: PowerShell root@LAPTOP-H8UBOVRR:~# groupdel ops
root@LAPTOP-H8UBOVRR:~# id aws
id: 'aws': no such user
root@LAPTOP-H8UBOVRR:~# sudo id aws
id: 'aws': no such user
root@LAPTOP-H8UBOVRR:~#
```

Fig. deleted users and groups

## cat /etc/shadow



```
Administrator: PowerShell root@LAPTOP-H8UBOVRR:~# cat /etc/shadow
root::19075:0:99999:7:::
daemon::19075:0:99999:7:::
bin::19075:0:99999:7:::
sys::19075:0:99999:7:::
sync::19075:0:99999:7:::
games::19075:0:99999:7:::
man::19075:0:99999:7:::
lp::19075:0:99999:7:::
mail::19075:0:99999:7:::
news::19075:0:99999:7:::
uucp::19075:0:99999:7:::
proxy::19075:0:99999:7:::
www-data::19075:0:99999:7:::
backup::19075:0:99999:7:::
list::19075:0:99999:7:::
irc::19075:0:99999:7:::
gnats::19075:0:99999:7:::
nobody::19075:0:99999:7:::
systemd-network::19075:0:99999:7:::
systemd-resolve::19075:0:99999:7:::
systemd-timesync::19075:0:99999:7:::
messagebus::19075:0:99999:7:::
syslog::19075:0:99999:7:::
_apt::19075:0:99999:7:::
tss::19075:0:99999:7:::
uuid::19075:0:99999:7:::
tcpdump::19075:0:99999:7:::
sshd::19075:0:99999:7:::
landscape::19075:0:99999:7:::
pollinate::19075:0:99999:7:::
saifshal:ubuntu:$6$1i110mCIGuMKtgI$/2Mf0wLMQL61V7gbm3Q9uMU39wNisHmosAnSGxL4S4T22g7ETrRE27d09Pu3GvLwjS63UXLfUbUY5spTtxRl1:19148:0:99999:7:::
rtkit::19148:0:99999:7:::
xdp::19148:0:99999:7:::
dnsmasq::19148:0:99999:7:::
usbmux::19148:0:99999:7:::
pulse::19148:0:99999:7:::
avahi::19148:0:99999:7:::
cups-pk-helper::19148:0:99999:7:::
geoclue::19148:0:99999:7:::
saned::19148:0:99999:7:::
colord::19148:0:99999:7:::
gdm::19148:0:99999:7:::
lightdm::19148:0:99999:7:::
root@LAPTOP-H8UBOVRR:~#
```

## Users and Group cheat sheet

COMMANDS	DESCRIPTION
useradd	Creates user in RedHat
adduser	Creates user in ubuntu
id	Shows user info
groupadd	Creates group
usermod -G grpnam username	Adds user to group
passwd	set/reset password
userdel -r	removes user with home dir
groupdel	removes group
last	shows last login in system
who	who is logged into system
whoami	username
lsof -u user	List files opened by user

Fig. Users and Group cheat sheet

## Quiz:



**Good job!**

User info file is /etc/passwd and Group info file is /etc/group

Question 1:

**User info file is /etc/group and Group info file is /etc/passwd**



True



False



**Good job!**

Question 2:

lsof -u username will list files opened by user



True



False



**Good job!**

Question 3:

**How to reset password of a user ?**



Any User can reset any users password by using `passwd username` command



Only user can reset its own password by using `passwd username` command



root user can reset any users password by using `passwd username` command, also user can reset its own password by running just `passwd` command.



Good job!

Question 4:

**How to switch between users in Linux cli?**



**su - username**



**sudo - username**



**sudo -i**



Good job!

Question 5:

Users password is stored(encrypted) in /etc/shadows file.



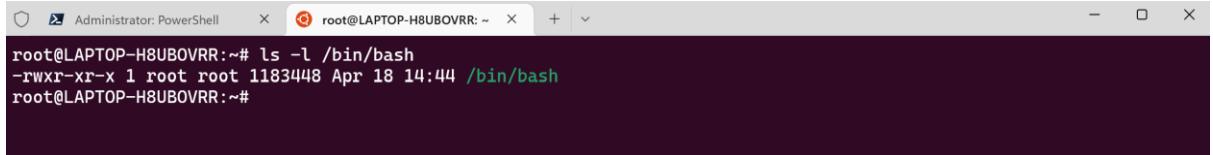
**True**



**False**

## File Permissions

### Viewing Permission from command – Line: **ls -l**



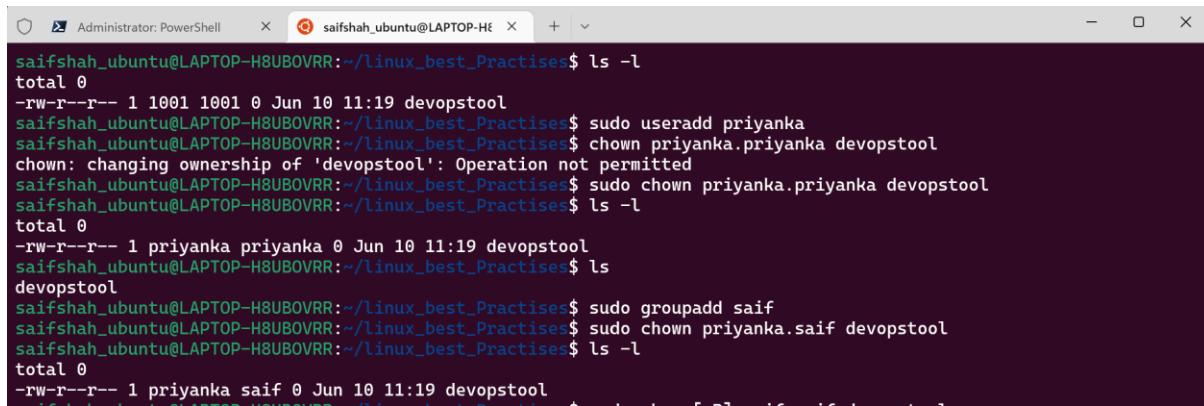
```
Administrator: PowerShell      root@LAPTOP-H8UBOVRR:~# ls -l /bin/bash
-rwxr-xr-x 1 root root 1183448 Apr 18 14:44 /bin/bash
root@LAPTOP-H8UBOVRR:~#
```

Fig. view permission

- Four Symbol are used when display permissions
  - : Type of file directory, links, characters, etc
  - r :Permission to read a file or list's the directory content
  - w : Permission to write a file or creates & remove file from directory
  - x : Permission to execute a program and changing the directory and do a long listing to a directory
  - : no permission in place of (r, w and x)

### Changing the File Ownership

- Only root can change the file's owner
- Only root or the owner can change a file's group
- Ownership is changed with **chown**  
**Chown[-R] user\_name File | directory...**
- Group-ownership is changed with **chgrp**  
**Chgrp[-R] group\_name File | directory...**



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ ls -l
total 0
-rw-r--r-- 1 1001 1001 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ sudo useradd priyanka
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ chown priyanka.priyanka devopstool
chown: changing ownership of 'devopstool': Operation not permitted
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ sudo chown priyanka.priyanka devopstool
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ ls -l
total 0
-rw-r--r-- 1 priyanka priyanka 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ ls
devopstool
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ sudo groupadd saif
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ sudo chown priyanka.saif devopstool
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/Linux_best_Practices$ ls -l
total 0
-rw-r--r-- 1 priyanka saif 0 Jun 10 11:19 devopstool
```

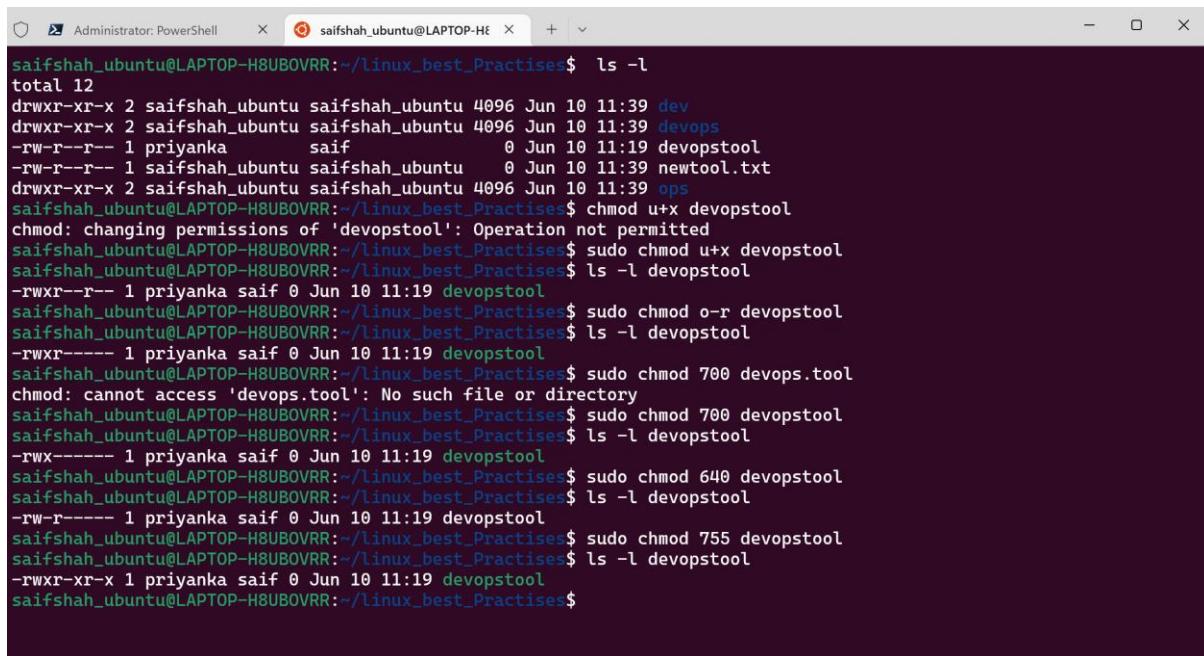
Fig. Changing File Permission

## Changing Permissions - Symbolic Method

- To change access modes:
  - **chmod [-OPTION] ... mode[,mode] file directory ...**
- *mode* includes:
  - **u,g** or **o** for user, group and other
  - **+** - or **=** for grant, deny or set
  - **r, w** or **x** for read, write and execute
- Options include:
  - **-R** Recursive
  - **-v** Verbose
  - **--reference** Reference another file for its mode
- Examples:
  - **chmod ugo+r file**: Grant read access to all for *file*
  - **chmod o-wx dir**: Deny write and execute to others for *dir*

## Changing Permissions - Numeric Method

- Uses a three-digit mode number
  - first digit specifies owner's permissions
  - second digit specifies group permissions
  - third digit represents others' permissions
- Permissions are calculated by adding:
  - 4 (for read)
  - 2 (for write)
  - 1 (for execute)
- Example:
  - **chmod 640 myfile**



The screenshot shows a terminal window titled 'Administrator: PowerShell' on a Windows system. The user is on an Ubuntu system, as indicated by the prompt 'saifshah\_ubuntu@LAPTOP-H8UB0VRR:~/linux\_best\_Practises\$'. The terminal displays the following command sequence:

```
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l
total 12
drwxr-xr-x 2 saifshah_ubuntu saifshah_ubuntu 4096 Jun 10 11:39 dev
drwxr-xr-x 2 saifshah_ubuntu saifshah_ubuntu 4096 Jun 10 11:39 devops
-rw-r--r-- 1 priyanka saif 0 Jun 10 11:19 devopstool
-rw-r--r-- 1 saifshah_ubuntu saifshah_ubuntu 0 Jun 10 11:39 newtool.txt
drwxr-xr-x 2 saifshah_ubuntu saifshah_ubuntu 4096 Jun 10 11:39 ops
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ chmod u+x devopstool
chmod: changing permissions of 'devopstool': Operation not permitted
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod u+x devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l devopstool
-rw-r--r-- 1 priyanka saif 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod o-r devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l devopstool
-rwxr----- 1 priyanka saif 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod 700 devops.tool
chmod: cannot access 'devops.tool': No such file or directory
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod 700 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l devopstool
-rwx----- 1 priyanka saif 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod 640 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l devopstool
-rw-r----- 1 priyanka saif 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ sudo chmod 755 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$ ls -l devopstool
-rwxr-xr-x 1 priyanka saif 0 Jun 10 11:19 devopstool
saifshah_ubuntu@LAPTOP-H8UB0VRR:~/linux_best_Practises$
```

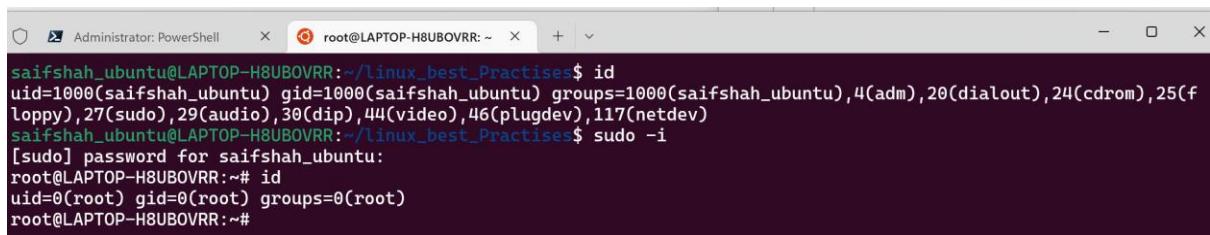
Fig. Changing permission Symbolic & Numeric Method

## Sudo

Sudo gives power to a normal user to execute commands which is owned by root user.

**If a user has already full sudoers privileges, it can become a root user anytime.**

⇒ **sudo -i changes from normal user to root user**

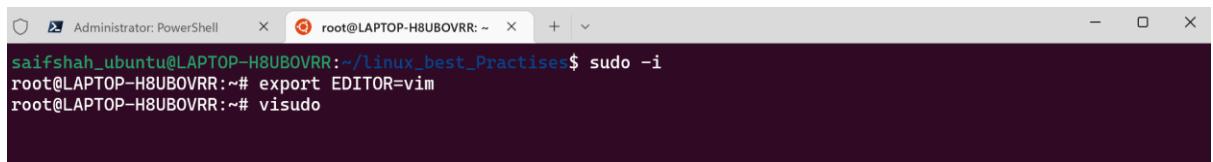


```
Administrator: PowerShell saifshah@LAPTOP-H8UBOVRR:~/linux_best_Practices$ id
uid=1000(saifshah_ubuntu) gid=1000(saifshah_ubuntu) groups=1000(saifshah_ubuntu),4(adm),20(dialout),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),117(netdev)
saifshah@LAPTOP-H8UBOVRR:~/linux_best_Practices$ sudo -i
[sudo] password for saifshah_ubuntu:
root@LAPTOP-H8UBOVRR:~# id
uid=0(root) gid=0(root) groups=0(root)
root@LAPTOP-H8UBOVRR:~#
```

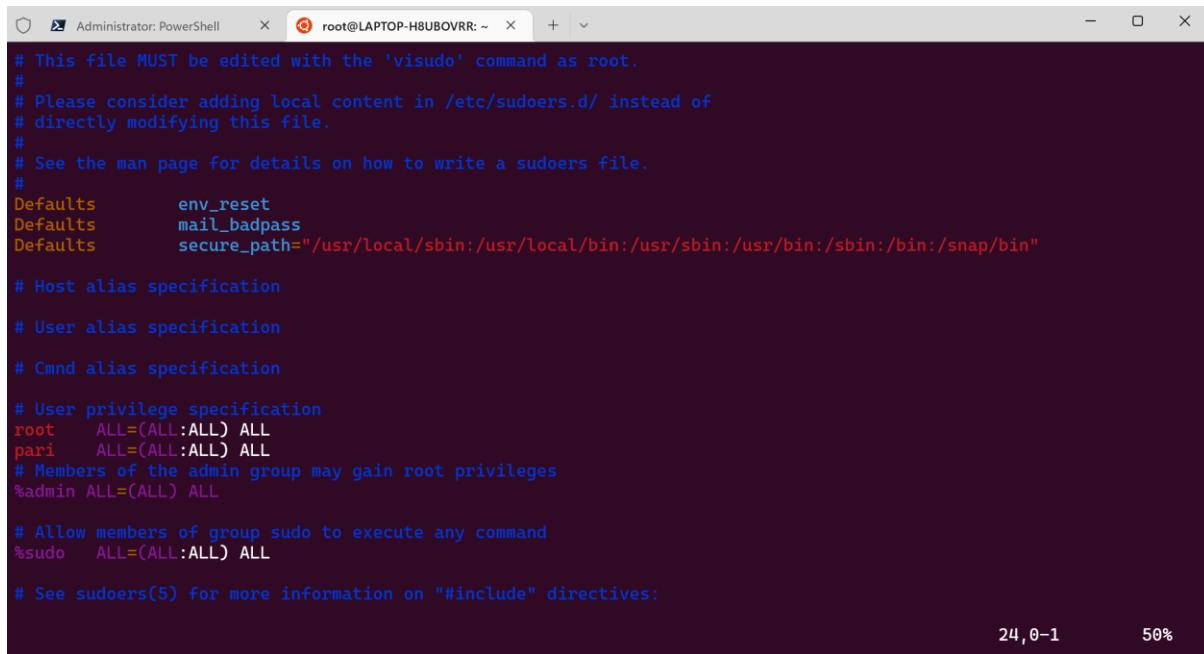
Fig. Sudo Commands to switch from normal to root user

**Note: User saifshah was already a sudo user with full privilege**

⇒ **Adding a user pari in sudoers list**



```
Administrator: PowerShell saifshah@LAPTOP-H8UBOVRR:~/linux_best_Practices$ sudo -i
root@LAPTOP-H8UBOVRR:~# export EDITOR=vim
root@LAPTOP-H8UBOVRR:~# visudo
```



```
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults      env_reset
Defaults      mail_badpass
Defaults      secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

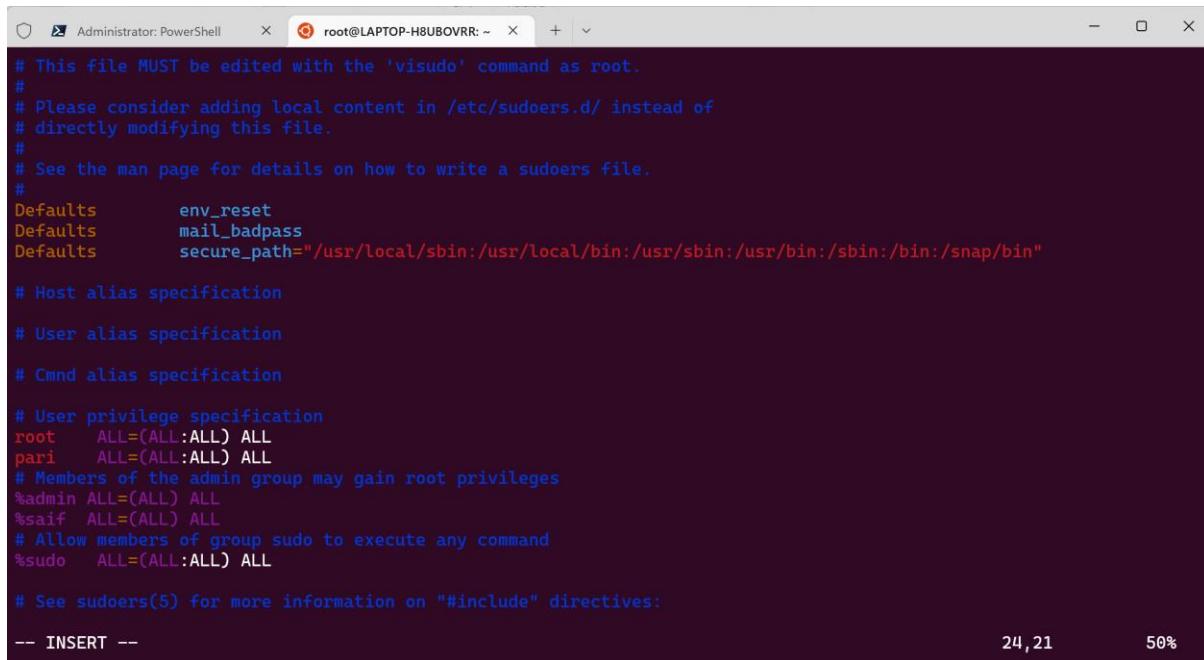
# User privilege specification
root    ALL=(ALL:ALL) ALL
par1   ALL=(ALL:ALL) ALL
# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "#include" directives:
```

Fig. adding user in sudoers list

⇒ Like a user a group can also be added into sudoers list.



```
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults      env_reset
Defaults      mail_badpass
Defaults      secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"

# Host alias specification

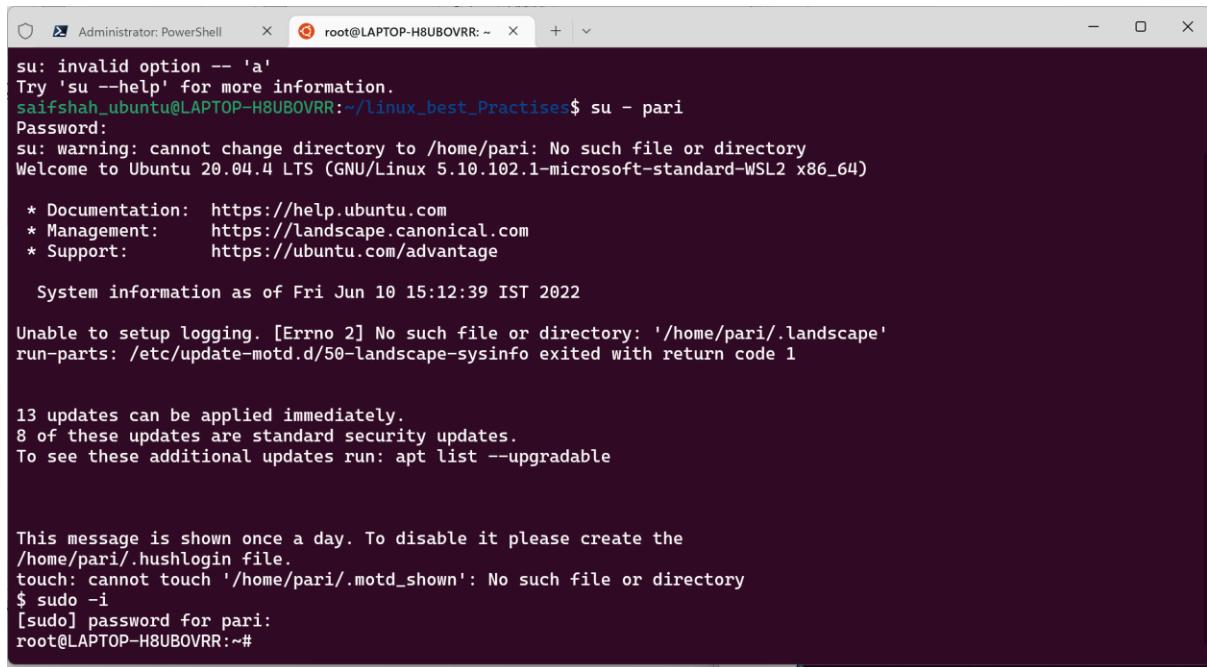
# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
par1   ALL=(ALL:ALL) ALL
# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL
%saif  ALL=(ALL) ALL
# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "#include" directives:
```

Fig. adding groups in sudoers list



```
Administrator: PowerShell      root@LAPTOP-H8UBOVRR: ~      + | - x
su: invalid option -- 'a'
Try 'su --help' for more information.
saifshah_ubuntu@LAPTOP-H8UBOVRR:~/linux_best_Practises$ su - pari
Password:
su: warning: cannot change directory to /home/pari: No such file or directory
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.10.102.1-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://Landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Jun 10 15:12:39 IST 2022

Unable to setup logging. [Errno 2] No such file or directory: '/home/pari/.landscape'
run-parts: /etc/update-motd.d/50-landscape-sysinfo exited with return code 1

13 updates can be applied immediately.
8 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

This message is shown once a day. To disable it please create the
/home/pari/.hushlogin file.
touch: cannot touch '/home/pari/.motd_shown': No such file or directory
$ sudo -i
[sudo] password for pari:
root@LAPTOP-H8UBOVRR:~#
```

Fig. login with sudoers users

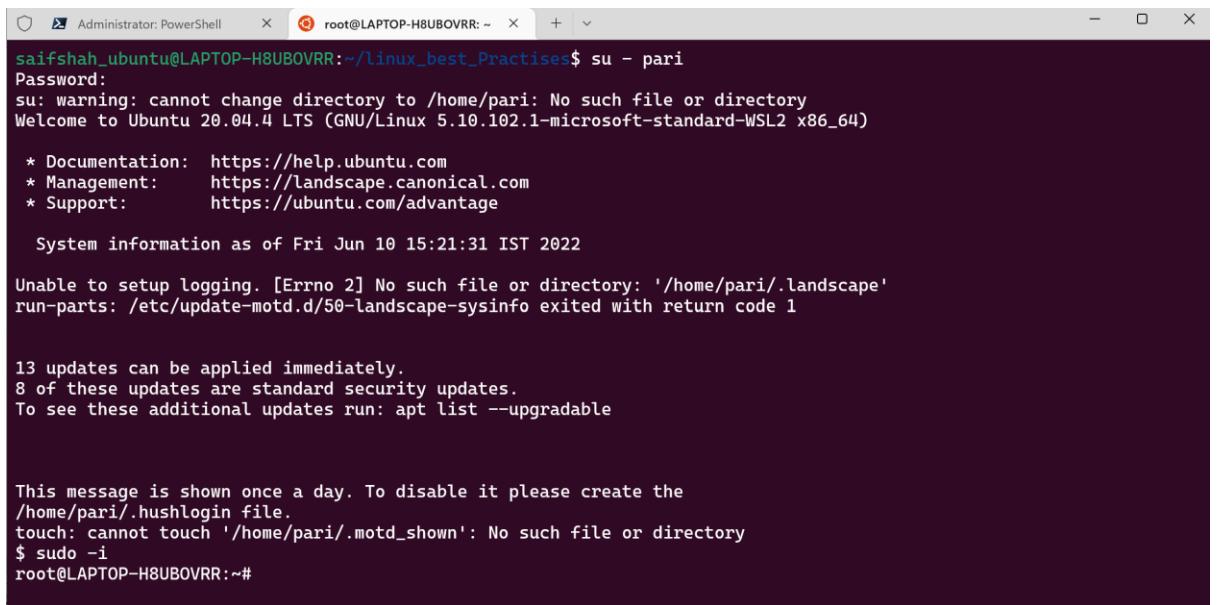
⇒ Every time you enter sudo command it asks your own password. To turn that off use NOPASSWD in sudoers file.

```
# User privilege specification
root    ALL=(ALL:ALL) ALL
pari    ALL=(ALL:ALL) NOPASSWD: ALL
```

Fig. setting NOPASSWD in sudoers file

⇒ **Changing to any other users with “su- “command.**

⇒ **Become a root user from pari user login**



```
Administrator: PowerShell root@LAPTOP-H8UBOVRR: ~
saifshah@LAPTOP-H8UBOVRR:~/linux_best_Practices$ su - pari
Password:
su: warning: cannot change directory to /home/pari: No such file or directory
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.10.102.1-microsoft-standard-WSL2 x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

 System information as of Fri Jun 10 15:21:31 IST 2022

Unable to setup logging. [Errno 2] No such file or directory: '/home/pari/.landscape'
run-parts: /etc/update-motd.d/50-landscape-sysinfo exited with return code 1

13 updates can be applied immediately.
8 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

This message is shown once a day. To disable it please create the
/home/pari/.hushlogin file.
touch: cannot touch '/home/pari/.motd_shown': No such file or directory
$ sudo -i
root@LAPTOP-H8UBOVRR:~#
```

**Fig. Changing to other users with su – command & become a root user from pari user login**

**Quiz:**



**Good job!**

Only user in /etc/sudoers file or /etc/sudoers.d dir can use sudo -i command to switch to root user as mentioned below

Question 1:

**sudo -i command can be used by any user to switch to root user**



True

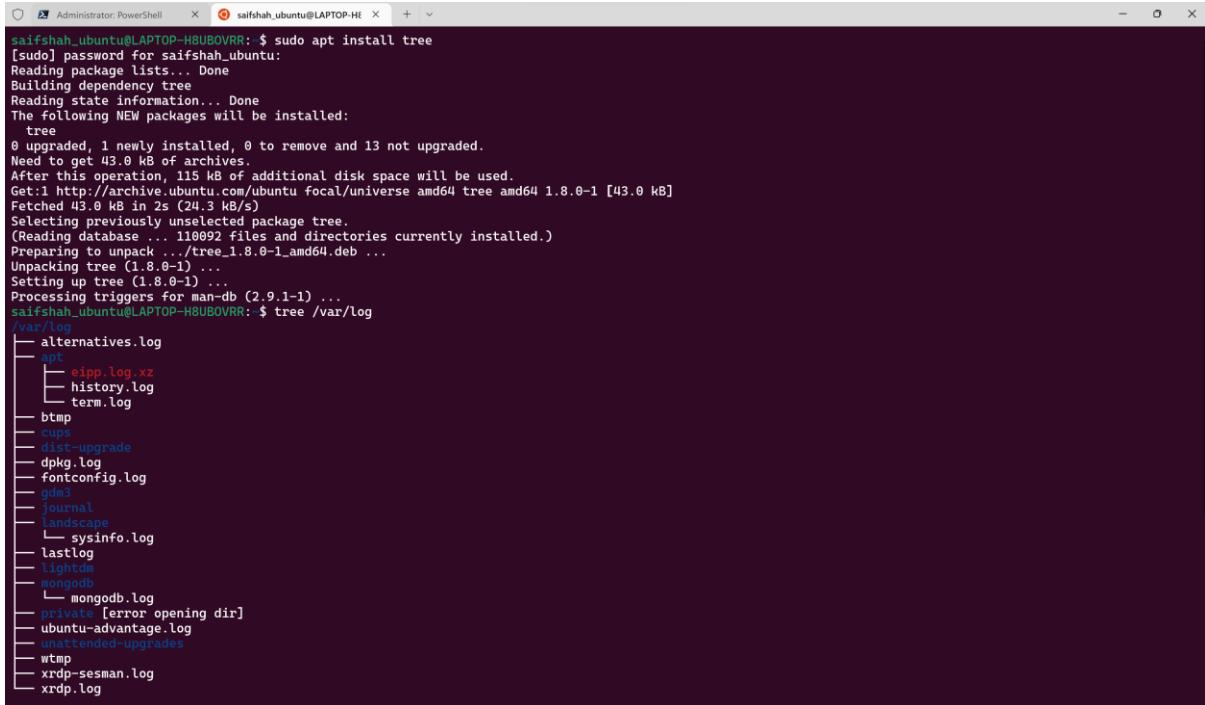


False

# Package Management

## ⇒ Download Packages from Internet

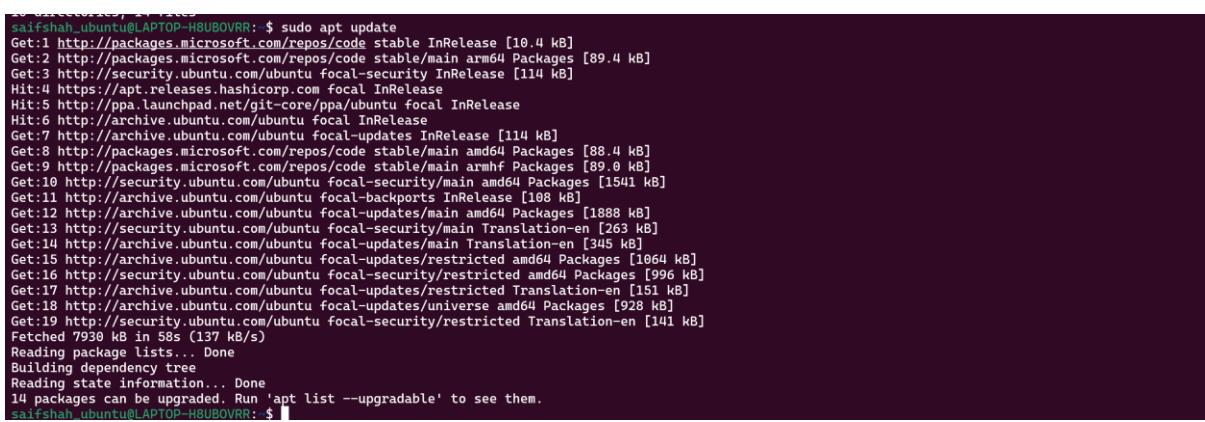
### Install Tree



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UB0VRR: $ sudo apt install tree
[sudo] password for saifshah_ubuntu:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  tree
0 upgraded, 1 newly installed, 0 to remove and 13 not upgraded.
Need to get 43.0 kB of archives.
After this operation, 115 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/universe amd64 tree amd64 1.8.0-1 [43.0 kB]
Fetched 43.0 kB in 2s (24.3 kB/s)
Selecting previously unselected package tree.
(Reading database ... 110092 files and directories currently installed.)
Preparing to unpack .../tree_1.8.0-1_amd64.deb ...
Unpacking tree (1.8.0-1) ...
Setting up tree (1.8.0-1) ...
Processing triggers for man-db (2.9.1-1) ...
saifshah_ubuntu@LAPTOP-H8UB0VRR: $ tree /var/log
/var/log
├── alternatives.log
├── apt
│   ├── eipp.log.xz
│   ├── history.log
│   └── term.log
├── btmp
├── cups
├── dist-upgrade
├── dpkg.log
├── fontconfig.log
├── gda3
├── journal
├── landscape
│   └── sysinfo.log
└── lastlog
    └── mongodb
        └── mongod.log
    private [error opening dir]
    ubuntu-advantage.log
    unattended-upgrades
    wtmp
    xrdp-sesman.log
    xrdp.log
```

Fig. tree successful Installation

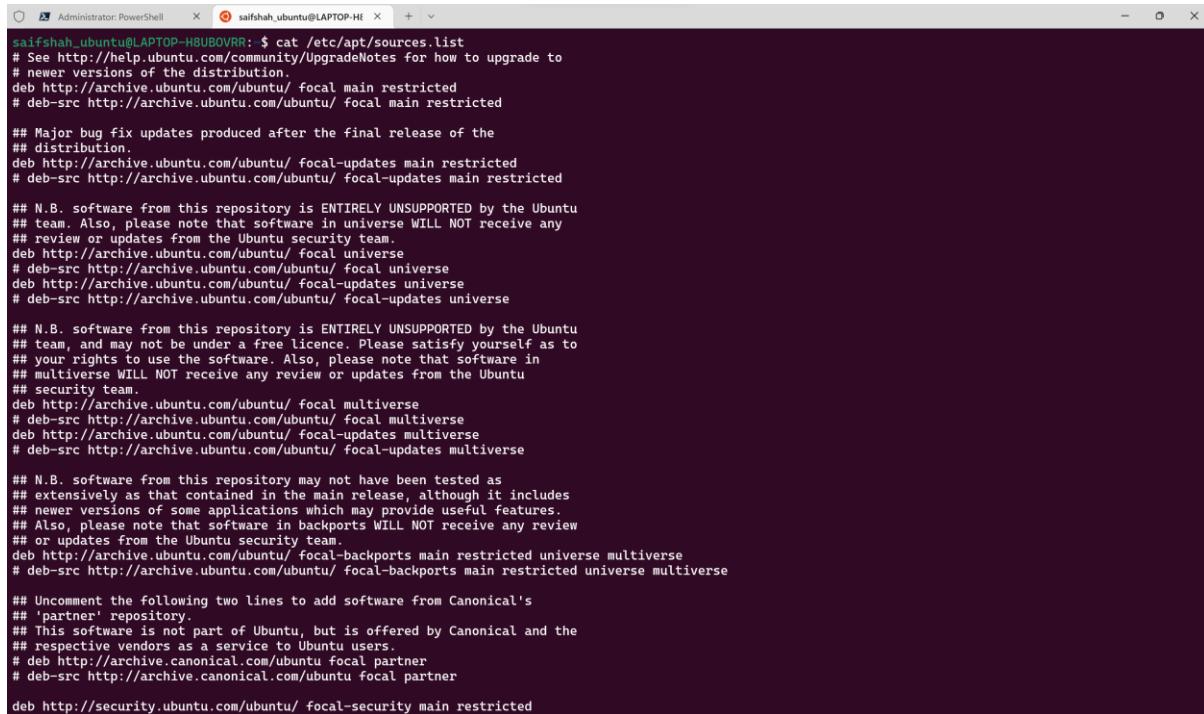
### To Update all your packages



```
10 directories, 117 files
saifshah_ubuntu@LAPTOP-H8UB0VRR: $ sudo apt update
Get:1 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Get:2 http://packages.microsoft.com/repos/code stable/main arm64 Packages [89.4 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:4 https://apt.releases.hashicorp.com focal InRelease
Hit:5 http://ppa.launchpad.net/git-core/ppa/ubuntu focal InRelease
Hit:6 http://archive.ubuntu.com/ubuntu focal InRelease
Get:7 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:8 http://packages.microsoft.com/repos/code stable/main amd64 Packages [88.4 kB]
Get:9 http://packages.microsoft.com/repos/code stable/main armhf Packages [89.0 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1541 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1888 kB]
Get:13 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [263 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/main Translation-en [345 kB]
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1064 kB]
Get:16 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [996 kB]
Get:17 http://archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [151 kB]
Get:18 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [928 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [141 kB]
Fetched 7930 kB in 58s (137 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
14 packages can be upgraded. Run 'apt list --upgradable' to see them.
saifshah_ubuntu@LAPTOP-H8UB0VRR: $
```

Fig. Update Packages

The **sources.list** file is a key factor in adding or upgrading applications to your Ubuntu installation. This is also used by your system for system updates. The file is basically the roadmap for your system to know where it may download programs for installation or upgrade.



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR: $ cat /etc/apt/sources.list
# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.
deb http://archive.ubuntu.com/ubuntu/ focal main restricted
# deb-src http://archive.ubuntu.com/ubuntu/ focal main restricted

## Major bug fix updates produced after the final release of the
## distribution.
deb http://archive.ubuntu.com/ubuntu/ focal-updates main restricted
# deb-src http://archive.ubuntu.com/ubuntu/ focal-updates main restricted

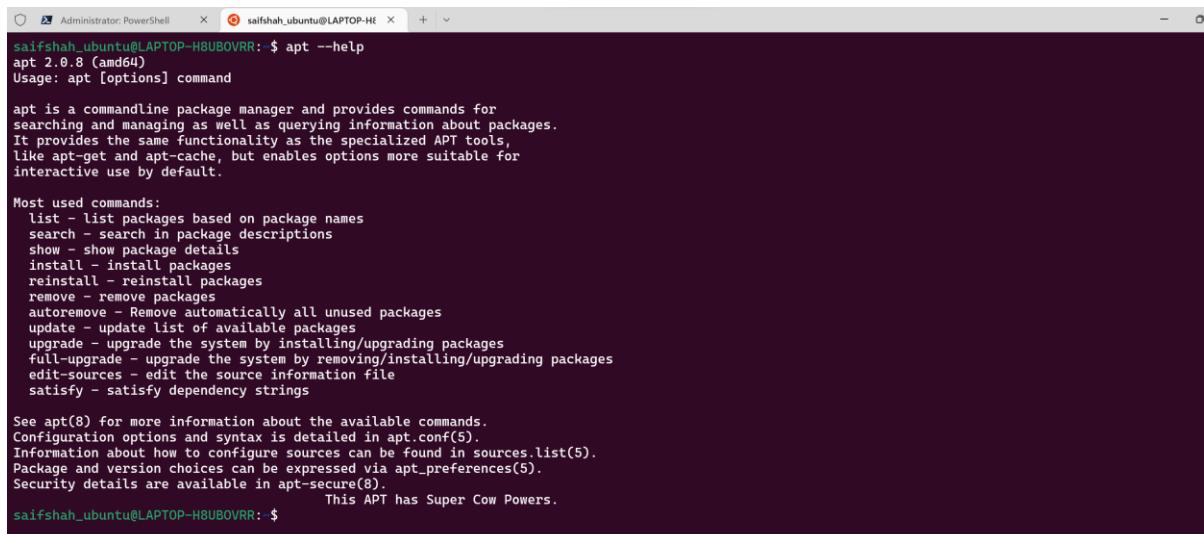
## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team. Also, please note that software in universe WILL NOT receive any
## review or updates from the Ubuntu security team.
deb http://archive.ubuntu.com/ubuntu/ focal universe
# deb-src http://archive.ubuntu.com/ubuntu/ focal universe
deb http://archive.ubuntu.com/ubuntu/ focal-updates universe
# deb-src http://archive.ubuntu.com/ubuntu/ focal-updates universe

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu
## team, and may not be under a free licence. Please satisfy yourself as to
## your rights to use the software. Also, please note that software in
## multiverse WILL NOT receive any review or updates from the Ubuntu
## security team.
deb http://archive.ubuntu.com/ubuntu/ focal multiverse
# deb-src http://archive.ubuntu.com/ubuntu/ focal multiverse
deb http://archive.ubuntu.com/ubuntu/ focal-updates multiverse
# deb-src http://archive.ubuntu.com/ubuntu/ focal-updates multiverse

## N.B. software from this repository may not have been tested as
## extensively as that contained in the main release, although it includes
## newer versions of some applications which may provide useful features.
## Also, please note that software in backports WILL NOT receive any review
## or updates from the Ubuntu security team.
deb http://archive.ubuntu.com/ubuntu/ focal-backports main restricted universe multiverse
# deb-src http://archive.ubuntu.com/ubuntu/ focal-backports main restricted universe multiverse

## Uncomment the following two lines to add software from Canonical's
## 'partner' repository.
## This software is not part of Ubuntu, but is offered by Canonical and the
## respective vendors as a service to Ubuntu users.
# deb http://archive.canonical.com/ubuntu focal partner
# deb-src http://archive.canonical.com/ubuntu focal partner

deb http://security.ubuntu.com/ubuntu/ focal-security main restricted
```



```
Administrator: PowerShell saifshah_ubuntu@LAPTOP-H8UBOVRR: $ apt --help
apt 2.0.8 (amd64)
Usage: apt [options] command

apt is a commandline package manager and provides commands for
searching and managing as well as querying information about packages.
It provides the same functionality as the specialized APT tools,
like apt-get and apt-cache, but enables options more suitable for
interactive use by default.

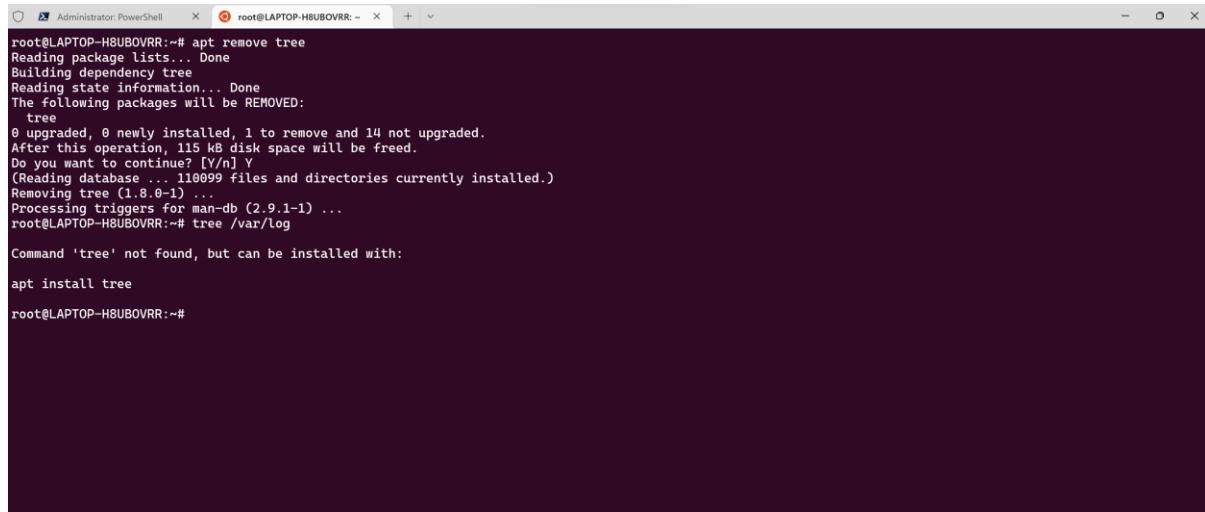
Most used commands:
  list - list packages based on package names
  search - search in package descriptions
  show - show package details
  install - install packages
  reinstall - reinstall packages
  remove - remove packages
  autoremove - Remove automatically all unused packages
  update - update list of available packages
  upgrade - upgrade the system by installing/upgrading packages
  full-upgrade - upgrade the system by removing/installing/upgrading packages
  edit-sources - edit the source information file
  satisfy - satisfy dependency strings

See apt(8) for more information about the available commands.
Configuration options and syntax is detailed in apt.conf(5).
Information about how to configure sources can be found in sources.list(5).
Package and version choices can be expressed via apt_preferences(5).
Security details are available in apt-secure(8).
This APT has Super Cow Powers.

saifshah_ubuntu@LAPTOP-H8UBOVRR:~$
```

## To remove tree

```
root@LAPTOP-H8UBOVRR:~# apt remove tree
```



```
root@LAPTOP-H8UBOVRR:~# apt remove tree
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  tree
0 upgraded, 0 newly installed, 1 to remove and 14 not upgraded.
After this operation, 115 kB disk space will be freed.
Do you want to continue? [Y/n] Y
(Reading database ... 110099 files and directories currently installed.)
Removing tree (1.8.0-1) ...
Processing triggers for man-db (2.9.1-1) ...
root@LAPTOP-H8UBOVRR:~# tree /var/log
Command 'tree' not found, but can be installed with:
apt install tree
root@LAPTOP-H8UBOVRR:~#
```

Fig. Removing packages

Ubuntu20 Commands		
<b>apt</b> <b>commands</b> <b>cheatsheet</b>	<a href="https://itsfoss.com/apt-command-guide/">https://itsfoss.com/apt-command-guide/</a>	
apt search PACKAGE	search from available repositories	
apt install PACKAGE -y	To Install Packages	
apt install apache2 -y	To Install apache2	
apt reinstall PACKAGE	To reinstall PACKAGE	
apt remove PACKAGE	To remove PACKAGE	
apt update	update all packages	
apt update PACKAGE	update only a package	

apt grouplist	List all available Group Packages	
apt groupinstall "GROUPNAME"	Installs all the packages in a group.	
apt repolist	List Enabled apt Repositories	
apt clean all	Clean apt Cache	
apt history	View History of apt	
apt show package name	Shows the information of package like version, size, source, repository etc	

## Services:

<code>\$ sudo systemctl start apache2</code>	<code># Starts apache2 on ubuntu</code>
<code>\$ sudo systemctl stop apache2</code>	<code># Stops apache2 on ubuntu</code>
<code>\$ sudo systemctl restart apache2</code>	<code># Restart service</code>
<code>\$ sudo systemctl reload apache2</code>	<code># Reload conf</code>
<code>\$ sudo systemctl enable apache2</code>	<code># starts apache2 at boot time</code>
<code>\$ sudo systemctl disable apache2</code>	<code># stops apache2 at boot time</code>
<code>\$ sudo systemctl is-active apache2</code>	<code># Shows whether the service is active or not</code>
<code>\$ sudo systemctl is-enabled apache2</code>	<code># Shows whether the service is enabled or not</code>

Fig. Services in Ubuntu20

## Process Related or Compression / Archives

```
$ tar cf home.tar home # Create tar named home.tar containing
home/ (11 tar examples)

$ tar xf
file.tar
file.tar
$ tar czf
file.tar.gz
compression
$ gzip file
to file.gz (untar gzip
file)
```

# Extract the files  
from

# Create a tar with  
gzip

# Compress file and renames  
it

```
$ processes (many parameters to
lsarn)
$ ps aux | grep
'telnet' telnet
process
$ pmap
(kernel, user memory
etc)
$ top
(30
examples)
$ kill pid
pid id (types of
signals)
$ killall
proc
$ pkill
processname its
name
$ # Resumes suspended jobs
bringing them to foreground (bg and fg)
command)
$ fg
foreground
$ fg
n
```

# Display your currently
active

# Find all process id related
to

# Memory map of
process

# Display all running
processes

# Kill process with
mentioned

# Kill all processes named
proc

# Send signal to a process
with

# Resumes suspended jobs

# Brings the most recent job
to

# Brings job n to the
foreground

## Quiz:



Good job!

Question 1:

Difference between CentOS & Ubuntu Linux

Both are same just different name, different packaging.

CentOS is for Server and Ubuntu is for Desktop

The biggest difference between the two Linux distributions is that Ubuntu is based on the Debian architecture while CentOS is forked from Red Hat Enterprise Linux



Good job!

Question 2:

apt command in ubuntu and yum in centos to manage packages

True

False