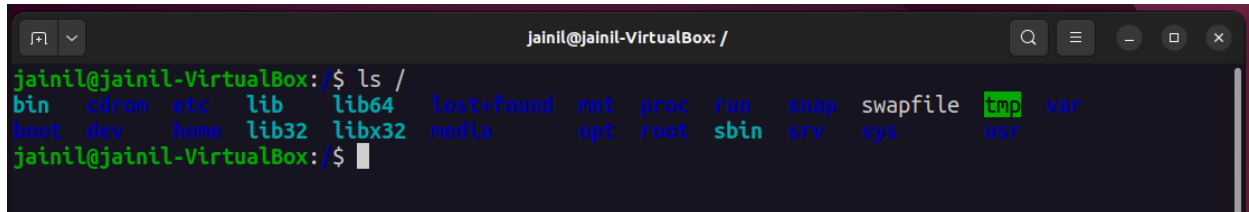


TASK 4

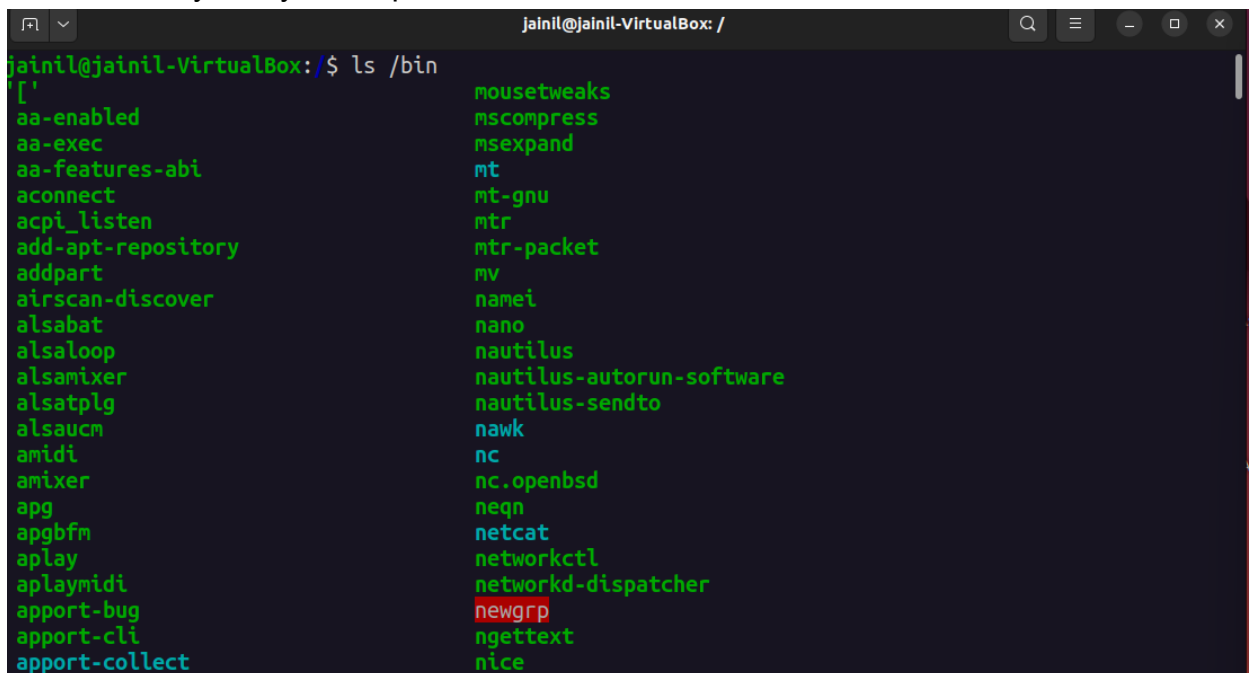
Linux file systems are organized in a hierarchical structure that starts with the root directory denoted by a forward slash `/`. Within this file system, various directories and files are organised to serve different purposes. `ls` command list of directory contents. Here are some common directories and their associated functions:

1. **/ (Root Directory):** The root directory is the top-level directory in the Linux file system. Everything in Linux is organized under this directory.



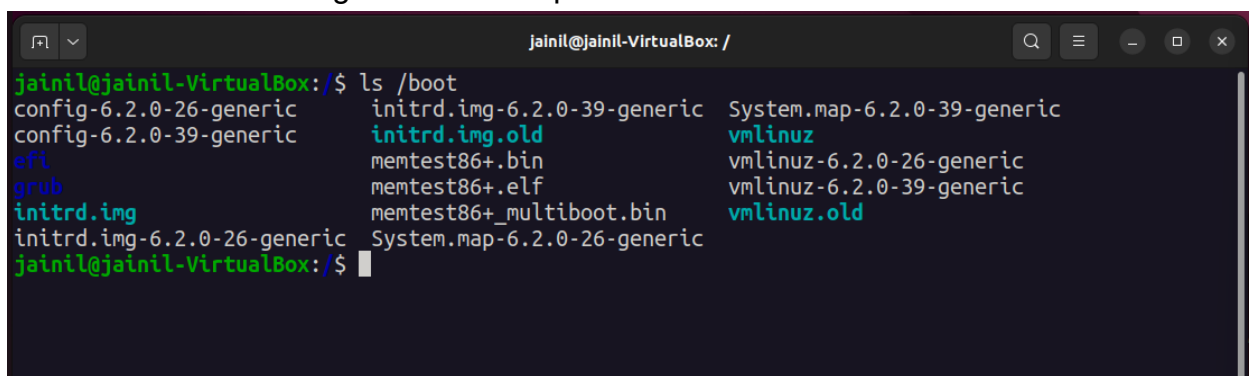
```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /  
bin    cdrom  etc    lib    lib64  lost+found  mnt  proc  run  snap  swapfile  tmp  var  
boot  dev    home  lib32  libx32  media      opt  root  sbin  srv   sys       usr
```

2. **/bin (Binary):** This directory contains essential binary executables (commands) required for system boot and repair. These executables are available to all users and are necessary for system operation.



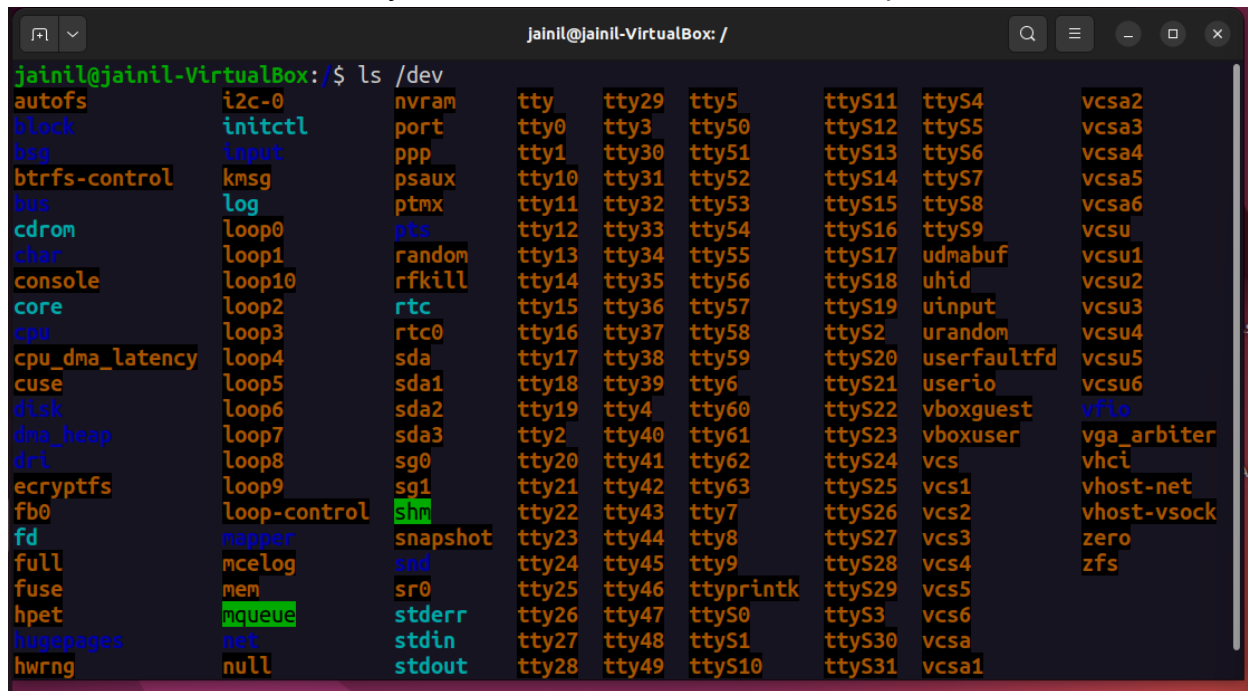
```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /bin  
['  
aa-enabled          mscompress  
aa-exec             msexpand  
aa-features-abi     nt  
aconect             nt-gnu  
acpi_listen         ntr  
add-apt-repository  ntr-packet  
addpart             mv  
airscan-discover    namei  
alsabat             nano  
alsaloop            nautilus  
alsamixer            nautilus-autorun-software  
alsatplg            nautilus-sendto  
alsaucm             nawk  
amidi               nc  
amixer              nc.openbsd  
apg                 neqn  
apgbfm              netcat  
aplay               networkctl  
aplaymidi           networkd-dispatcher  
apport-bug          newgrp  
apport-cli          ngettext  
apport-collect      nice
```

3. **/boot:** This directory contains the bootloader configuration and the Linux kernel. It's crucial for the initial stages of the boot process.



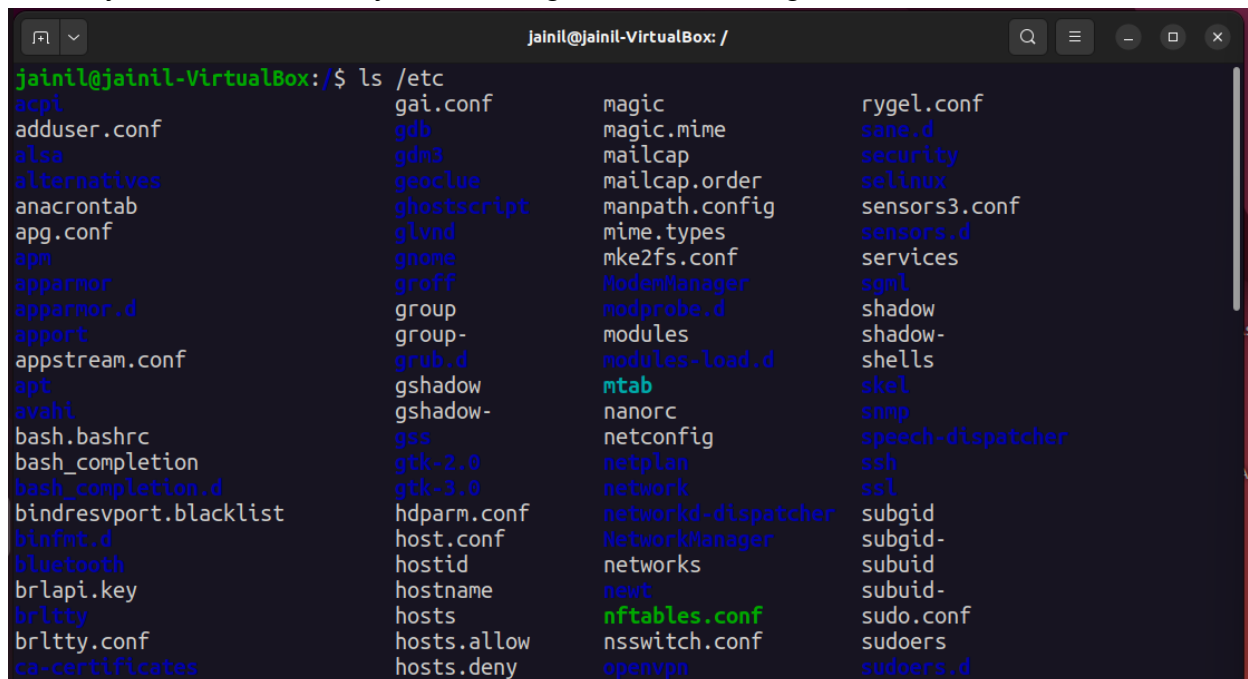
```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /boot  
config-6.2.0-26-generic  initrd.img-6.2.0-39-generic  System.map-6.2.0-39-generic  
config-6.2.0-39-generic  initrd.img.old               vmlinuz  
efi                     memtest86+.bin              vmlinuz-6.2.0-26-generic  
grub                   memtest86+.elf              vmlinuz-6.2.0-39-generic  
initrd.img             memtest86+_multiboot.bin    vmlinuz.old  
initrd.img-6.2.0-26-generic  System.map-6.2.0-26-generic
```

4. **/dev (Device):** This directory contains special device files that represent hardware devices connected to the system, such as disks, terminals, or printers.



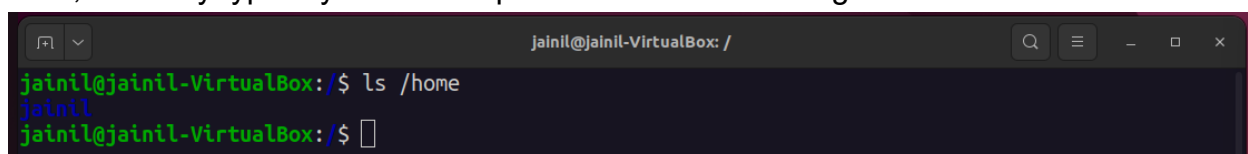
```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /dev  
autofs      i2c-0      nvram      tty         tty29      tty5        ttyS11      ttyS4      vcsa2  
block       initctl    port       tty0        tty3       tty50       ttyS12      ttyS5      vcsa3  
bsg         input     ppp        tty1        tty30      tty51       ttyS13      ttyS6      vcsa4  
btrfs-control kmsg      psaux     tty10       tty31      tty52       ttyS14      ttyS7      vcsa5  
bus         log        ptmx       tty11       tty32      tty53       ttyS15      ttyS8      vcsa6  
cdrom       loop0      pts        tty12       tty33      tty54       ttyS16      ttyS9      vcsu  
char        loop1      random     tty13       tty34      tty55       ttyS17      udmabuf    vcsu1  
console     loop10     rfkill     tty14       tty35      tty56       ttyS18      uhid       vcsu2  
core        loop2      rtc        tty15       tty36      tty57       ttyS19      uinput     vcsu3  
cpu         loop3      rtc0       tty16       tty37      tty58       ttyS2       urandom     vcsu4  
cpu_dma_latency loop4      sda        tty17       tty38      tty59       ttyS20      userfaultfd vcsu5  
cuse        loop5      sda1       tty18       tty39      tty6         ttyS21      userio      vcsu6  
disk        loop6      sda2       tty19       tty4       tty60       ttyS22      vboxguest   vfio  
dma_heap    loop7      sda3       tty2         tty40      tty61       ttyS23      vboxuser    vga_arbiter  
dri         loop8      sg0        tty20       tty41      tty62       ttyS24      vcs         vhci  
ecryptfs    loop9      sg1        tty21       tty42      tty63       ttyS25      vcs1        vhost-net  
fb0         loop-control shm         tty22       tty43      tty7         ttyS26      vcs2        vhost-vsock  
fd          mapper     snapshot   tty23       tty44      tty8         ttyS27      vcs3        zero  
full        mcelog     snd        tty24       tty45      tty9         ttyS28      vcs4        zfs  
fuse        mem        sr0        tty25       tty46      ttyprintk    ttyS29      vcs5  
hpet        mqueue     stderr     tty26       tty47      ttyS0        ttyS3       vcs6  
hugepages   net        stdin      tty27       tty48      ttyS1        ttyS30      vcsa  
hwrng       null       stdout     tty28       tty49      ttyS10       ttyS31      vcsa1
```

5. **/etc (Etcetera):** This directory contains system-wide configuration files and scripts. It's where you'll find files for system settings, network configuration, and more.



```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /etc  
acpi          gai.conf      magic          rygel.conf  
adduser.conf  gdb           magic.mime     sane.d  
alsa          gdm3          mailcap        security  
alternatives  geoclue       mailcap.order  selinux  
anacrontab    ghostscript   manpath.config sensors3.conf  
apg.conf      glvnd         mime.types     sensors.d  
apm           gnome         mke2fs.conf    services  
apparmor      groff         ModemManager   sgml  
apparmor.d    group         modprobe.d     shadow  
appport       group-        modules        shadow-  
appstream.conf grub.d         modules-load.d shells  
apt           gshadow       mtab           skel  
avahi         gshadow-     nanorc         snmp  
bash.bashrc   gss           netconfig     speech-dispatcher  
bash_completion gtk-2.0       netplan        ssh  
bash_completion.d gtk-3.0       network        ssl  
bindresvport.blacklist hdpam.conf   networkd-dispatcher subgid  
binfmt.d      host.conf    NetworkManager subgid-  
bluetooth     hostid       networks       subuid  
brlapi.key     hostname     newt           subuid-  
brltty         hosts        nftables.conf sudo.conf  
brltty.conf    hosts.allow  nsswitch.conf sudoers  
ca-certificates hosts.deny    openvpn        sudoers.d
```

6. **/home:** This is the location of user home directories. Each user has a subdirectory here, and they typically store their personal files and settings.



```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /home  
jainil  
jainil@jainil-VirtualBox:/$
```

7. **/lib (Library):** Essential shared libraries needed by the system and applications are stored here.

```
jainil@jainil-VirtualBox: /
jainil@jainil-VirtualBox:/$ ls /lib
apg                               initramfs-tools                python3
apparmor                          ispell                         python3.10
apt                              kernel                         python3.11
aspell                           klibc                          recovery-mode
binfmt.d                         klibc-K8e6D0mVI9JpyGMLR7qNe5iZeBk.so  rhythmbox
bluetooth                        libreoffice                    rsyslog
brltty                           linux                          sasl2
cnf-update-db                    linux-boot-probes              shim
command-not-found               linux-sound-base               snapd
console-setup                   locale                         software-properties
cpp                              lp_solve                       speech-dispatcher-modules
crda                             lsb                            ssl
cups                             man-db                         sysctl.d
dbus-1.0                         memtest86+                     systemd
debug                            mime                            sysusers.d
dpkg                             modprobe.d                    tc
emacsen-common                  modules                        terminfo
environment.d                   modules-load.d                 thunderbird
evolution-data-server           netplan                       thunderbird-addons
file                             networkd-dispatcher            tmpfiles.d
firewalld                       NetworkManager                 ubiquity
firmware                        nvidia                         ubuntu-advantage
gcc                              openssh                        ubuntu-release-upgrader
```

8. **/media**: Removable media, such as USB drives or optical discs, are typically mounted in subdirectories under /media when they're inserted.
9. **/mnt (Mount)**: Historically used as a temporary mount point for mounting file systems, though /media is commonly used for this purpose today.
10. **/opt (Optional)**: This directory is often used for optional, third-party software packages. Some applications install in subdirectories under /opt.
11. **/proc (Process)**: This is a virtual file system that provides information about currently running processes and system status.

```
jainil@jainil-VirtualBox: /
jainil@jainil-VirtualBox:/$ ls /proc
1      12504  15    1838  2018  2487  47    559   74    execdomains  pagetypeinfo
10     12509  1504  1846  2023  25    479   56    75    fb           partitions
10716  12527  1512  1866  205   2516  48    562   772    filesystems  pressure
11     12548  1519  1873  2068  2538  480   564   8     fs           schedstat
11011  12825  1522  1886  2086  26    481   567   83    interrupts   scsi
112    12831  1563  19    21    27    49    57    85    iomem        self
11387  12832  16    1919  2138  28    5    571   86    ioports      slabinfo
1143   12861 1601  1940  2141  286   50    59    90    irq          softirqs
11481  12889  1616  1942  2146  29    51    6    940    kallsyms     stat
11514  12933  1624  1967  2155  3     52    60    953    kcore        swaps
11528  12934  1626  1968  22    307   527   61    acpi        keys          sys
11567  12935  165   1970  2234  31    528   62    asound      key-users     sysrq-trigger
11674  12954  166   1971  2250  32    53    639    bootconfig  kmsg          sysvipc
11826  13     1684  1977  2255  33    531   64    buddyinfo  kpagecgroup  thread-self
11851  133    17    1988  2256  34    532   642    bus         kpagecount   timer_list
12     134    1728  1990  2281  35    533   647    cgroups    kpageflags   tty
12011  14     1734  1992  2282  38    534   66    cmdline    loadavg       uptime
12285  1433   1746  1994  23    39    54    67    consoles   locks         version
12307  1484   1769  1995  2312  3922  543   672    cpuinfo    mdstat        version_signature
12328  1485   1775  2    2341  4     547   68    crypto     meminfo       vmallocinfo
12369  1491   1780  20    2370  40    549   69    devices    misc          vmstat
124    1492   1790  2001  245   41    55    699    diskstats  modules       zoneinfo
12470  1493   1816  2003  2459  42    551   719    dma         mounts
```

12. **/root**: This is the home directory for the superuser (root). The root user is the administrative user with the highest privileges.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ sudo ls /root  
[sudo] password for jainil:  
snap  
jainil@jainil-VirtualBox:/$ sudo tree /root  
/root  
├── snap  
│   ├── firefox  
│   │   ├── 2987  
│   │   ├── common  
│   │   └── current -> 2987  
│   ├── snapd-desktop-integration  
│   │   ├── 83  
│   │   ├── common  
│   │   └── current -> 83  
│   └── snap-store  
│       ├── 959  
│       ├── common  
│       └── current -> 959  
└── 13 directories, 0 files  
jainil@jainil-VirtualBox:/$
```

13. **/run**: This directory holds system runtime data, such as process IDs and socket files. It is often a tmpfs file system that is cleared at boot.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /run  
acpid.pid      crond.pid      initctl         NetworkManager  snapd            tmpfiles.d  
acpid.socket   crond.reboot   initramfs       openvpn          snapd-snap.socket  udev  
alsa           cups           irqbalance     openvpn-client  snapd.socket      udisks2  
avahi-daemon   dbus           log             openvpn-server  speech-dispatcher  user  
blkid          fsck           mount           plymouth        spice-vdagentd     utmp  
console-setup  gdm3           netns           sendsigs.omit.d sudo             uuidd  
credentials    gdm3.pid      shm             systemd  
jainil@jainil-VirtualBox:/$
```

14. **/bin (System Binary)**: Similar to /bin, but it contains binary executables that are typically used for system maintenance and repair.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /bin  
'['  
aa-enabled      mousetweaks  
aa-exec         mscompress  
aa-features-abi msexpand  
aconnect        mt  
acpi_listen     mt-gnu  
add-apt-repository mtr  
addpart         mtr-packet  
airscan-discover mv  
alsabat         namei  
alsaloop        nano  
alsamixer       nautilus  
alsatplg        nautilus-autorun-software  
alsaucm         nautilus-sendto  
amidi           nawk  
amixer          nc  
apg             nc.openbsd  
apgbfm          neqn  
aplay           netcat  
aplaymidi       networkctl  
apport-bug      networkd-dispatcher  
apport-cli      newgrp  
apport-collect  ngettext  
               nice
```

15. **/srv (Service)**: This directory can be used for data and service-specific files. For example, web server data might be located under /srv.

16. **/sys (System)**: A virtual file system that exposes kernel information and configuration settings.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /sys  
block bus class dev devices firmware fs hypervisor kernel module power  
jainil@jainil-VirtualBox:/$
```

17. **/tmp (Temporary)**: A directory for temporary files that are not intended to be preserved across reboots. It's often used for storing temporary data by applications.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /tmp  
snap-private-tmp  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-color.service-msotkx  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-ModemManager.service-gKRSnz  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-power-profiles-daemon.service-MeMalY  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-switcheroo-control.service-Ovt01Q  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-systemd-logind.service-bd2bGK  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-systemd-oomd.service-OfHkBr  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-systemd-resolved.service-EhUigC  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-systemd-timesyncd.service-LAE1Ba  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-ubuntu-advantage-desktop-daemon.service-ZyFluH  
systemd-private-5ab7ee91af57413da98774aa3c6e30d0-upower.service-oNYaHG  
tracker-extract-3-files.1000  
tracker-extract-3-files.128  
VMwareDnD  
jainil@jainil-VirtualBox:/$
```

18. **/usr (User System Resources)**: This directory contains user data and program files. It's subdivided into /usr/bin, /usr/lib, /usr/share, etc.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /usr  
bin games include lib lib32 lib64 libexec libx32 local sbin share src  
jainil@jainil-VirtualBox:/$
```

19. **/var (Variable)**: This directory contains variable data, including log files, spool directories, and temporary files generated by system and applications.

```
jainil@jainil-VirtualBox: /  
jainil@jainil-VirtualBox:/$ ls /var  
backups cache crash lib local lock log mail metrics opt run snap spool tmp  
jainil@jainil-VirtualBox:/$
```