

NETWORKING & SYSTEM ADMINISTRATION LAB

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Roll No: 49

Batch: MCA -A

Date: 22/04/2022

Experiment No.: 8

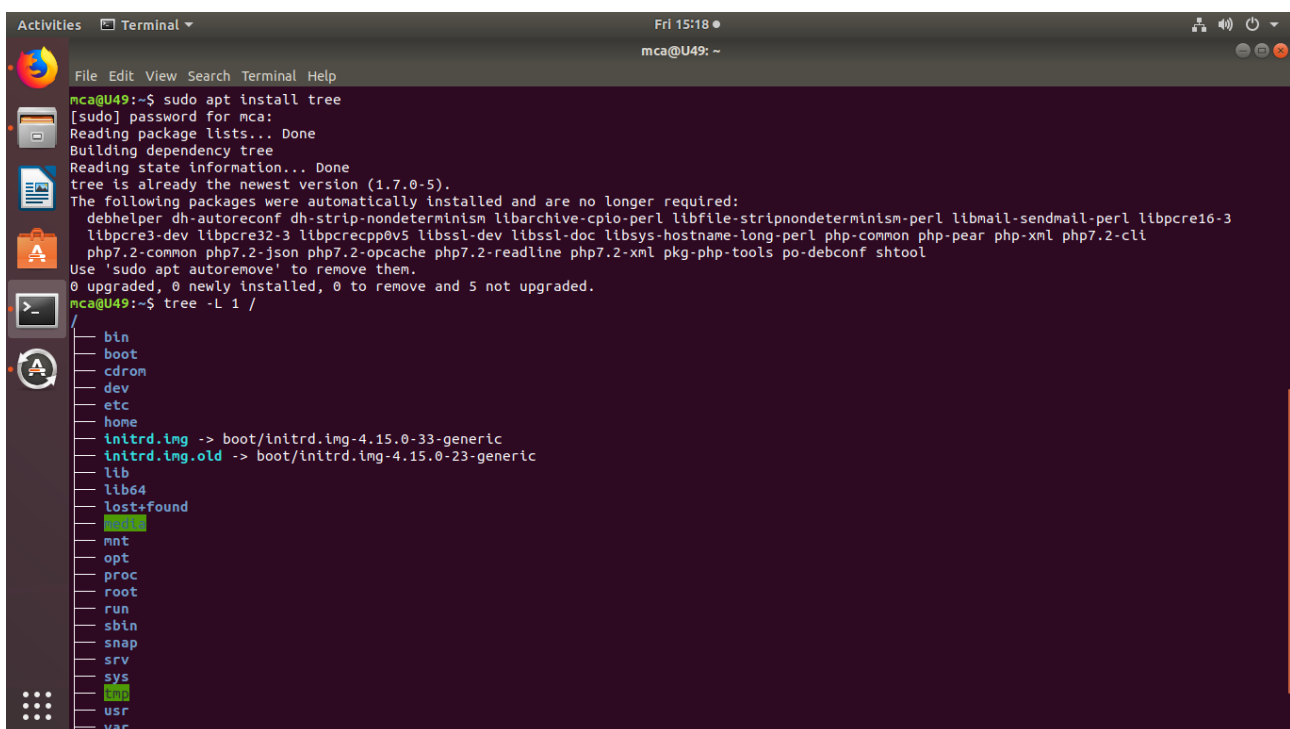
Aim

a) Acquire knowledge about locations of various system and configuration files listed above

Procedure

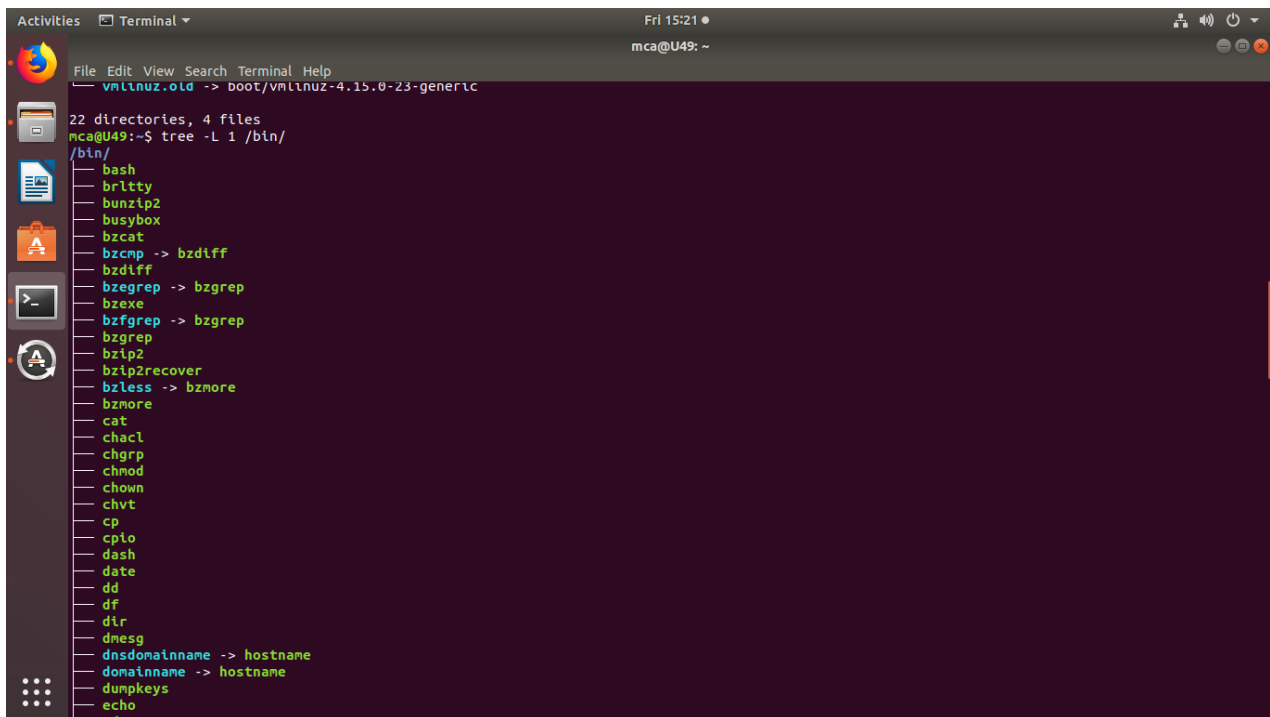
1. / - The Root Directory

Everything on your Linux system is located under the / directory, known as the root directory.



```
Activities Terminal Fri 15:18 mca@U49: ~
File Edit View Search Terminal Help
mca@U49:~$ sudo apt install tree
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tree is already the newest version (1.7.0-5).
The following packages were automatically installed and are no longer required:
debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
mca@U49:~$ tree -L 1 /
/
bin
boot
cdrom
dev
etc
home
initrd.img -> boot/initrd.img-4.15.0-33-generic
initrd.img.old -> boot/initrd.img-4.15.0-23-generic
lib
lib64
lost+found
mnt
opt
proc
root
run
sbin
snap
srv
sys
usr
var
```

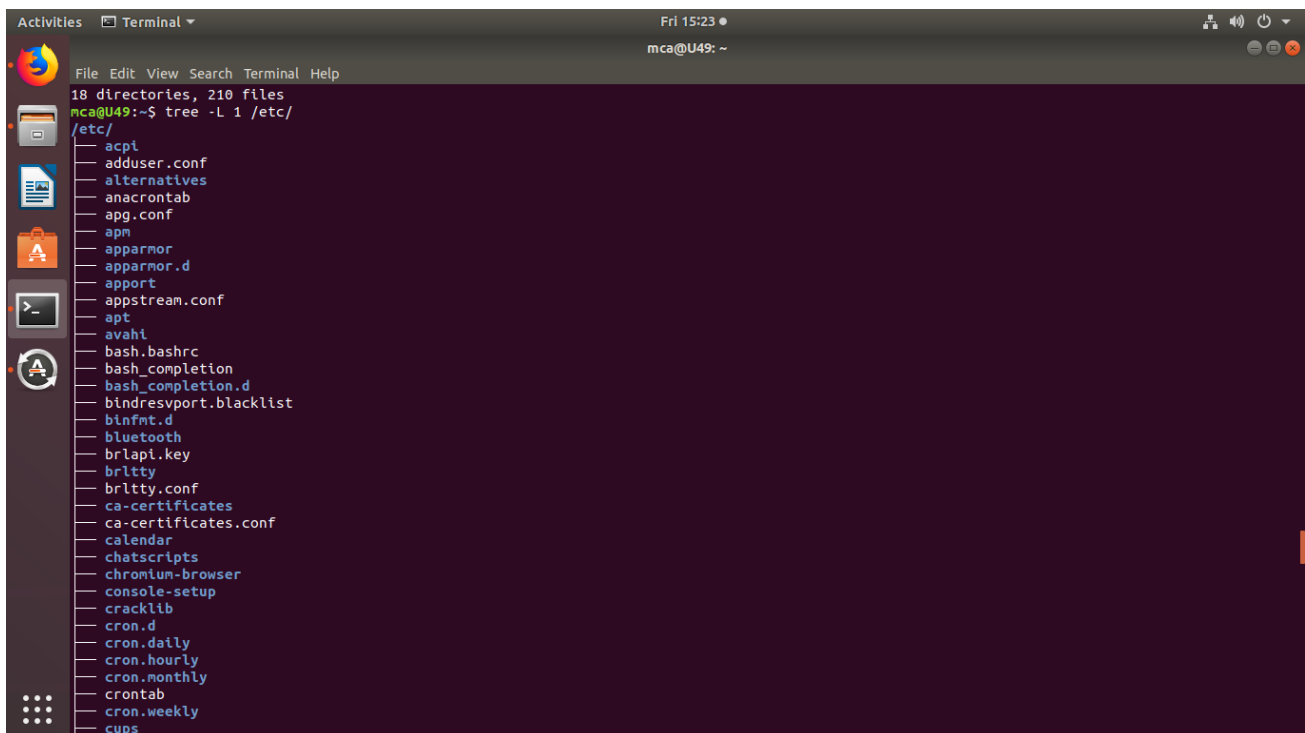
2. /bin – binary or executable programs.



A terminal window titled 'Terminal' showing the command `tree -L 1 /bin/` and its output. The output lists 22 directories and 4 files in the `/bin/` directory. The files listed are: `bash`, `brltty`, `bunzip2`, `busybox`, `bzcat`, `bzcmp` (with a note `-> bzdifff`), `bzdifff`, `bzegrep` (with a note `-> bzgrep`), `bzexe`, `bzfgrep` (with a note `-> bzgrep`), `bzgrep`, `bzip2`, `bzip2recover`, `bzless` (with a note `-> bzmores`), `bzmores`, `cat`, `chacl`, `chgrp`, `chmod`, `chown`, `chvt`, `cp`, `cpio`, `dash`, `date`, `dd`, `df`, `dir`, `dmesg`, `dnsdomainname` (with a note `-> hostname`), `domainname` (with a note `-> hostname`), `dumpkeys`, `echo`, and `ed`.

```
File Edit View Search Terminal Help
VRLinux.old -> boot/VRLinux-4.15.0-23-generic
22 directories, 4 files
mca@U49:~$ tree -L 1 /bin/
/bin/
├── bash
├── brltty
├── bunzip2
├── busybox
├── bzcat
├── bzcmp -> bzdifff
├── bzdifff
├── bzegrep -> bzgrep
├── bzexe
├── bzfgrep -> bzgrep
├── bzgrep
├── bzip2
├── bzip2recover
├── bzless -> bzmores
├── bzmores
├── cat
├── chacl
├── chgrp
├── chmod
├── chown
├── chvt
├── cp
├── cpio
├── dash
├── date
├── dd
├── df
├── dir
├── dmesg
├── dnsdomainname -> hostname
├── domainname -> hostname
├── dumpkeys
├── echo
└── ed
```

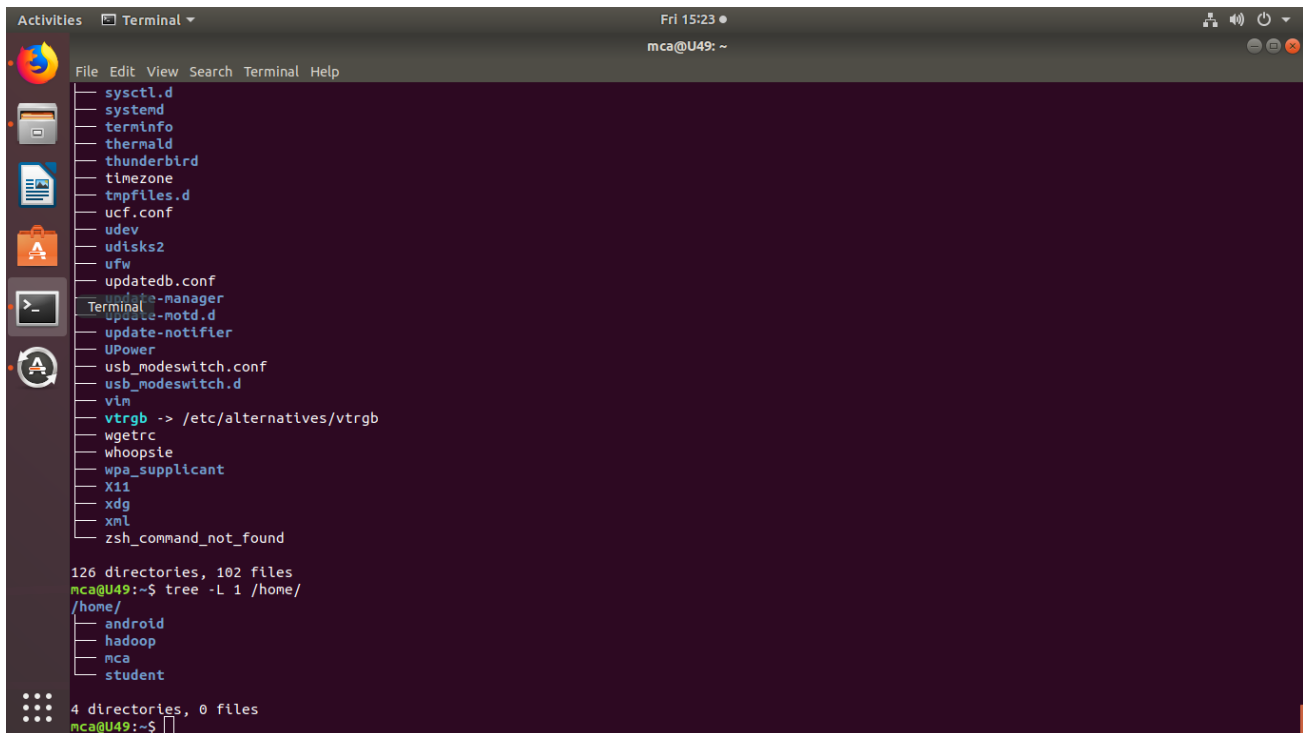
3. /etc – system configuration files.



A terminal window titled 'Terminal' showing the command `tree -L 1 /etc/` and its output. The output lists 18 directories and 210 files in the `/etc/` directory. The files listed are: `acpi`, `adduser.conf`, `alternatives`, `anacrontab`, `apg.conf`, `apm`, `apparmor`, `apparmor.d`, `appport`, `appstream.conf`, `apt`, `avahi`, `avahi.bashrc`, `bash_completion`, `bash_completion.d`, `bindresvport.blacklist`, `binfmt.d`, `bluetooth`, `brlapi.key`, `brltty`, `brltty.conf`, `ca-certificates`, `ca-certificates.conf`, `calendar`, `chatscripts`, `chromium-browser`, `console-setup`, `cracklib`, `cron.d`, `cron.daily`, `cron.hourly`, `cron.monthly`, `crontab`, `cron.weekly`, and `cups`.

```
File Edit View Search Terminal Help
mca@U49:~$ tree -L 1 /etc/
/etc/
├── acpi
├── adduser.conf
├── alternatives
├── anacrontab
├── apg.conf
├── apm
├── apparmor
├── apparmor.d
├── appport
├── appstream.conf
├── apt
├── avahi
├── avahi.bashrc
├── bash_completion
├── bash_completion.d
├── bindresvport.blacklist
├── binfmt.d
├── bluetooth
├── brlapi.key
├── brltty
├── brltty.conf
├── ca-certificates
├── ca-certificates.conf
├── calendar
├── chatscripts
├── chromium-browser
├── console-setup
├── cracklib
├── cron.d
├── cron.daily
├── cron.hourly
├── cron.monthly
├── crontab
├── cron.weekly
└── cups
```

4. /home – home directory. It is the default current directory.



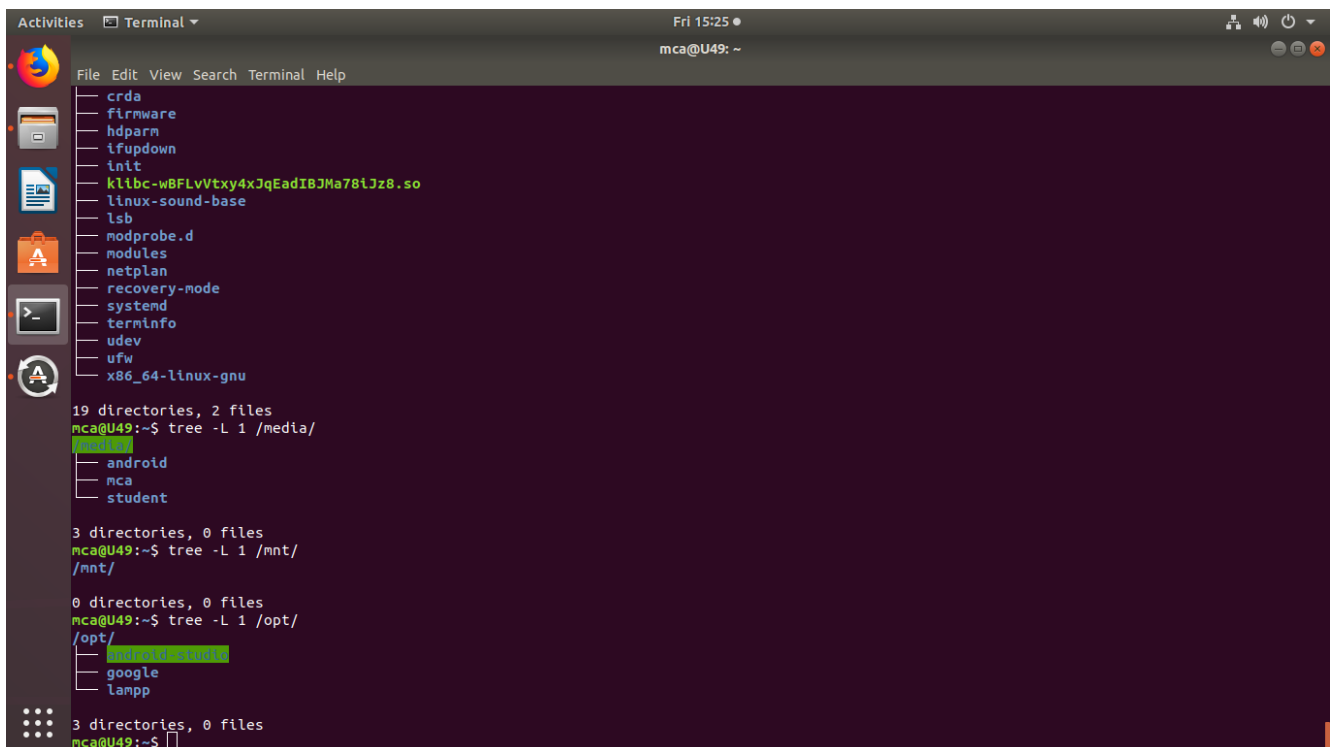
A terminal window titled 'Terminal' showing a file listing of the root directory. The files listed include: sysctl.d, systemd, terminfo, thermald, thunderbird, timezone, tmpfiles.d, ucf.conf, udev, udisks2, ufw, updatedb.conf, update-manager, update-motd.d, update-notifier, UPower, usb_modeswitch.conf, usb_modeswitch.d, vim, vtrgb, wgetrc, whoopsie, wpa_supplicant, X11, xdg, xml, and zsh_command_not_found. A command is executed: `vtrgb -> /etc/alternatives/vtrgb`. Then, a directory tree for /home is shown: `tree -L 1 /home/`, resulting in: `/home/`, `android`, `hadoop`, `mca`, and `student`. Finally, a directory tree for /opt is shown: `tree -L 1 /opt/`, resulting in: `/opt/`, `android-studio`, `google`, and `lampp`.

```
File Edit View Search Terminal Help
--
sysctl.d
systemd
terminfo
thermald
thunderbird
timezone
tmpfiles.d
ucf.conf
udev
udisks2
ufw
updatedb.conf
update-manager
update-motd.d
update-notifier
UPower
usb_modeswitch.conf
usb_modeswitch.d
vim
vtrgb -> /etc/alternatives/vtrgb
wgetrc
whoopsie
wpa_supplicant
X11
xdg
xml
zsh_command_not_found

126 directories, 102 files
mca@U49:~$ tree -L 1 /home/
/home/
├── android
├── hadoop
├── mca
└── student

4 directories, 0 files
mca@U49:~$
```

5. /opt – optional or third-party software.



A terminal window titled 'Terminal' showing a file listing of the root directory. The files listed include: crda, firmware, hdparm, ifupdown, init, klibc-wBFLvTxy4xJqEadI8JMa78tJz8.so, linux-sound-base, lsb, modprobe.d, modules, netplan, netplan, recovery-mode, systemd, terminfo, udev, ufw, and x86_64-linux-gnu. Then, a directory tree for /media is shown: `tree -L 1 /media/`, resulting in: `/media/`, `android`, `mca`, and `student`. Finally, a directory tree for /opt is shown: `tree -L 1 /opt/`, resulting in: `/opt/`, `android-studio`, `google`, and `lampp`.

```
File Edit View Search Terminal Help
--
crda
firmware
hdparm
ifupdown
init
klibc-wBFLvTxy4xJqEadI8JMa78tJz8.so
linux-sound-base
lsb
modprobe.d
modules
netplan
netplan
recovery-mode
systemd
terminfo
udev
ufw
x86_64-linux-gnu

19 directories, 2 files
mca@U49:~$ tree -L 1 /media/
/media/
├── android
├── mca
└── student

3 directories, 0 files
mca@U49:~$ tree -L 1 /mnt/
/mnt/

0 directories, 0 files
mca@U49:~$ tree -L 1 /opt/
/opt/
├── android-studio
├── google
└── lampp

3 directories, 0 files
mca@U49:~$
```

6. /tmp – temporary space, typically cleared on reboot.

```

Fri 15:27
mca@U49: ~

File Edit View Search Terminal Help

power

11 directories, 0 files
mca@U49:~$ tree -L 1 /tmp/
/tmp/
├── config-err-01XjNk
├── config-err-0Py8h1
├── ssh-2QczvCBTV4lk
├── ssh-Kn7Ir06qSL72
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-bolt.service-fAnl4x
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-colord.service-gwbZ99
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-fwupd.service-YUVPb6
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-rtkit-daemon.service-GNj1LF
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-resolved.service-QglRMWZ
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-timesyncd.service-QQnIps
├── Temp-0bb82b0a-5f4b-4343-be03-ed2680f7f958
└── Temp-7e4b73ba-3e1c-4521-9d54-c75a36e5cacc

10 directories, 2 files
mca@U49:~$ tree -L 1 /var/
/var/
├── backups
├── cache
├── crash
├── lib
├── local
├── lock -> /run/lock
├── log
├── mail
├── metrics
├── opt
├── run -> /run
├── snap
├── spool
└── tmp

14 directories, 0 files
mca@U49:~$

```

7. /usr – User related programs.

```

Fri 15:28
mca@U49: ~

File Edit View Search Terminal Help

systemd-private-6b1b025c5c474fa08b58565144a24ab3-rtkit-daemon.service-GNj1LF
systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-resolved.service-QglRMWZ
systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-timesyncd.service-QQnIps
Temp-0bb82b0a-5f4b-4343-be03-ed2680f7f958
Temp-7e4b73ba-3e1c-4521-9d54-c75a36e5cacc

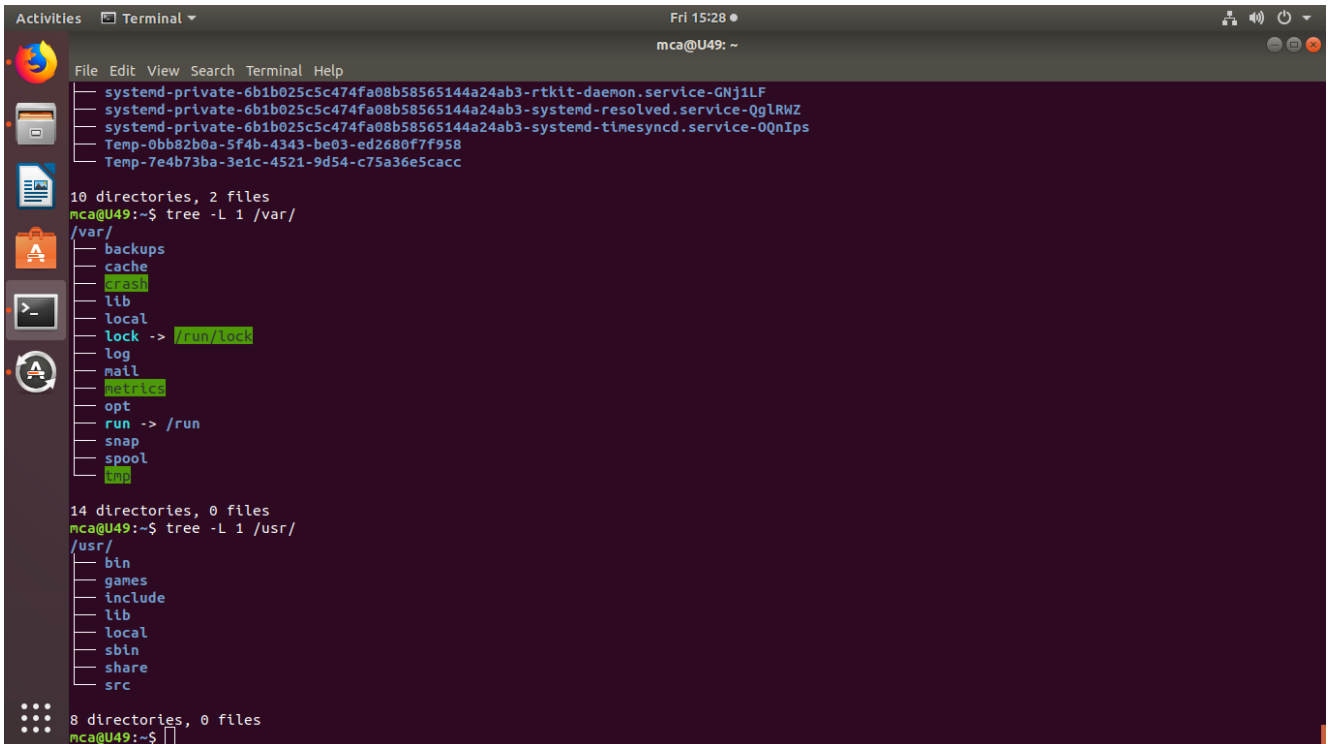
10 directories, 2 files
mca@U49:~$ tree -L 1 /var/
/var/
├── backups
├── cache
├── crash
├── lib
├── local
├── lock -> /run/lock
├── log
├── mail
├── metrics
├── opt
├── run -> /run
├── snap
├── spool
└── tmp

14 directories, 0 files
mca@U49:~$ tree -L 1 /usr/
/usr/
├── bin
├── games
├── include
├── lib
├── local
├── sbin
├── share
└── src

8 directories, 0 files
mca@U49:~$

```

8. /var – log files.



A terminal window titled 'Terminal' showing the output of two 'tree' commands. The first command, 'tree -L 1 /var/', lists the contents of the /var directory, including subdirectories like backups, cache, etc., and files like log and mail. The second command, 'tree -L 1 /usr/', lists the contents of the /usr directory, including subdirectories like bin, games, include, lib, local, sbin, share, and src. The terminal output is as follows:

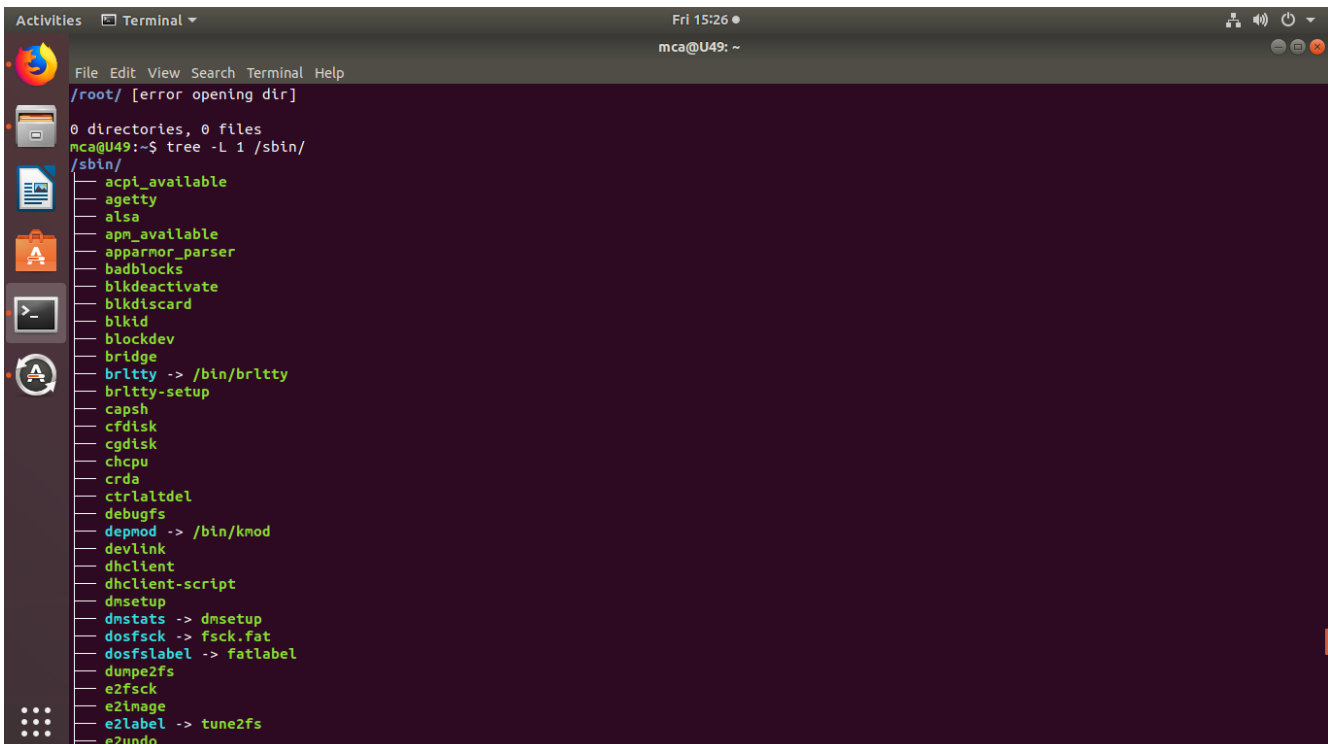
```
systemd-private-6b1b025c5c474fa08b58565144a24ab3-rtkit-daemon.service-GNj1lF
systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-resolved.service-QglRWZ
systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-timesyncd.service-QqnIps
Temp-0bb82b0a-5f4b-4343-be03-ed2680f7f958
Temp-7e4b73ba-3e1c-4521-9d54-c75a36e5cacc

10 directories, 2 files
mca@U49:~$ tree -L 1 /var/
/var/
├── backups
├── cache
├── etc
├── lib
├── local
├── lock -> /run/lock
├── log
├── mail
├── metrics
├── opt
├── run -> /run
├── snap
├── spool
└── tmp

14 directories, 0 files
mca@U49:~$ tree -L 1 /usr/
/usr/
├── bin
├── games
├── include
├── lib
├── local
├── sbin
├── share
└── src

8 directories, 0 files
mca@U49:~$
```

9. /sbin – binary executable programs for an administrator.

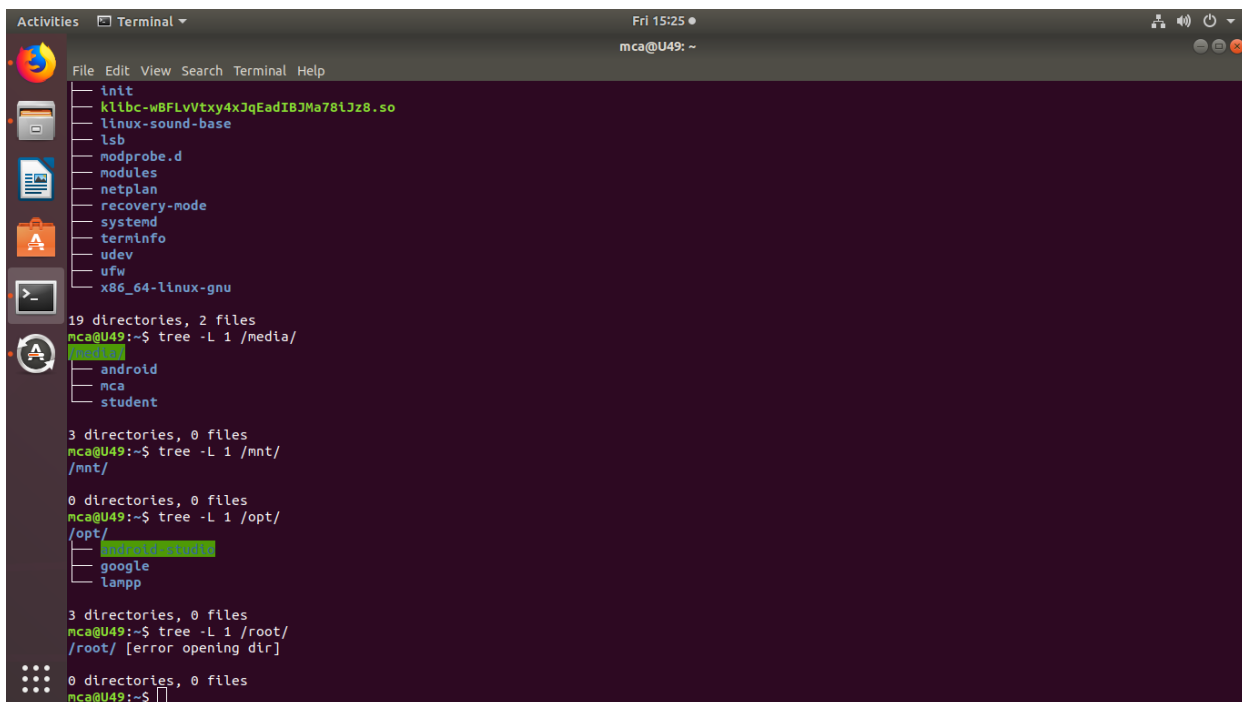


A terminal window titled 'Terminal' showing the output of the 'tree -L 1 /sbin/' command. The command lists the contents of the /sbin directory, including various binary executable programs like acpi_available, agetty, alsa, apparmor_parser, badblocks, blkdeactivate, blkdiscard, blkid, blockdev, bridge, brltty, brltty-setup, capsh, cfdisk, cgdisk, chcpu, crda, ctrlaltdel, debugfs, depmod, devlink, dhclient, dhclient-script, dmsetup, dmstats, dosfsck, dosfslabel, dumpe2fs, e2fsck, e2image, e2label, and e2undo. The terminal output is as follows:

```
/root/ [error opening dir]

0 directories, 0 files
mca@U49:~$ tree -L 1 /sbin/
/sbin/
├── acpi_available
├── agetty
├── alsa
├── apm_available
├── apparmor_parser
├── badblocks
├── blkdeactivate
├── blkdiscard
├── blkid
├── blockdev
├── bridge
├── brltty -> /bin/brltty
├── brltty-setup
├── capsh
├── cfdisk
├── cgdisk
├── chcpu
├── crda
├── ctrlaltdel
├── debugfs
├── depmod -> /bin/knodd
├── devlink
├── dhclient
├── dhclient-script
├── dmsetup
├── dmstats -> dmsetup
├── dosfsck -> fsck.fat
├── dosfslabel -> fatlabel
├── dumpe2fs
├── e2fsck
├── e2image
├── e2label -> tune2fs
└── e2undo
```

10./media – It contains subdirectories where removal media devices inserted.



```
Activities Terminal Fri 15:25 mca@U49: ~
File Edit View Search Terminal Help
init
klibc-wBFLvVtxy4xJqEadIBJMa78lJz8.so
linux-sound-base
lsb
modprobe.d
modules
netplan
recovery-mode
systemd
terminfo
udev
ufw
x86_64-linux-gnu

19 directories, 2 files
mca@U49:~$ tree -L 1 /media/
/media/
├── android
├── mca
└── student

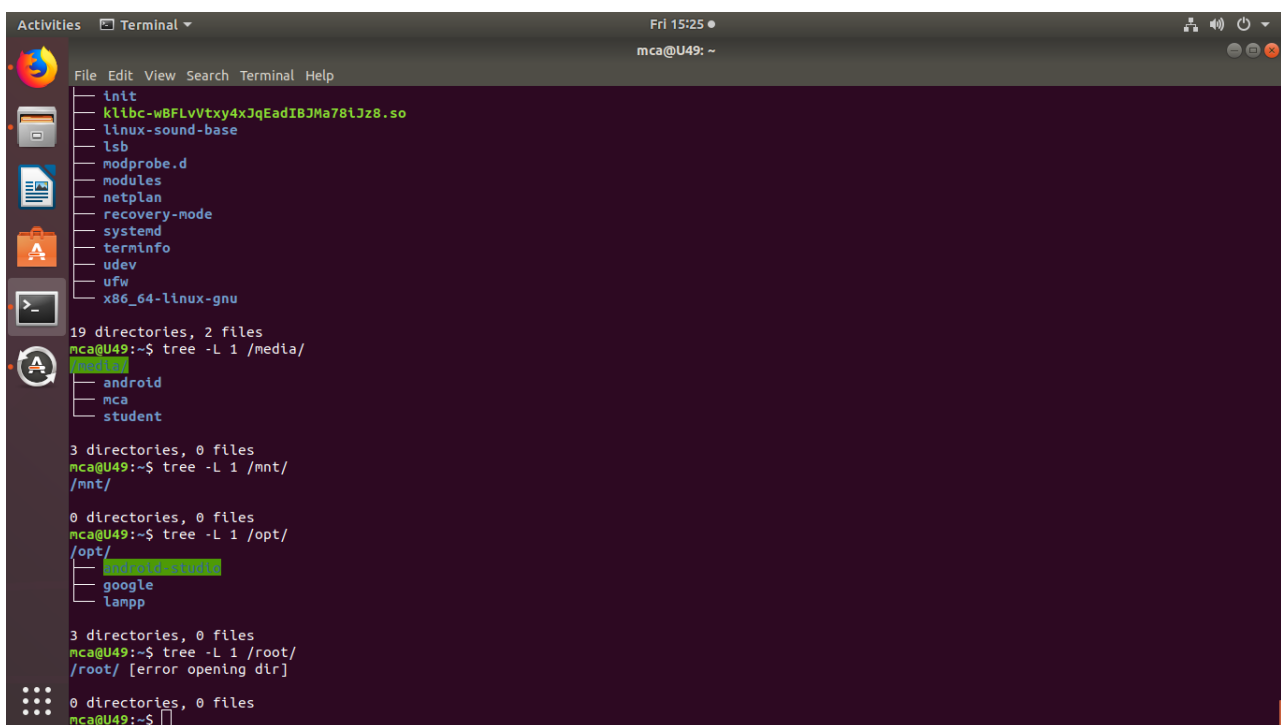
3 directories, 0 files
mca@U49:~$ tree -L 1 /mnt/
/mnt/

0 directories, 0 files
mca@U49:~$ tree -L 1 /opt/
/opt/
├── android-studio
├── google
└── lampp

3 directories, 0 files
mca@U49:~$ tree -L 1 /root/
/root/ [error opening dir]

0 directories, 0 files
mca@U49:~$
```

11./mnt – It contains temporary mount directories for mounting the file system.



```
Activities Terminal Fri 15:25 mca@U49: ~
File Edit View Search Terminal Help
init
klibc-wBFLvVtxy4xJqEadIBJMa78lJz8.so
linux-sound-base
lsb
modprobe.d
modules
netplan
recovery-mode
systemd
terminfo
udev
ufw
x86_64-linux-gnu

19 directories, 2 files
mca@U49:~$ tree -L 1 /media/
/media/
├── android
├── mca
└── student

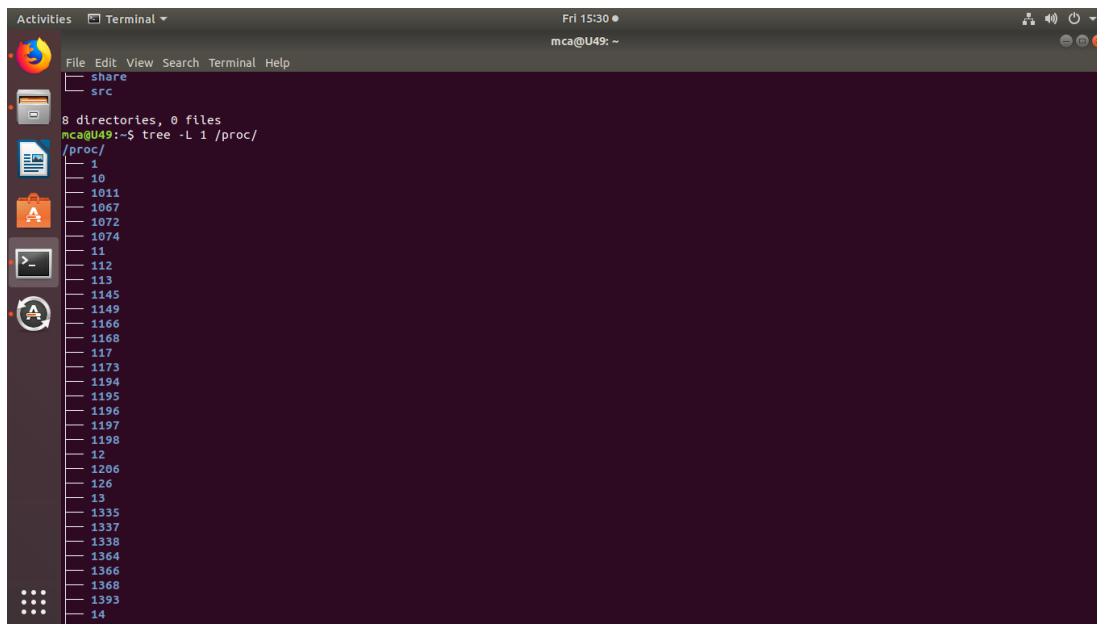
3 directories, 0 files
mca@U49:~$ tree -L 1 /mnt/
/mnt/

0 directories, 0 files
mca@U49:~$ tree -L 1 /opt/
/opt/
├── android-studio
├── google
└── lampp

3 directories, 0 files
mca@U49:~$ tree -L 1 /root/
/root/ [error opening dir]

0 directories, 0 files
mca@U49:~$
```

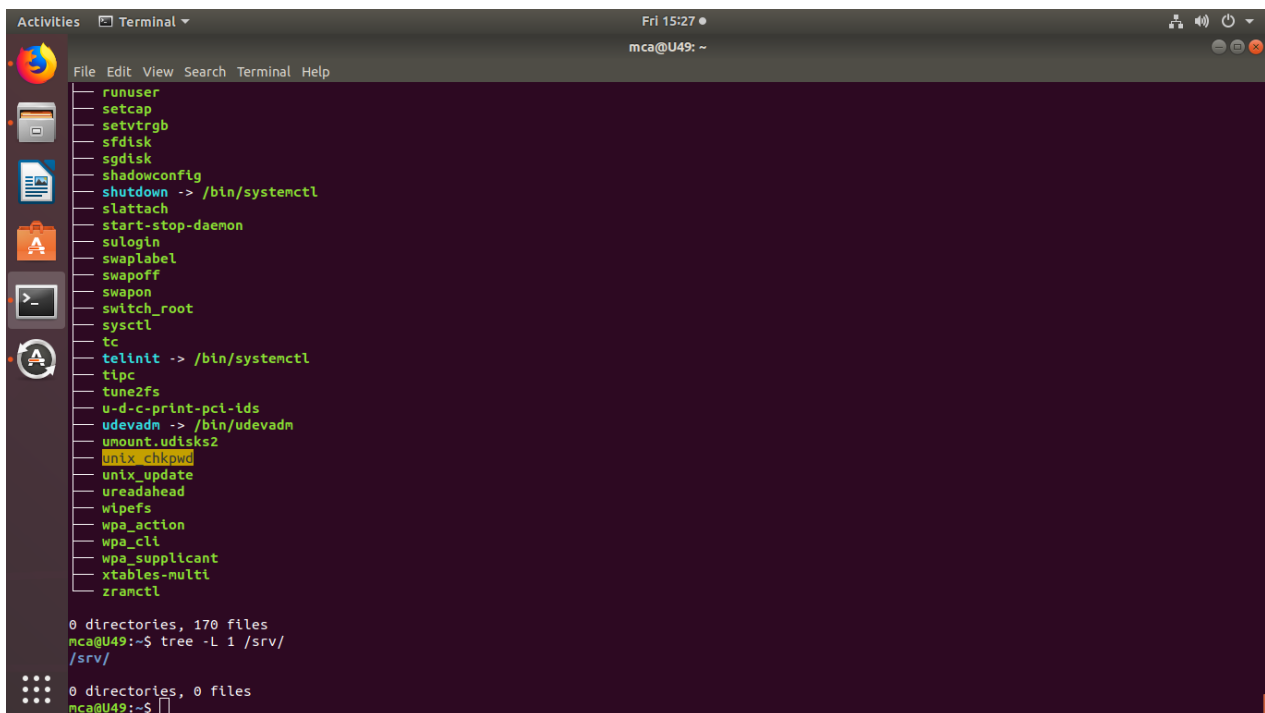
12./proc – It is a virtual and pseudo-file system to contains info about the running processes with a specific process ID or PID.



A terminal window titled 'Terminal' showing the command `tree -L 1 /proc/` and its output. The output lists 17 directories corresponding to process IDs: 1, 10, 1011, 1067, 1072, 1074, 11, 112, 113, 1145, 1149, 1166, 1168, 117, 1173, 1194, 1195, 1196, 1197, 1198, 12, 1206, 126, 13, 1335, 1337, 1338, 1364, 1366, 1368, 1393, and 14. The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The status bar shows 'Fri 15:30' and 'mca@U49: ~'.

```
File Edit View Search Terminal Help
mca@U49:~$ tree -L 1 /proc/
/proc/
├── 1
├── 10
├── 1011
├── 1067
├── 1072
├── 1074
├── 11
├── 112
├── 113
├── 1145
├── 1149
├── 1166
├── 1168
├── 117
├── 1173
├── 1194
├── 1195
├── 1196
├── 1197
├── 1198
├── 12
├── 1206
├── 126
├── 13
├── 1335
├── 1337
├── 1338
├── 1364
├── 1366
├── 1368
├── 1393
└── 14
```

13./srv – It contains server-specific and server-related files.



A terminal window titled 'Terminal' showing the command `tree -L 1 /srv/` and its output. The output lists 170 files: `runuser`, `setcap`, `setvtrgb`, `sfdisk`, `sgdisk`, `shadowconfig`, `shutdown -> /bin/systemctl`, `slattach`, `start-stop-daemon`, `sulogin`, `swaplabel`, `swapoff`, `swapon`, `switch_root`, `sysctl`, `tc`, `telinit -> /bin/systemctl`, `tipc`, `tune2fs`, `u-d-c-print-pci-ids`, `udevadm -> /bin/udevadm`, `umount.udisks2`, `unix_chkpwd`, `unix_update`, `ureadahead`, `wipefs`, `wpa_action`, `wpa_cli`, `wpa_supplicant`, `xtables-multi`, and `zramctl`. The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The status bar shows 'Fri 15:27' and 'mca@U49: ~'.

```
File Edit View Search Terminal Help
mca@U49:~$ tree -L 1 /srv/
/srv/
├── runuser
├── setcap
├── setvtrgb
├── sfdisk
├── sgdisk
├── shadowconfig
├── shutdown -> /bin/systemctl
├── slattach
├── start-stop-daemon
├── sulogin
├── swaplabel
├── swapoff
├── swapon
├── switch_root
├── sysctl
├── tc
├── telinit -> /bin/systemctl
├── tipc
├── tune2fs
├── u-d-c-print-pci-ids
├── udevadm -> /bin/udevadm
├── umount.udisks2
├── unix_chkpwd
├── unix_update
├── ureadahead
├── wipefs
├── wpa_action
├── wpa_cli
├── wpa_supplicant
├── xtables-multi
└── zramctl
```

14. /sys – It is a virtual filesystem for modern Linux distributions to store and allows modification of the devices connected to the system.

```

Activities  Terminal  Fri 15:27
mca@U49: ~

0 directories, 170 files
mca@U49:~$ tree -L 1 /srv/
/srv/

0 directories, 0 files
mca@U49:~$ tree -L 1 /sys/
/sys/
├── block
├── bus
├── class
├── dev
├── devices
├── firmware
├── fs
├── hypervisor
├── kernel
├── module
└── power

11 directories, 0 files
mca@U49:~$ tree -L 1 /tmp/
/tmp/
├── config-err-01XjNk
├── config-err-0Py8h1
├── ssh-2QczvCBTV4tk
├── ssh-Kn7Ir06qSL72
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-bolt.service-fAnI4x
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-color.service-gwbZ99
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-fwupd.service-YUVPb6
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-rtkit-daemon.service-GNj1LF
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-resolved.service-QglRMW
├── systemd-private-6b1b025c5c474fa08b58565144a24ab3-systemd-timesyncd.service-QQnIps
├── Temp-0bb82b0a-5f4b-4343-be03-ed2680f7f958
└── Temp-7e4b73ba-3e1c-4521-9d54-c75a36e5cacc

10 directories, 2 files
mca@U49:~$

```

15. /boot- It contains all the boot-related information files and folders such as conf, grub, etc.

```

Activities  Terminal  Fri 15:21
mca@U49: ~

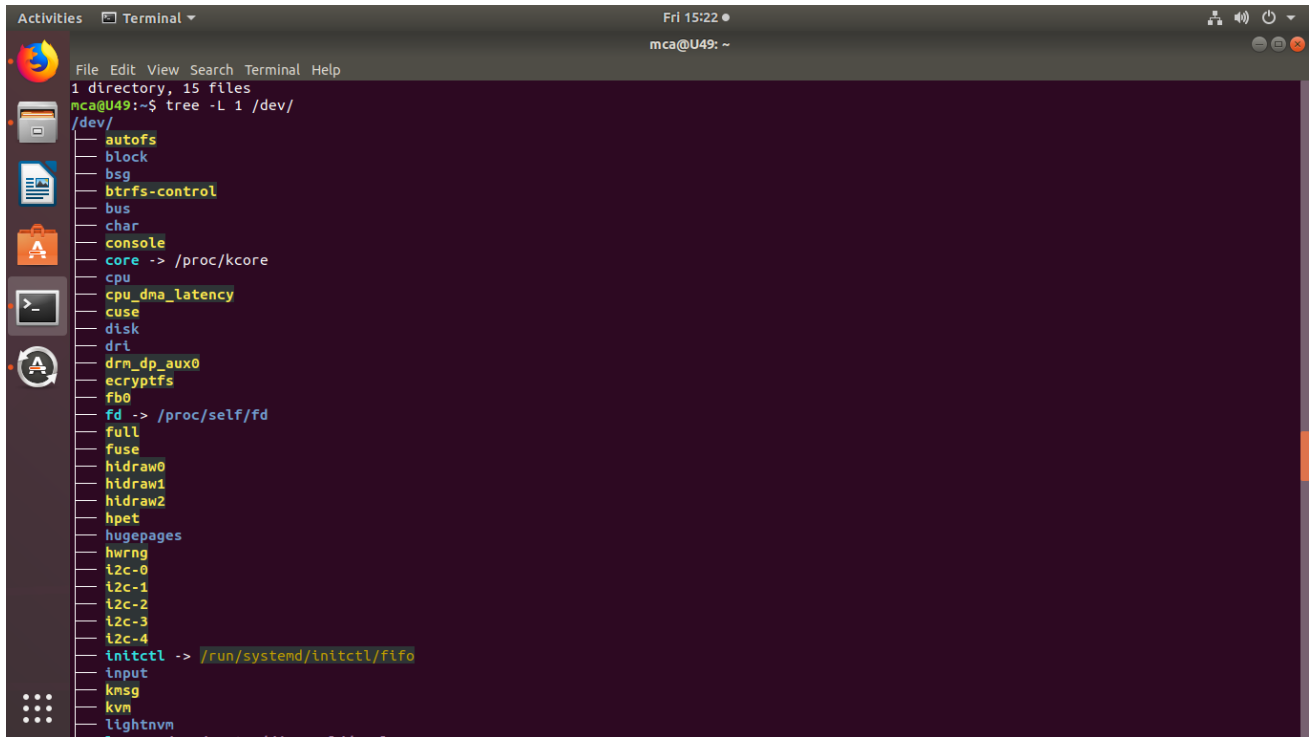
vdir
wdctl
which
whiptail
ypdomainname -> hostname
zcat
zcmp
zdiff
zegrep
zfgrep
zforce
zgrep
zless
zmore
znew

0 directories, 163 files
mca@U49:~$ tree -L 1 /boot/
/boot/
├── abi-4.15.0-23-generic
├── abi-4.15.0-33-generic
├── config-4.15.0-23-generic
├── config-4.15.0-33-generic
├── grub
├── initrd.img-4.15.0-23-generic
├── initrd.img-4.15.0-33-generic
├── memtest86+.bin
├── memtest86+.elf
├── memtest86+_multiboot.bin
├── retpoline-4.15.0-23-generic
├── retpoline-4.15.0-33-generic
├── System.map-4.15.0-23-generic
├── System.map-4.15.0-33-generic
├── vmlinuz-4.15.0-23-generic
└── vmlinuz-4.15.0-33-generic

1 directory, 15 files
mca@U49:~$

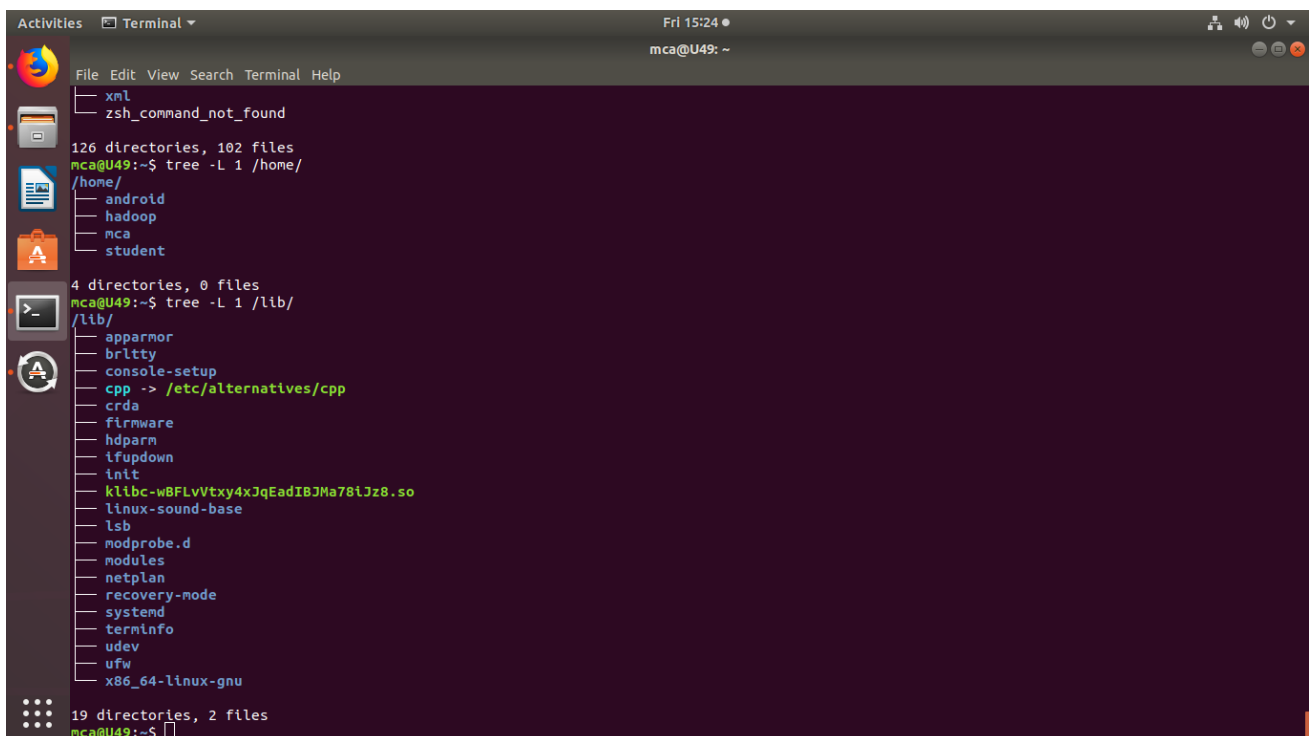
```


16./dev – It is the location of the device files such as **dev/sda1**, **dev/sda2**, etc.



A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Fri 15:22, mca@U49: ~). The terminal shows the command `tree -L 1 /dev/` and its output, listing 15 files in the `/dev/` directory. The files are: `autofs`, `block`, `bsg`, `btrfs-control`, `bus`, `char`, `console`, `core` (with a subcommand `-> /proc/kcore`), `cpu`, `cpu_dma_latency`, `cuse`, `disk`, `dri`, `drm_dp_aux0`, `ecryptfs`, `fb0`, `fd` (with a subcommand `-> /proc/self/fd`), `full`, `fuse`, `hidraw0`, `hidraw1`, `hidraw2`, `hpet`, `hugepages`, `hwrng`, `i2c-0`, `i2c-1`, `i2c-2`, `i2c-3`, `i2c-4`, `initctl` (with a subcommand `-> /run/systemd/initctl/fifo`), `input`, `kmsg`, `kvm`, and `lightnvm`.

17./lib – It contains kernel modules and a shared library.



A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Fri 15:24, mca@U49: ~). The terminal shows the command `tree -L 1 /lib/` and its output, listing 19 directories and 2 files in the `/lib/` directory. The directories are: `apparmor`, `brltty`, `console-setup`, `cpp` (with a subcommand `-> /etc/alternatives/cpp`), `crda`, `firmware`, `hdparm`, `ifupdown`, `init`, `klitbc-wBFLVtxy4xJqEadI8JMa78lJz8.so`, `linux-sound-base`, `lsb`, `modprobe.d`, `modules`, `netplan`, `recovery-mode`, `systemd`, `terminfo`, `udev`, `ufw`, and `x86_64-linux-gnu`. The files are `xml` and `zsh_command_not_found`.