

1. Login as a root

```
mint@mint:/etc$ su root
root@mint:/etc#
```

2. Changing password

```
root@mint:/etc# passwd root
New password:
Retype new password:
passwd: password updated successfully
root@mint:/etc#
```

Command parameters might be examined by using man command.

Files that might be affected by passwd command

## FILES

```
/etc/passwd
    User account information.

/etc/shadow
    Secure user account information.

/etc/pam.d/passwd
    PAM configuration for passwd.
```

3. These are users registered in the system

```
root@mint:/etc#  
root@mint:/etc# cat passwd | cut -d: -f1  
root  
daemon  
bin  
sys  
sync  
games  
man  
lp  
mail  
news  
uucp  
proxy  
www-data  
backup  
list  
irc  
gnats  
nobody  
systemd-network  
systemd-resolve  
messagebus  
systemd-timesync  
syslog  
_apt  
tss  
rtkit  
systemd-coredump  
kernoops  
uidd  
cups-pk-helper  
lightdm  
tcpdump  
speech-dispatcher  
avahi-autoipd  
usbmux  
nm-openvpn  
geoclue  
dnsmasq  
pulse  
_flatpak  
avahi  
saned  
colord  
hplip  
mint  
root@mint:/etc#
```

Every line has seven fields delimited by : (User name, password (x if encrypted), user id number, user group ID number, full name of the user, user home directory, login shell)

```
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:/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:/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
:
```

#### 4. Changed full username

```
mint@mint:/etc$ cat /etc/passwd | grep mint
mint:x:999:999:mint:/home/mint:/bin/bash
mint@mint:/etc$ sudo usermod -c "Artem Nesterenko" mint
mint@mint:/etc$ cat /etc/passwd | grep mint
mint:x:999:999:Artem Nesterenko:/home/mint:/bin/bash
mint@mint:/etc$
```

## 5. Run help and man for passwd command

```
mint@mint:/etc$ passwd --help
Usage: passwd [options] [LOGIN]

Options:
  -a, --all                report password status on all accounts
  -d, --delete             delete the password for the named account
  -e, --expire             force expire the password for the named account
  -h, --help              display this help message and exit
  -k, --keep-tokens        change password only if expired
  -i, --inactive INACTIVE set password inactive after expiration
                           to INACTIVE
  -l, --lock               lock the password of the named account
  -n, --mindays MIN_DAYS  set minimum number of days before password
                           change to MIN_DAYS
  -q, --quiet              quiet mode
  -r, --repository REPOSITORY change password in REPOSITORY repository
  -R, --root CHROOT_DIR   directory to chroot into
  -S, --status             report password status on the named account
  -u, --unlock            unlock the password of the named account
  -w, --warndays WARN_DAYS set expiration warning days to WARN_DAYS
  -x, --maxdays MAX_DAYS set maximum number of days before password
                           change to MAX_DAYS
```

```
PASSWD(1)                                User Commands                                PASSWD(1)

NAME
    passwd - change user password

SYNOPSIS
    passwd [options] [LOGIN]

DESCRIPTION
    The passwd command changes passwords for user accounts. A normal user may only change the password for their own account, while the superuser may change the password for any account. passwd also changes the account or associated password validity period.

    Password Changes
    The user is first prompted for their old password, if one is present. This password is then encrypted and compared against the stored password. The user has only one chance to enter the correct password. The superuser is permitted to bypass this step so that forgotten passwords may be changed.

    After the password has been entered, password aging information is checked to see if the user is permitted to change the password at this time. If not, passwd refuses to change the password and exits.

    The user is then prompted twice for a replacement password. The second entry is compared against the first and both are required to match in order for the password to be changed.

    Then, the password is tested for complexity. As a general guideline, passwords should consist of 6 to 8 characters including one or more characters from each of the following sets:

    • lower case alphabets
    • digits 0 thru 9
    • punctuation marks

    Care must be taken not to include the system default erase or kill characters. passwd will reject any password containing these characters.

Manual page passwd(1) line 1 (press h for help or q to quit)
```

## 6. less command on /etc/passwd file

```
mint@mint: /etc
File Edit View Search Terminal Help
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:/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:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
:
```

## more command on /etc/passwd file

```
mint@mint: /etc
File Edit View Search Terminal Help
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:/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:/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
--More-- (29%)
```

## 7. getting familiar with finger command using man

```
FINGER(1) BSD General Commands Manual FINGER(1)

NAME
    finger - user information lookup program

SYNOPSIS
    finger [-lmsp] [user ...] [user@host ...]

DESCRIPTION
    The finger displays information about the system users.

    Options are:

    -s    Finger displays the user's login name, real name, terminal name and write sta-
          tus (as a ``*' after the terminal name if write permission is denied), idle
```

## finger command example

```
mint@mint:/etc$ finger mint
Login: mint                               Name: Artem Nesterenko
Directory: /home/mint                     Shell: /bin/bash
On since Sat Oct  8 14:27 (UTC) on tty7 from :0
No mail.
No Plan.
```

## 8. List of home directory

```
File Edit View Search Terminal Help
mint@mint:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
mint@mint:~$
```

## Task 1 Part 2

1. List of directories to and including level 2 is done by command

```
mint@mint:/$ tree -L 2
*
├── bin -> usr/bin
├── boot
│   ├── System.map-5.15.0-41-generic
│   ├── config-5.15.0-41-generic
│   ├── grub
│   ├── initrd.img -> initrd.img-5.15.0-41-generic
│   ├── initrd.img.old -> initrd.img-5.15.0-41-generic
│   ├── vmlinuz -> vmlinuz-5.15.0-41-generic
│   └── vmlinuz.old -> vmlinuz-5.15.0-41-generic
├── cdrom
│   ├── EFI
│   ├── MD5SUMS
│   ├── README.diskdefines
│   ├── boot
│   ├── boot.catalog
│   ├── casper
│   ├── dists
│   ├── isolinux
│   ├── pool
│   └── preseed
├── dev
│   ├── autofs
│   ├── block
│   ├── bsg
│   ├── btrfs-control
│   └── bus
```

Template can be applied using -P option, with some regexp. However --prune option must be used also, to remove empty directories from output. Example search tty files

```
mint@mint:/$ tree -P tty --prune
```

```
.
├── dev
│   └── tty
├── rofs
│   ├── dev
│   │   └── tty
│   ├── usr
│   │   └── bin
│   │       └── tty
└── usr
    └── bin
        └── tty
```

2. Type of file can be determined by file command

```
mint@mint:~/Desktop/Linux_Essentials$ echo "hello World" > file.txt
mint@mint:~/Desktop/Linux_Essentials$ file file.txt
file.txt: ASCII text
mint@mint:~/Desktop/Linux_Essentials$
```

3. Relative path - path to somewhere from current directory, absolute path - path from root directory, starting with /  
You can get to home directory from anywhere using cd or cd~ commands

4. ls command with -l -a flags

```
mint@mint:~$ ls -a -l
total 48
drwxr-x--- 15 mint mint 520 Oct 9 07:38 .
drwxr-xr-x  1 root root  60 Oct 8 14:27 ..
-rw-----  1 mint mint  49 Oct 8 14:27 .Xauthority
-rw-----  1 mint mint 148 Oct 9 06:21 .bash_history
-rw-r--r--  1 mint mint 220 Oct 8 14:27 .bash_logout
-rw-r--r--  1 mint mint 3771 Oct 8 14:27 .bashrc
drwx----- 10 mint mint 200 Oct 9 07:17 .cache
drwxrwxr-x  3 mint mint  60 Oct 8 14:28 .cinnamon
drwxr-xr-x 17 mint mint 420 Oct 9 06:38 .config
-rw-rw-r--  1 mint mint  48 Oct 9 07:16 .gitconfig
-rw-r--r--  1 mint mint  22 Oct 8 14:27 .gtkrc-2.0
-rw-r--r--  1 mint mint 516 Oct 8 14:27 .gtkrc-xfce
-rw-----  1 mint mint  20 Oct 9 07:38 .lesshist
drwx-----  3 mint mint  60 Oct 8 14:27 .local
drwx-----  4 mint mint  80 Oct 9 07:16 .mozilla
-rw-r--r--  1 mint mint 807 Oct 8 14:27 .profile
-rw-r--r--  1 mint mint   0 Oct 8 14:28 .sudo_as_admin_successful
-rw-----  1 mint mint 11445 Oct 9 06:38 .xsession-errors
drwxr-xr-x  3 mint mint  80 Oct 9 06:38 Desktop
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Documents
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Downloads
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Music
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Pictures
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Public
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Templates
drwxr-xr-x  2 mint mint  40 Oct 8 14:27 Videos
```

-a stands for "show all" which means NOT ignoring hidden files started from . or ..

-l stands for long-listing format that gives info of type of file (link, regular file, directory, etc.), read-write-execute permissions for user and user group, number of links or directories, owner and group of the owner, size, creation date, name of file

```
mint@mint:~$ mkdir subdir
mint@mint:~$ ls
Desktop  Downloads  Pictures  Templates  subdir
Documents Music      Public    Videos
mint@mint:~$ ls -la > subdir/info_file.txt
```

5. `ls -la` command



```

mint@mint:~$ cat subdir/info_file.txt
total 48
drwxr-x--- 16 mint mint 540 Oct 9 07:46 .
drwxr-xr-x 1 root root 60 Oct 8 14:27 ..
-rw----- 1 mint mint 49 Oct 8 14:27 .Xauthority
-rw----- 1 mint mint 148 Oct 9 06:21 .bash_history
-rw-r--r-- 1 mint mint 220 Oct 8 14:27 .bash_logout
-rw-r--r-- 1 mint mint 3771 Oct 8 14:27 .bashrc
drwx----- 10 mint mint 200 Oct 9 07:17 .cache
drwxrwxr-x 3 mint mint 60 Oct 8 14:28 .cinnamon
drwxr-xr-x 17 mint mint 420 Oct 9 06:38 .config
-rw-rw-r-- 1 mint mint 48 Oct 9 07:16 .gitconfig
-rw-r--r-- 1 mint mint 22 Oct 8 14:27 .gtkrc-2.0
-rw-r--r-- 1 mint mint 516 Oct 8 14:27 .gtkrc-xfce
-rw----- 1 mint mint 20 Oct 9 07:38 .lessht
drwx----- 3 mint mint 60 Oct 8 14:27 .local
drwx----- 4 mint mint 80 Oct 9 07:16 .mozilla
-rw-r--r-- 1 mint mint 807 Oct 8 14:27 .profile
-rw-r--r-- 1 mint mint 0 Oct 8 14:28 .sudo_as_admin_successful
-rw----- 1 mint mint 11445 Oct 9 06:38 .xsession-errors
drwxr-xr-x 3 mint mint 80 Oct 9 06:38 Desktop
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Documents
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Downloads
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Music
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Pictures
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Public
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Templates
drwxr-xr-x 2 mint mint 40 Oct 8 14:27 Videos
drwxrwxr-x 2 mint mint 60 Oct 9 07:47 subdir
mint@mint:~$ cd subdir/
mint@mint:~/subdir$ ls
info_file.txt

```

```

mint@mint:~/subdir$ cp info_file.txt ../info_file_copy_relative.txt

```

```

mint@mint:~/subdir$ cp info_file.txt /home/mint/info_file_absolute.txt

```

```

mint@mint:~/subdir$ cd ..
mint@mint:~$ rm -rf subdir/
mint@mint:~$ ls
Desktop  Downloads  Pictures  Templates  info_file_absolute.txt
Documents Music      Public    Videos    info_file_copy_relative.txt
mint@mint:~$ rm info_file_*
mint@mint:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos

```

```

mint@mint:~$ mkdir test
mint@mint:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  test
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash
.bash_history .bash_logout .bashrc
mint@mint:~$ cp .bash history test/labwork2

```

6. mint@mint:~\$ cp .bash history test/labwork2

## Creating hard and soft links

```
mint@mint:~$ ln test/labwork2 hardlink
mint@mint:~$ ln -s test/labwork2 softlink
mint@mint:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  hardlink  softlink  test
```

## changing file though softlink

```
mint@mint:~$ cat test/labwork2
ls
whoami
cd
mint@mint:~$ nano softlink
mint@mint:~$ cat test/labwork2
ls
whoami
cd
edited_command
```

## Renaming the link, still accessible

```
mint@mint:~$ mv hardlink hard_lnk_labwork2
mint@mint:~$ mv softlink soft_lnk_labwork2
mint@mint:~$ cat hard_lnk_labwork2
ls
whoami
cd
edited_command
mint@mint:~$ cat soft_lnk_labwork2
ls
whoami
cd
edited_command
```

## Deleting initial file

```
mint@mint:~$ rm test/labwork2
mint@mint:~$
```

There is no link with soft link, but still able to get file data with the hard one

```
mint@mint:~$ cat soft_lnk_labwork2
cat: soft_lnk_labwork2: No such file or directory
mint@mint:~$ cat hard_lnk_labwork2
ls
whoami
cd
edited_command
mint@mint:~$
```

That is because the soft link points to the file, which is obviously deleted and not accessible. Otherwise, hard link points to the spot in the memory, where file data was stored

- ```
mint@mint:/$ sudo locate squid
mint@mint:/$ sudo locate traceroute
7. /usr/src/linux-headers-5.15.0-41/tools/testing/selftests/net/traceroute.sh
```

Looks like I don't have any squid files in system

8. Mounted partitions can be determined with lsblk command or with mount command

```
mint@mint:/$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
loop0        7:0      0   2.1G  1 loop /rofs
sda           8:0      0   40G   0 disk
sr0          11:0     1   2.3G   0 rom  /cdrom
```

```
mint@mint:/$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=1930420k,nr_inodes=482605,mode=755,inode64)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,noexec,relatime,size=398492k,mode=755,inode64)
/dev/sr0 on /cdrom type iso9660 (ro,noatime,nojoliet,check=s,map=n,blocksize=2048,ioccharset=utf8)
/dev/loop0 on /rofs type squashfs (ro,noatime,errors=continue)
/cow on / type overlay (rw,relatime,lowerdir=/filesystem.squashfs,upperdir=/cow/upper,workdir=/cow/work,xino=off)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,inode64)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,nsdelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=29,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,pipe_ino=25520)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime)
none on /run/credentials/systemd-sysusers.service type ramfs (ro,nosuid,nodev,noexec,relatime,mode=700)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /tmp type tmpfs (rw,nosuid,nodev,relatime,inode64)
tmpfs on /run/user/999 type tmpfs (rw,nosuid,nodev,relatime,size=398488k,nr_inodes=99622,mode=700,uid=999,gid=999,inode64)
gvfsd-fuse on /run/user/999/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=999,group_id=999)
vmware-vmblock on /run/vmblock-fuse type fuse.vmware-vmblock (rw,relatime,user_id=0,group_id=0,default_permissions,allow_other)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,nosuid,nodev,noexec,relatime)
portal on /run/user/999/doc type fuse.portal (rw,nosuid,nodev,relatime,user_id=999,group_id=999)
```

9. There is 22 lines in .bash\_history file

```
mint@mint:~$ wc -l .bash_history
22 .bash_history
```

Lets count ones those have /root in them

```
mint@mint:~$ cat .bash_history
ls
whoami
cd ~/home
cd //
cd ..
ks
ls
cd ..
ls
passwd
man passwd
ls
cd root
cd /root
sudo cd /root
cd ~/root
cd /root
su root
ls
sudo ls
;s
cd home
mint@mint:~$ cat .bash_history | grep /root
cd /root
sudo cd /root
cd ~/root
cd /root
```

So, there must be 4 lines

```
mint@mint:~$ grep -c "/root" .bash_history
4
```

And here it is

10.

```
mint@mint:/etc$ sudo find -name "*host*"
./X11/Xsession.d/35x11-common_xhost-local
./apparmor.d/abstractions/hosts_access
./avahi/hosts
./ghostscript
./gufw/app_profiles/dynamic-host-configuration-protocol.jhansonxi
./host.conf
./hostid
./hostname
./hosts
./hosts.allow
./hosts.deny
mint@mint:/etc$
```

11.

```
mint@mint:/etc$ ls | grep ss
gss
guest-session
issue
issue.net
nsswitch.conf
passwd
passwd-
ssh
ssl
```

12. combination of ls and less (more) commands can be used in this case

```
mint@mint:/etc$ ls | less
ModemManager
NetworkManager
PackageKit
UPower
X11
acpi
adduser.conf
adjtime
alsa
alternatives
anacrontab
apg.conf
apm
apparmor
apparmor.d
appport
appstream.conf
:
```

13. Type of the device can be determined by the first symbol of the permission field

```
mint@mint:/dev$ ls -l | more
total 0
crw-r--r--  1 root root      10, 235 Oct  8 14:27 autofs
drwxr-xr-x  2 root root      240 Oct  8 11:29 block
drwxr-xr-x  2 root root       80 Oct  8 14:27 bsg
crw-rw----  1 root disk     10, 234 Oct  8 11:29 btrfs-control
drwxr-xr-x  3 root root       60 Oct  8 14:27 bus
lrwxrwxrwx  1 root root        3 Oct  8 11:29 cdrom -> sr0
drwxr-xr-x  2 root root    3820 Oct  9 09:28 char
crw-----  1 root root        5,  1 Oct  8 14:27 console
lrwxrwxrwx  1 root root       11 Oct  8 14:27 core -> /proc/kcore
drwxr-xr-x  4 root root       80 Oct  8 14:27 cpu
crw-----  1 root root    10, 124 Oct  8 14:27 cpu_dma_latency
crw-----  1 root root    10, 203 Oct  8 14:27 cuse
drwxr-xr-x  6 root root      120 Oct  8 14:27 disk
drwxr-xr-x  2 root root       60 Oct  8 14:27 dma_heap
crw-rw----+ 1 root audio    14,  9 Oct  8 14:27 dmmidi
```

c - character device (transfers one character at a time)

b - block device (transfer data by blocks of fixed size)

p - pipes (inter-process communication)

s - socket (inter-process communication as well, but more than 2 processes can be involved)

14. type of file can be determined like device's type, by the first char of permission field

- r stands for regular file

d stands for directory

l stands for links

more info can be gathered with file command

15. Last 5 edited files can be show with combination of ls and head format

```
mint@mint:/etc$ ls -thl | head -6
total 438K
-rw-r--r--  1 root root   2.4K Oct  9 09:29 less
-rw-r--r--  1 root root     6 Oct  9 09:26 tty0
drwxr-xr-x  1 root root    60 Oct  9 06:39 bash_completion.d
drwxr-xr-x  1 root lp    120 Oct  9 06:16 cups
-rw-r--r--  1 root root  429 Oct  8 14:27 casper.conf
mint@mint:/etc$
```