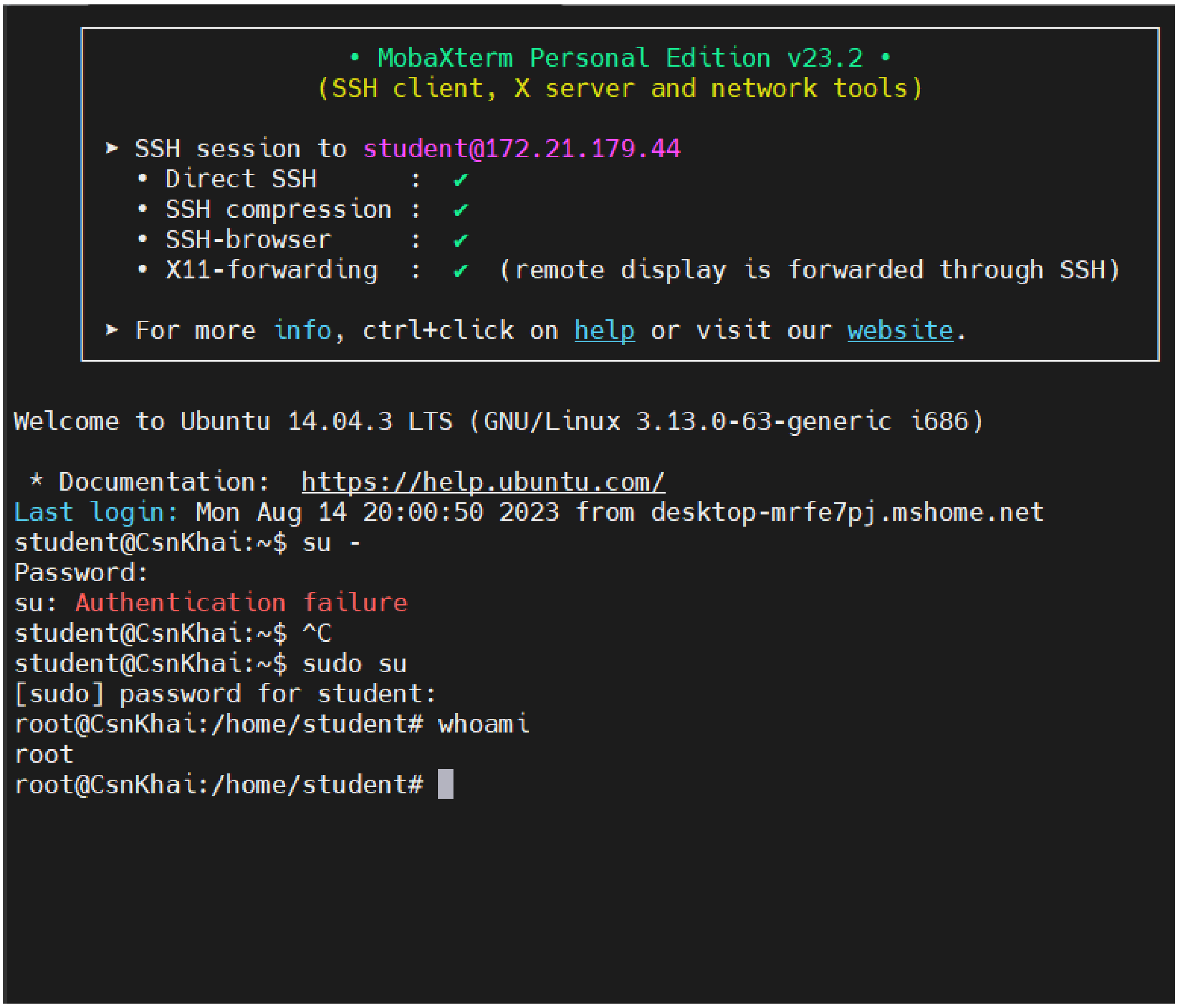
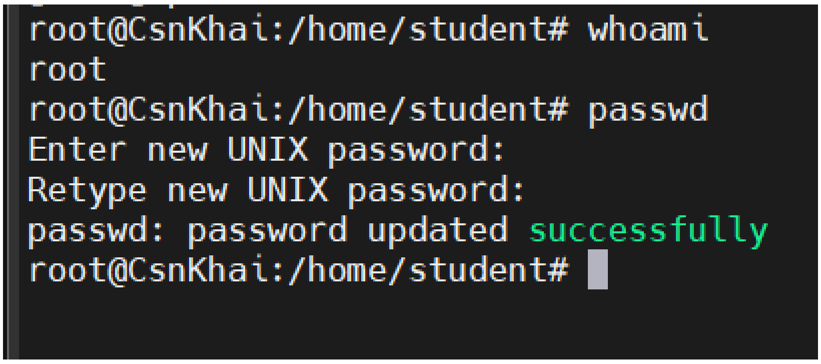
Task1.Part1

1) Log in to the system as root.



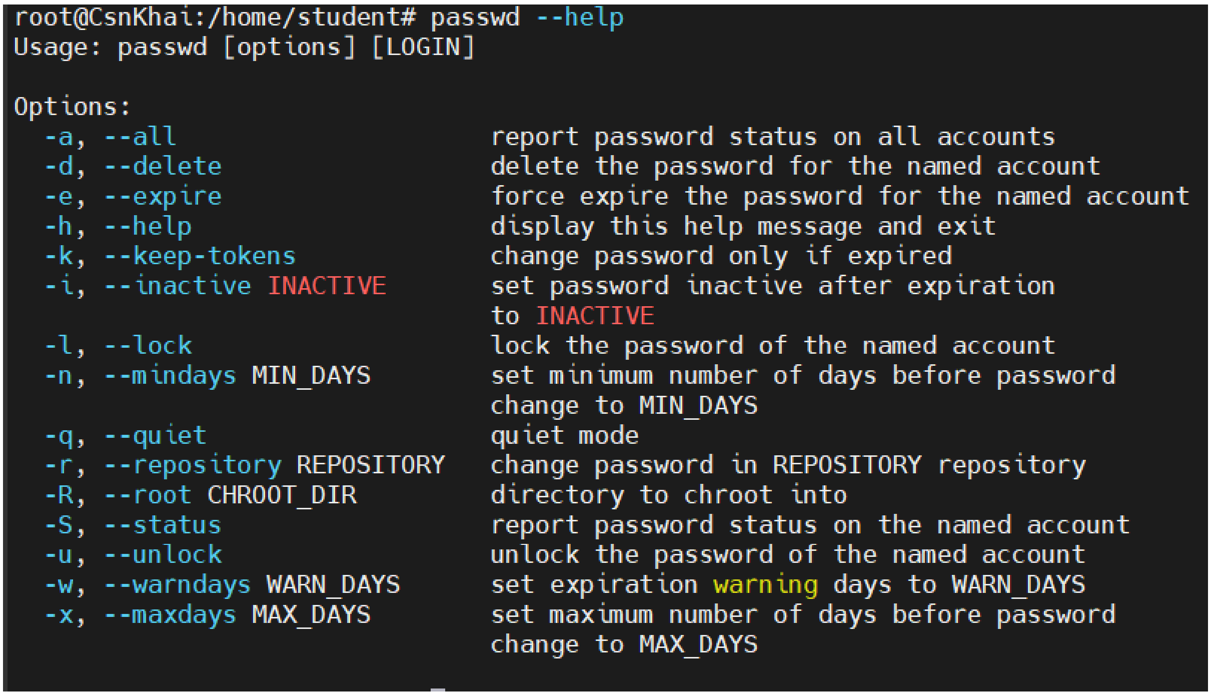
```
         • MobaXterm Personal Edition v23.2 •
       (SSH client, X server and network tools)

 ➤ SSH session to student@172.21.179.44
   • Direct SSH       :  ✔
   • SSH compression  :  ✔
   • SSH-browser      :  ✔
   • X11-forwarding   :  ✔  (remote display is forwarded through SSH)

 ➤ For more info, ctrl+click on help or visit our website.

Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-63-generic i686)

 * Documentation:  https://help.ubuntu.com/
Last login: Mon Aug 14 20:00:50 2023 from desktop-mrfe7pj.mshome.net
student@CsnKhai:~$ su -
Password:
su: Authentication failure
student@CsnKhai:~$ ^C
student@CsnKhai:~$ sudo su
[sudo] password for student:
root@CsnKhai:/home/student# whoami
root
root@CsnKhai:/home/student#
```

2) Use the passwd command to change the password.



```
root@CsnKhai:/home/student# whoami
root
root@CsnKhai:/home/student# passwd
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@CsnKhai:/home/student#
```

Examine the basic parameters of the command.

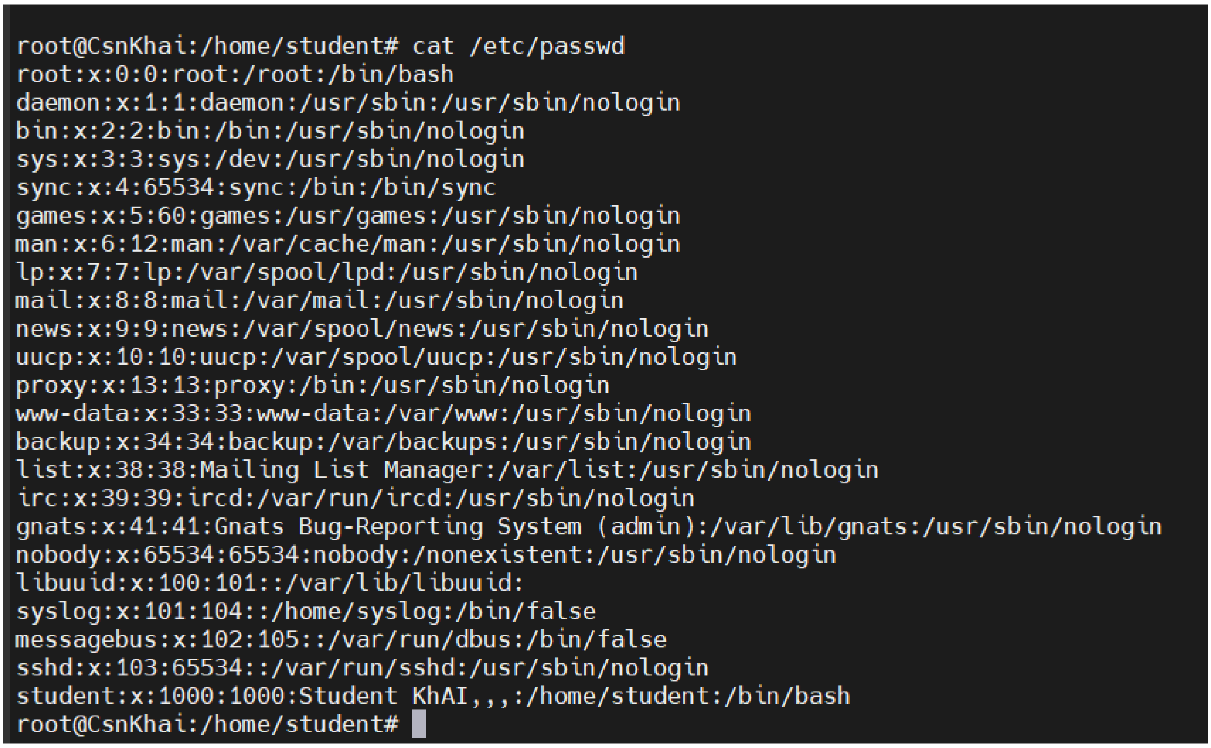


```
root@CsnKhai:/home/student# passwd --help
Usage: passwd [options] [LOGIN]

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
```

What system file does it change *?

/etc/shadow

3) Determine the users registered in the system, as well as what commands they execute.

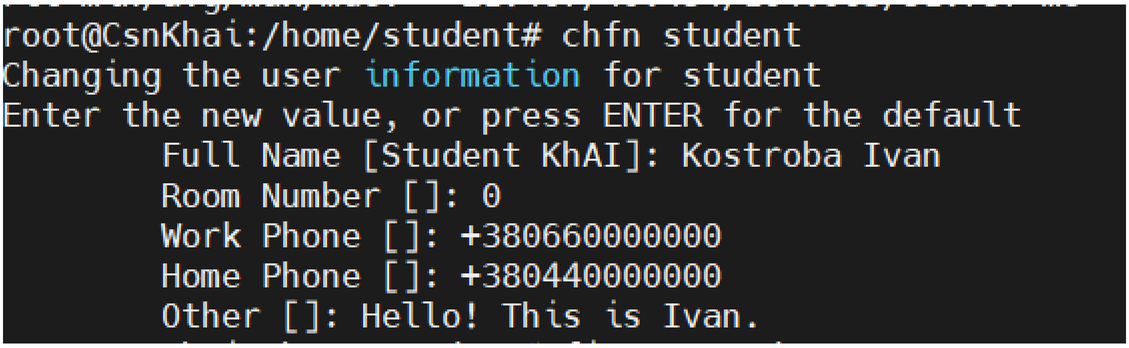


```
root@CsnKhai:/home/student# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
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
libuuid:x:100:101::/var/lib/libuuid:
syslog:x:101:104::/home/syslog:/bin/false
messagebus:x:102:105::/var/run/dbus:/bin/false
sshd:x:103:65534::/var/run/sshd:/usr/sbin/nologin
student:x:1000:1000:Student KhAI,,,:/home/student:/bin/bash
root@CsnKhai:/home/student# 
```

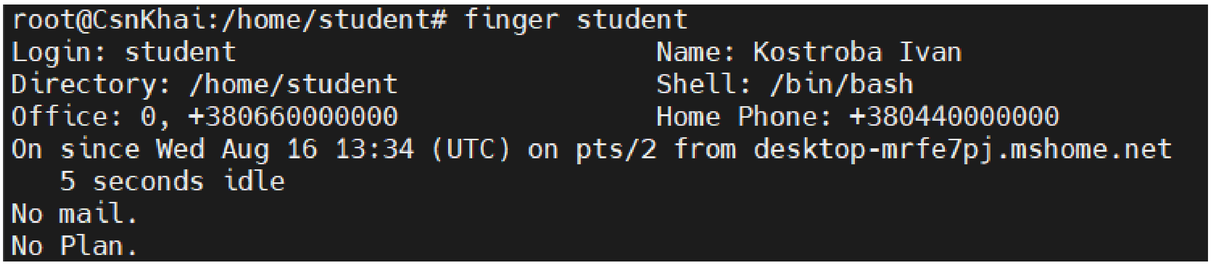
What additional information can be gleaned from the command Execution?

Used ID’s, user primary group ID’s, user additional info, user home directory

4) Change personal information about yourself.

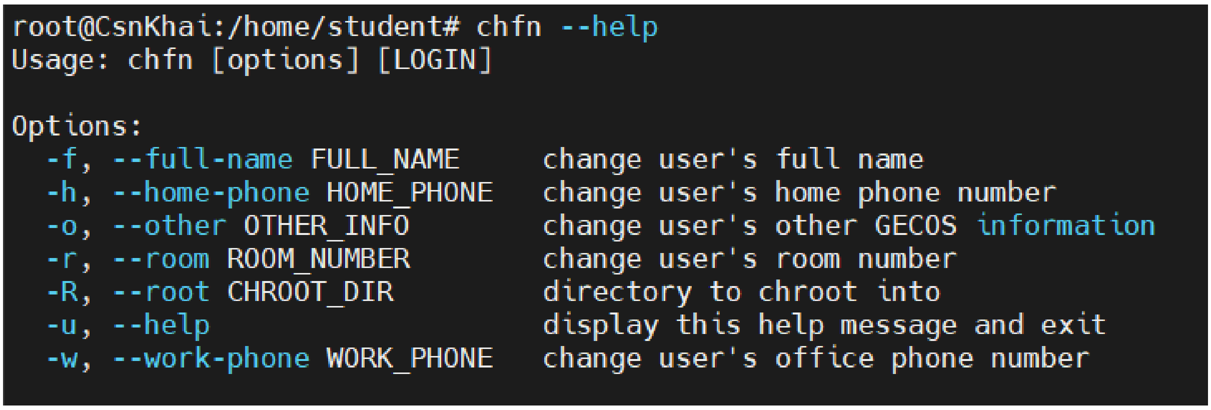


```
root@CsnKhai:/home/student# chfn student
Changing the user information for student
Enter the new value, or press ENTER for the default
        Full Name [Student KhAI]: Kostroba Ivan
        Room Number []: 0
        Work Phone []: +380660000000
        Home Phone []: +380440000000
        Other []: Hello! This is Ivan.
```



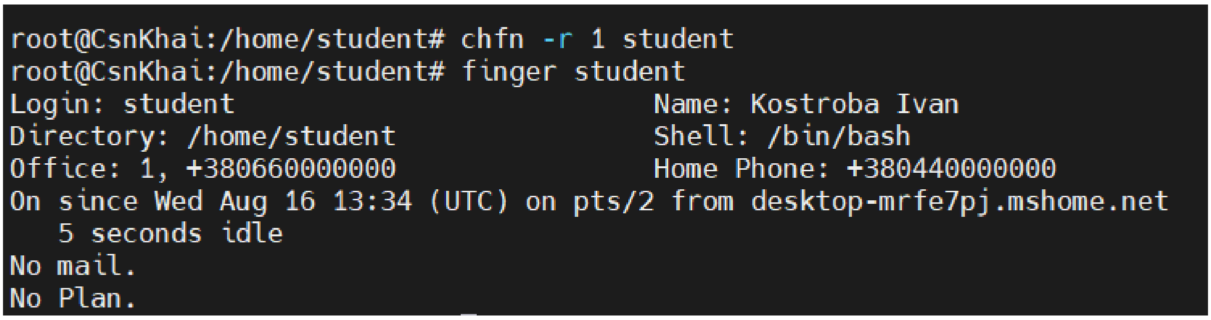
```
root@CsnKhai:/home/student# finger student
Login: student                          Name: Kostroba Ivan
Directory: /home/student                Shell: /bin/bash
Office: 0, +380660000000                Home Phone: +380440000000
On since Wed Aug 16 13:34 (UTC) on pts/2 from desktop-mrfe7pj.mshome.net
   5 seconds idle
No mail.
No Plan.
```

5) Become familiar with the Linux help system and the man and info commands.
Get help on the previously discussed commands, define and describe any two
keys for these commands. Give examples.



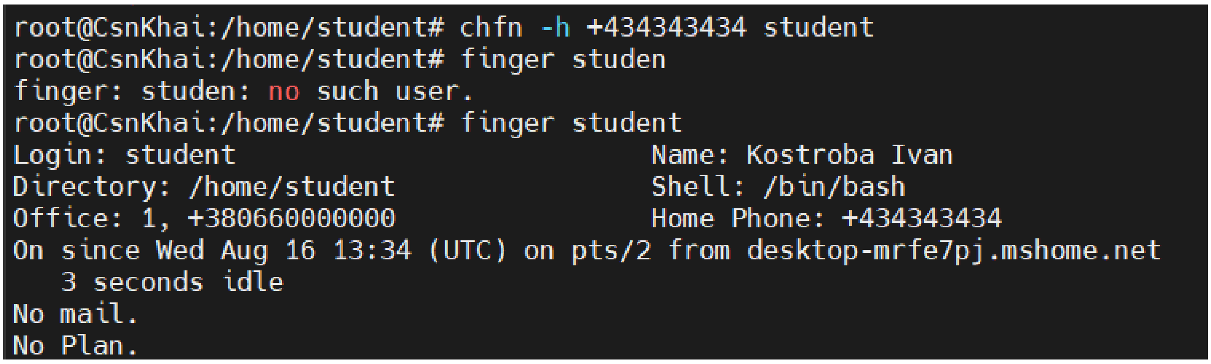
```
root@CsnKhai:/home/student# chfn --help
Usage: chfn [options] [LOGIN]

Options:
  -f, --full-name FULL_NAME     change user's full name
  -h, --home-phone HOME_PHONE   change user's home phone number
  -o, --other OTHER_INFO        change user's other GECOS information
  -r, --room ROOM_NUMBER        change user's room number
  -R, --root CHROOT_DIR         directory to chroot into
  -u, --help                    display this help message and exit
  -w, --work-phone WORK_PHONE   change user's office phone number
```

If you execute chfn with any of the aforementioned keys, you may change only one particular piece of information, not to write down everything again. For example, usage of -r key allows to change only the room number, in this case from 0 to 1:



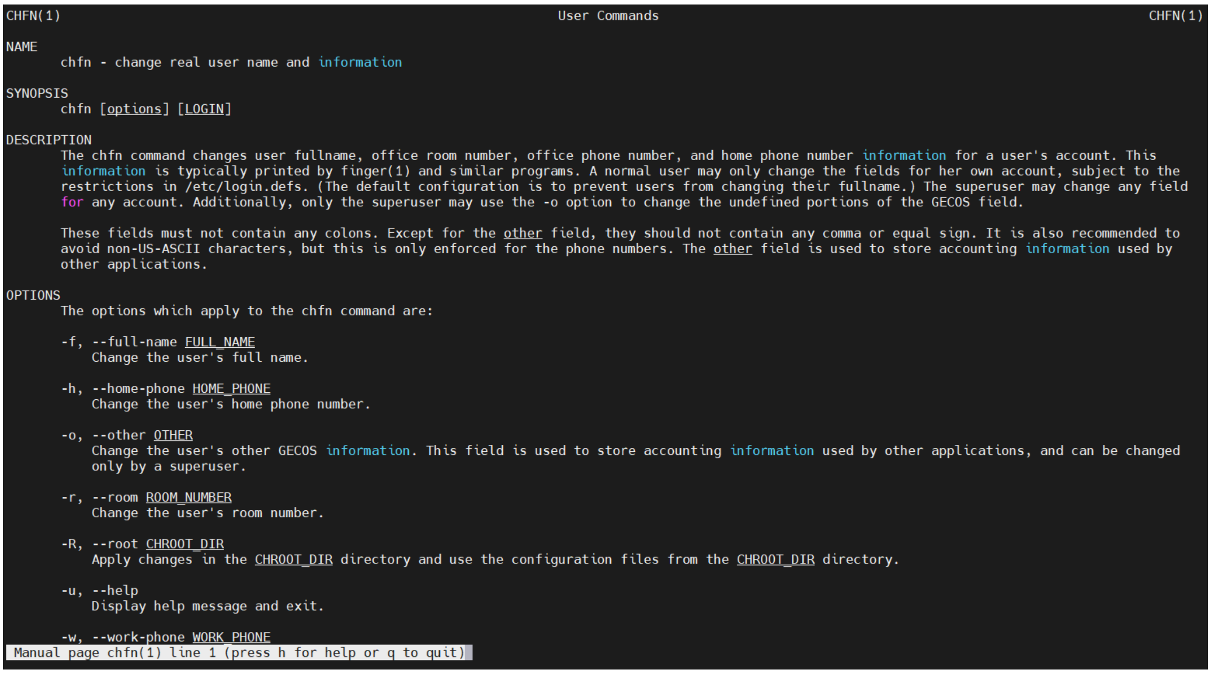
```
root@CsnKhai:/home/student# chfn -r 1 student
root@CsnKhai:/home/student# finger student
Login: student                          Name: Kostroba Ivan
Directory: /home/student                Shell: /bin/bash
Office: 1, +380660000000                Home Phone: +380440000000
On since Wed Aug 16 13:34 (UTC) on pts/2 from desktop-mrfe7pj.mshome.net
   5 seconds idle
No mail.
No Plan.
```

The same goes for other keys as well:



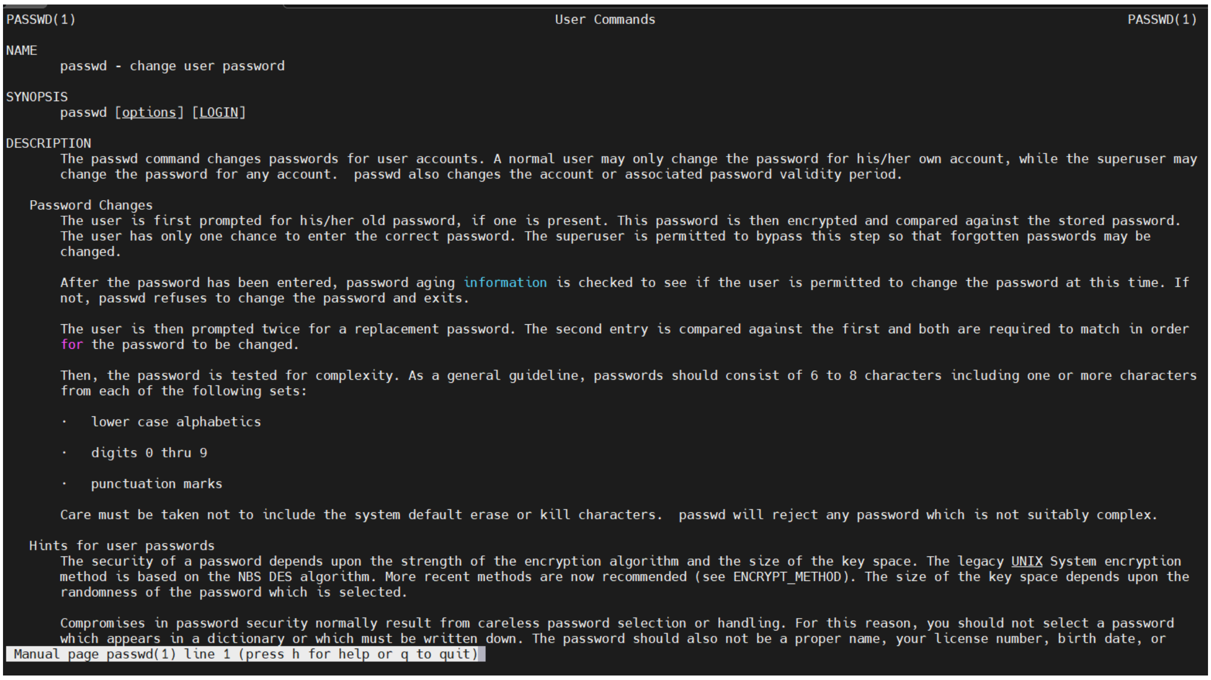
```
root@CsnKhai:/home/student# chfn -h +434343434 student
root@CsnKhai:/home/student# finger studen
finger: studen: no such user.
root@CsnKhai:/home/student# finger student
Login: student                          Name: Kostroba Ivan
Directory: /home/student                Shell: /bin/bash
Office: 1, +380660000000                Home Phone: +434343434
On since Wed Aug 16 13:34 (UTC) on pts/2 from desktop-mrfe7pj.mshome.net
   3 seconds idle
No mail.
No Plan.
```

Man command gives more detailed description:

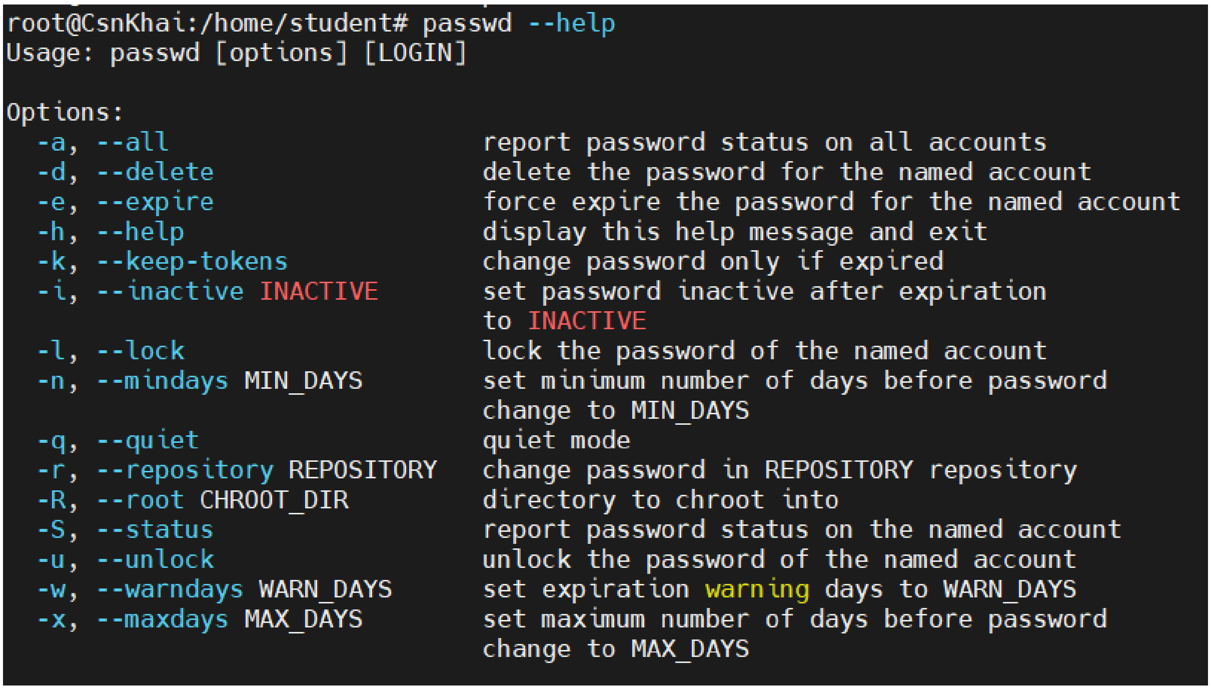


```
CHFN(1)                                          User Commands                                          CHFN(1)

NAME
       chfn - change real user name and information

SYNOPSIS
       chfn [options] [LOGIN]

DESCRIPTION
       The chfn command changes user fullname, office room number, office phone number, and home phone number information for a user's account. This
       information is typically printed by finger(1) and similar programs. A normal user may only change the fields for her own account, subject to the
       restrictions in /etc/login.defs. (The default configuration is to prevent users from changing their fullname.) The superuser may change any field
       for any account. Additionally, only the superuser may use the -o option to change the undefined portions of the GECOS field.

       These fields must not contain any colons. Except for the other field, they should not contain any comma or equal sign. It is also recommended to
       avoid non-US-ASCII characters, but this is only enforced for the phone numbers. The other field is used to store accounting information used by
       other applications.

OPTIONS
       The options which apply to the chfn command are:

       -f, --full-name FULL_NAME
           Change the user's full name.

       -h, --home-phone HOME_PHONE
           Change the user's home phone number.

       -o, --other OTHER
           Change the user's other GECOS information. This field is used to store accounting information used by other applications, and can be changed
           only by a superuser.

       -r, --room ROOM_NUMBER
           Change the user's room number.

       -R, --root CHROOT_DIR
           Apply changes in the CHROOT_DIR directory and use the configuration files from the CHROOT_DIR directory.

       -u, --help
           Display help message and exit.

       -w, --work-phone WORK_PHONE
 Manual page chfn(1) line 1 (press h for help or q to quit)
```

The same works for virtually any well-documented command:

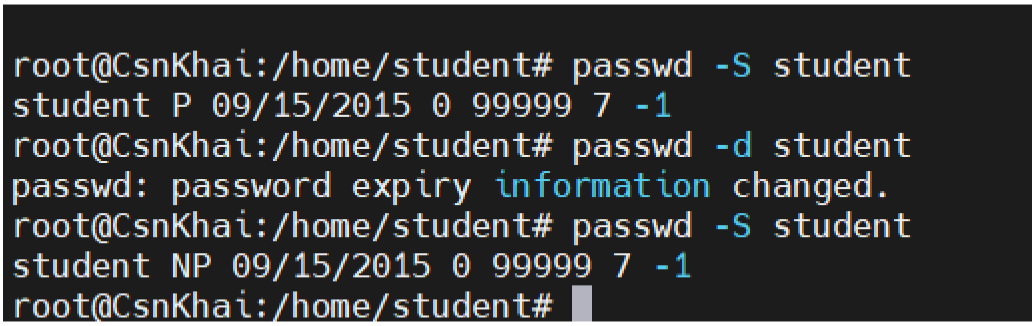


```
PASSWD(1)                                        User Commands                                        PASSWD(1)

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 his/her 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 his/her 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 alphabetics

       ·   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 which is not suitably complex.

   Hints for user passwords
       The security of a password depends upon the strength of the encryption algorithm and the size of the key space. The legacy UNIX System encryption
       method is based on the NBS DES algorithm. More recent methods are now recommended (see ENCRYPT_METHOD). The size of the key space depends upon the
       randomness of the password which is selected.

       Compromises in password security normally result from careless password selection or handling. For this reason, you should not select a password
       which appears in a dictionary or which must be written down. The password should also not be a proper name, your license number, birth date, or
 Manual page passwd(1) line 1 (press h for help or q to quit)
```



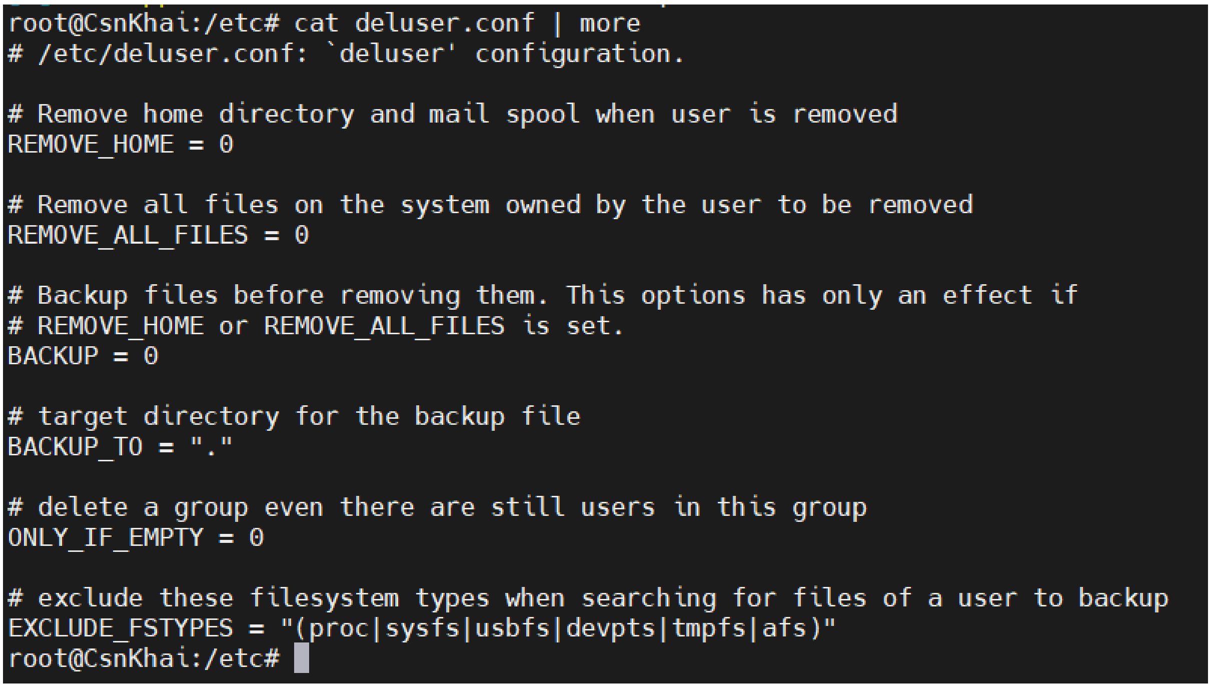
```
root@CsnKhai:/home/student# passwd --help
Usage: passwd [options] [LOGIN]

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
```

Example of additional keys usage on a passwd command:



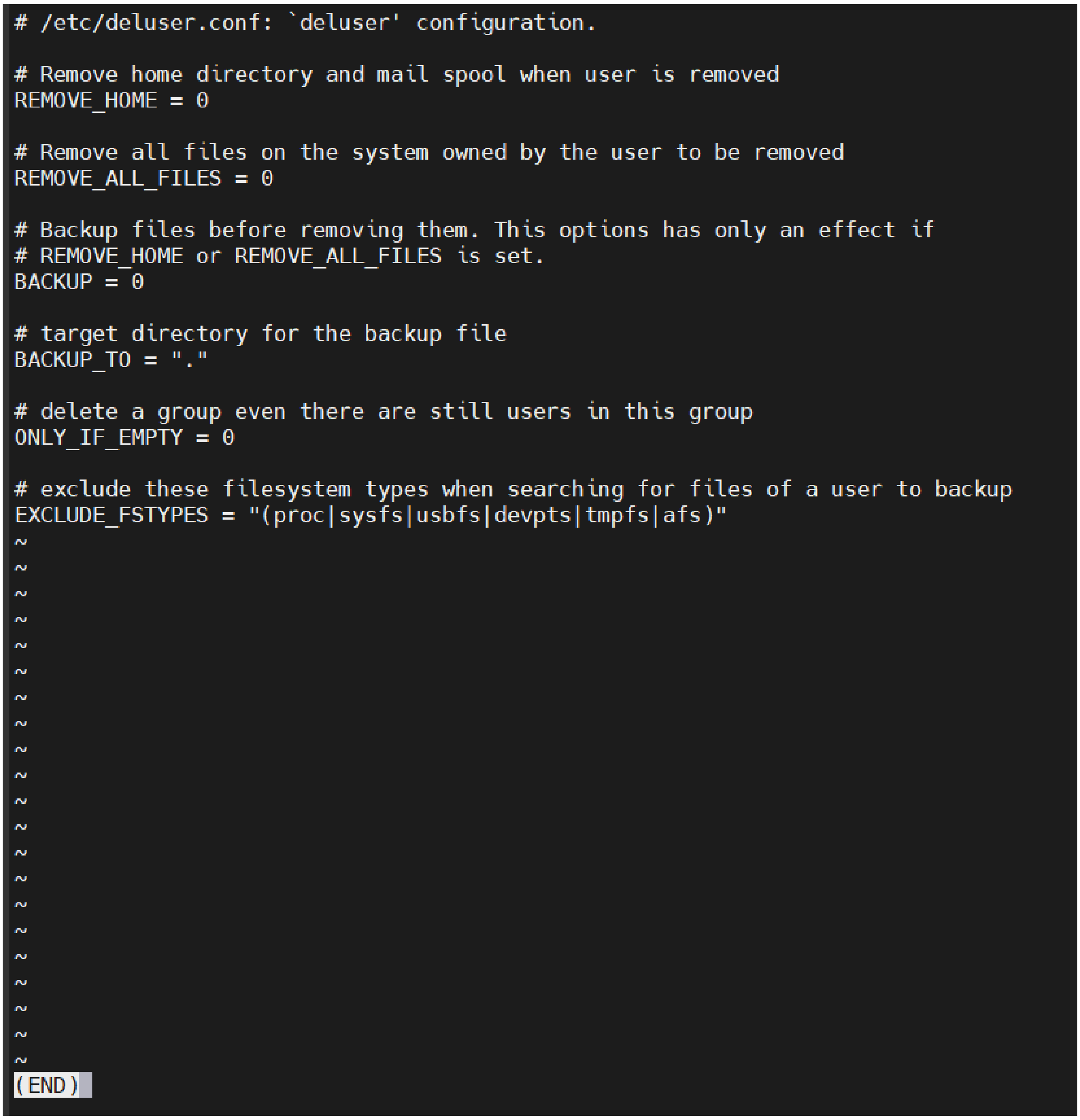
```
root@CsnKhai:/home/student# passwd -S student
student P 09/15/2015 0 99999 7 -1
root@CsnKhai:/home/student# passwd -d student
passwd: password expiry information changed.
root@CsnKhai:/home/student# passwd -S student
student NP 09/15/2015 0 99999 7 -1
root@CsnKhai:/home/student#
```

6) Explore the more and less commands using the help system. View the contents of files .bash* using commands.



```
root@CsnKhai:/etc# cat deluser.conf | more
# /etc/deluser.conf: `deluser' configuration.

# Remove home directory and mail spool when user is removed
REMOVE_HOME = 0

# Remove all files on the system owned by the user to be removed
REMOVE_ALL_FILES = 0

# Backup files before removing them. This options has only an effect if
# REMOVE_HOME or REMOVE_ALL_FILES is set.
BACKUP = 0

# target directory for the backup file
BACKUP_TO = "."

# delete a group even there are still users in this group
ONLY_IF_EMPTY = 0

# exclude these filesystem types when searching for files of a user to backup
EXCLUDE_FSTYPES = "(proc|sysfs|usbfs|devpts|tmpfs|afs)"
root@CsnKhai:/etc#
```

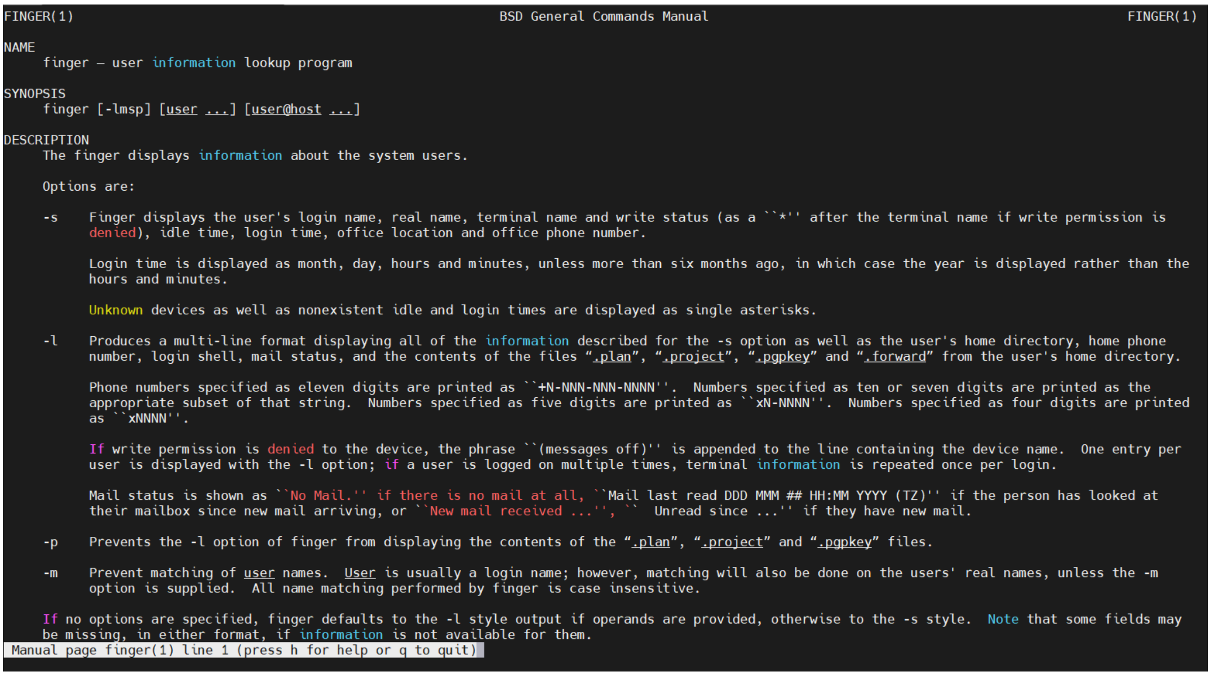
Cat deluser.conf | less:



```
# /etc/deluser.conf: `deluser' configuration.

# Remove home directory and mail spool when user is removed
REMOVE_HOME = 0

# Remove all files on the system owned by the user to be removed
REMOVE_ALL_FILES = 0

# Backup files before removing them. This options has only an effect if
# REMOVE_HOME or REMOVE_ALL_FILES is set.
BACKUP = 0

# target directory for the backup file
BACKUP_TO = "."

# delete a group even there are still users in this group
ONLY_IF_EMPTY = 0

# exclude these filesystem types when searching for files of a user to backup
EXCLUDE_FSTYPES = "(proc|sysfs|usbfs|devpts|tmpfs|afs)"
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
(END)
```

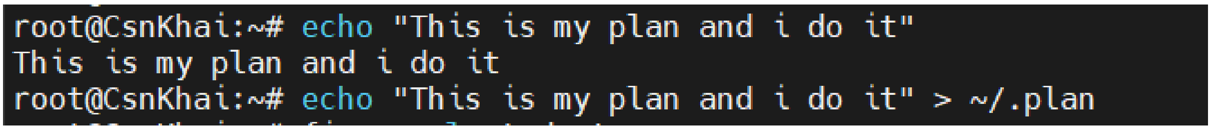
7) * Describe in plans that you are working on laboratory work 1. Tip: You should read the documentation for the finger command.

Man finger page:



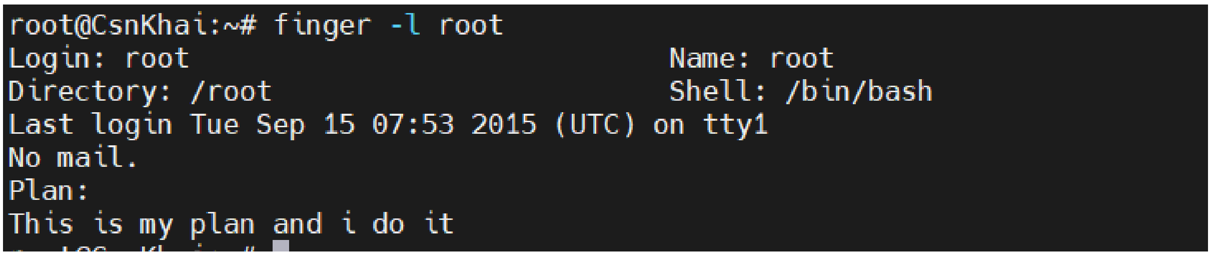
```
FINGER(1)                                  BSD General Commands Manual                                  FINGER(1)

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 status (as a ``*'' after the terminal name if write permission is
           denied), idle time, login time, office location and office phone number.

           Login time is displayed as month, day, hours and minutes, unless more than six months ago, in which case the year is displayed rather than the
           hours and minutes.

           Unknown devices as well as nonexistent idle and login times are displayed as single asterisks.

     -l    Produces a multi-line format displaying all of the information described for the -s option as well as the user's home directory, home phone
           number, login shell, mail status, and the contents of the files “.plan”, “.project”, “.pgpkey” and “.forward” from the user's home directory.

           Phone numbers specified as eleven digits are printed as ``+N-NNN-NNN-NNNN''.  Numbers specified as ten or seven digits are printed as the
           appropriate subset of that string.  Numbers specified as five digits are printed as ``xN-NNNN''.  Numbers specified as four digits are printed
           as ``xNNNN''.

           If write permission is denied to the device, the phrase ``(messages off)'' is appended to the line containing the device name.  One entry per
           user is displayed with the -l option; if a user is logged on multiple times, terminal information is repeated once per login.

           Mail status is shown as ``No Mail.'' if there is no mail at all, ``Mail last read DDD MMM ## HH:MM YYYY (TZ)'' if the person has looked at
           their mailbox since new mail arriving, or ``New mail received ...'', ``  Unread since ...'' if they have new mail.

     -p    Prevents the -l option of finger from displaying the contents of the “.plan”, “.project” and “.pgpkey” files.

     -m    Prevent matching of user names.  User is usually a login name; however, matching will also be done on the users' real names, unless the -m
           option is supplied.  All name matching performed by finger is case insensitive.

     If no options are specified, finger defaults to the -l style output if operands are provided, otherwise to the -s style.  Note that some fields may
     be missing, in either format, if information is not available for them.
 Manual page finger(1) line 1 (press h for help or q to quit)
```

Creating a plan file with text:



```
root@CsnKhai:~# echo "This is my plan and i do it"
This is my plan and i do it
root@CsnKhai:~# echo "This is my plan and i do it" > ~/.plan
```

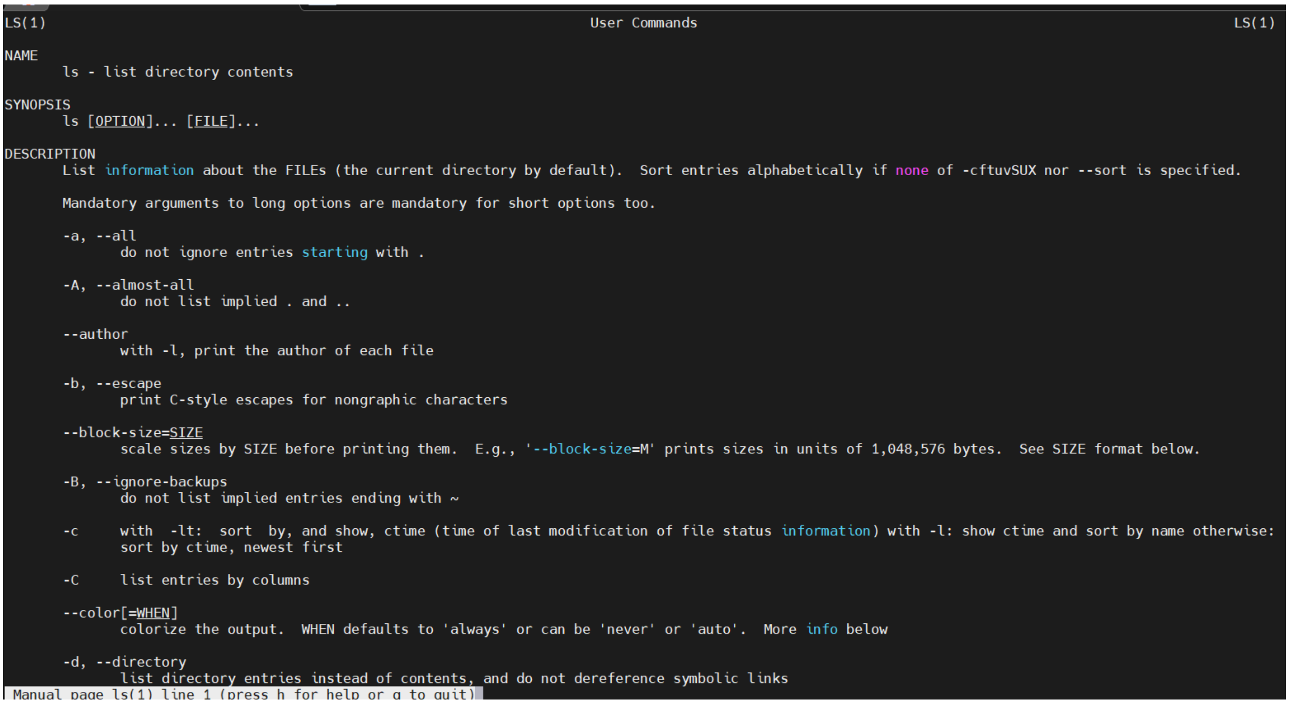
Having it seen by finger command:



```
root@CsnKhai:~# finger -l root
Login: root                             Name: root
Directory: /root                        Shell: /bin/bash
Last login Tue Sep 15 07:53 2015 (UTC) on tty1
No mail.
Plan:
This is my plan and i do it
```

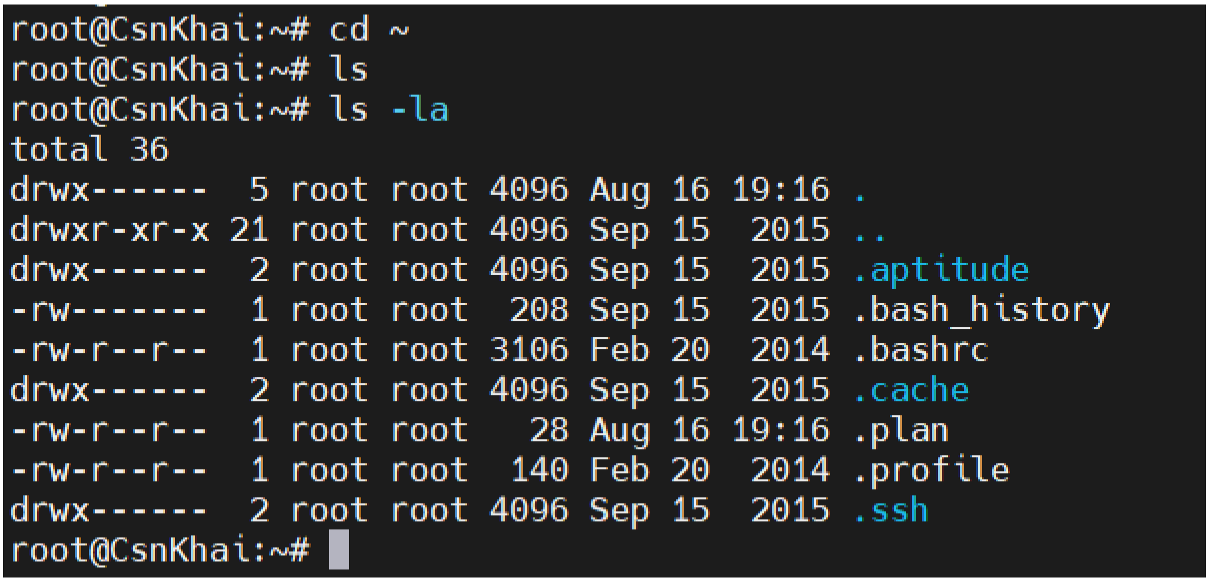
8) * List the contents of the home directory using the ls command, define its files and directories. Hint: Use the help system to familiarize yourself with the ls Command.

Manual page for ls:



```
LS(1)                                   User Commands                                   LS(1)

NAME
       ls - list directory contents

SYNOPSIS
       ls [OPTION]... [FILE]...

DESCRIPTION
       List information about the FILEs (the current directory by default).  Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

       Mandatory arguments to long options are mandatory for short options too.

       -a, --all
              do not ignore entries starting with .

       -A, --almost-all
              do not list implied . and ..

       --author
              with -l, print the author of each file

       -b, --escape
              print C-style escapes for nongraphic characters

       --block-size=SIZE
              scale sizes by SIZE before printing them.  E.g., '--block-size=M' prints sizes in units of 1,048,576 bytes.  See SIZE format below.

       -B, --ignore-backups
              do not list implied entries ending with ~

       -c     with  -lt:  sort  by, and show, ctime (time of last modification of file status information) with -l: show ctime and sort by name otherwise:
              sort by ctime, newest first

       -C     list entries by columns

       --color[=WHEN]
              colorize the output.  WHEN defaults to 'always' or can be 'never' or 'auto'.  More info below

       -d, --directory
              list directory entries instead of contents, and do not dereference symbolic links
 Manual page ls(1) line 1 (press h for help or q to quit)
```

Listing files in home directory:

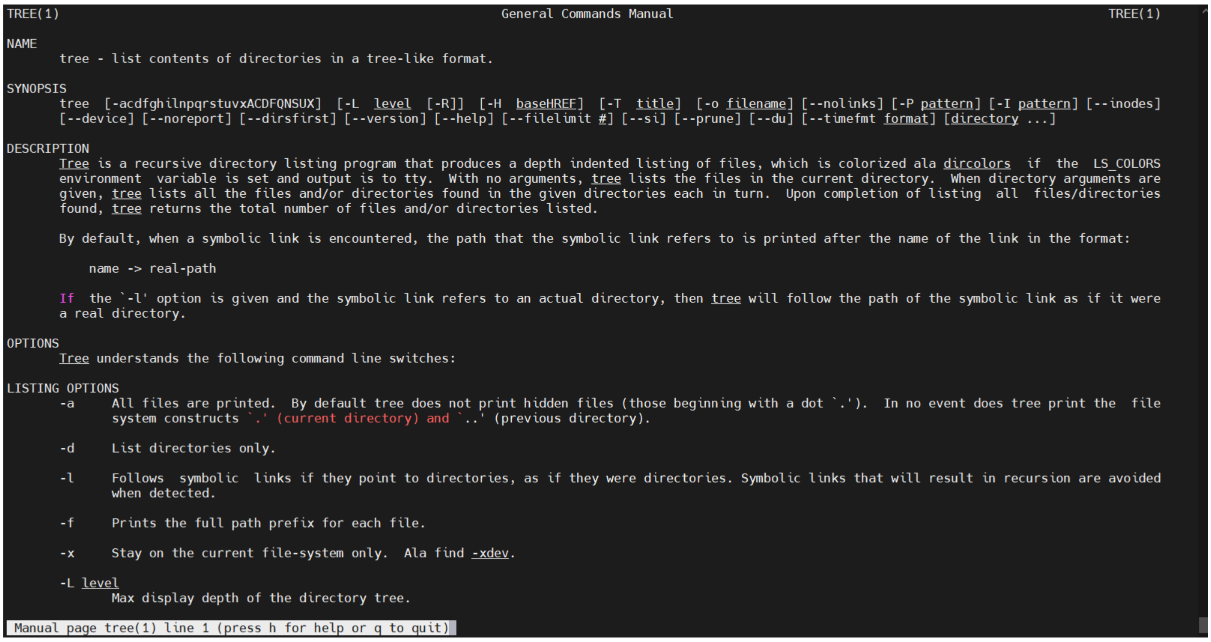


```
root@CsnKhai:~# cd ~
root@CsnKhai:~# ls
root@CsnKhai:~# ls -la
total 36
drwx------  5 root root 4096 Aug 16 19:16 .
drwxr-xr-x 21 root root 4096 Sep 15  2015 ..
drwx------  2 root root 4096 Sep 15  2015 .aptitude
-rw-------  1 root root  208 Sep 15  2015 .bash_history
-rw-r--r--  1 root root 3106 Feb 20  2014 .bashrc
drwx------  2 root root 4096 Sep 15  2015 .cache
-rw-r--r--  1 root root   28 Aug 16 19:16 .plan
-rw-r--r--  1 root root  140 Feb 20  2014 .profile
drwx------  2 root root 4096 Sep 15  2015 .ssh
root@CsnKhai:~# 
```

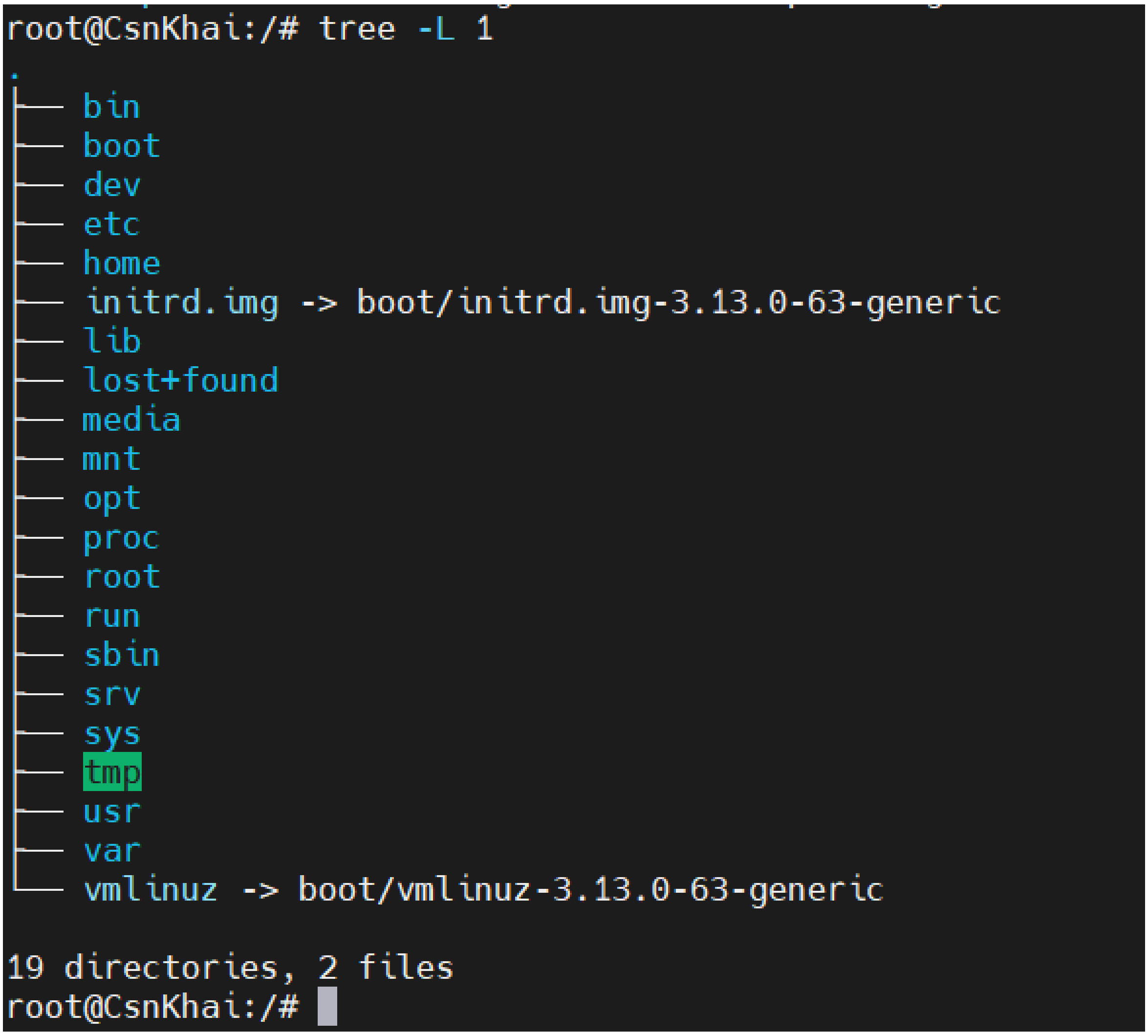
Task1.Part2

1) Examine the tree command. Master the technique of applying a template, for example, display all files that contain a character c, or files that contain a specific sequence of characters. List subdirectories of the root directory up to and including the second nesting level.

Manual entry for tree:

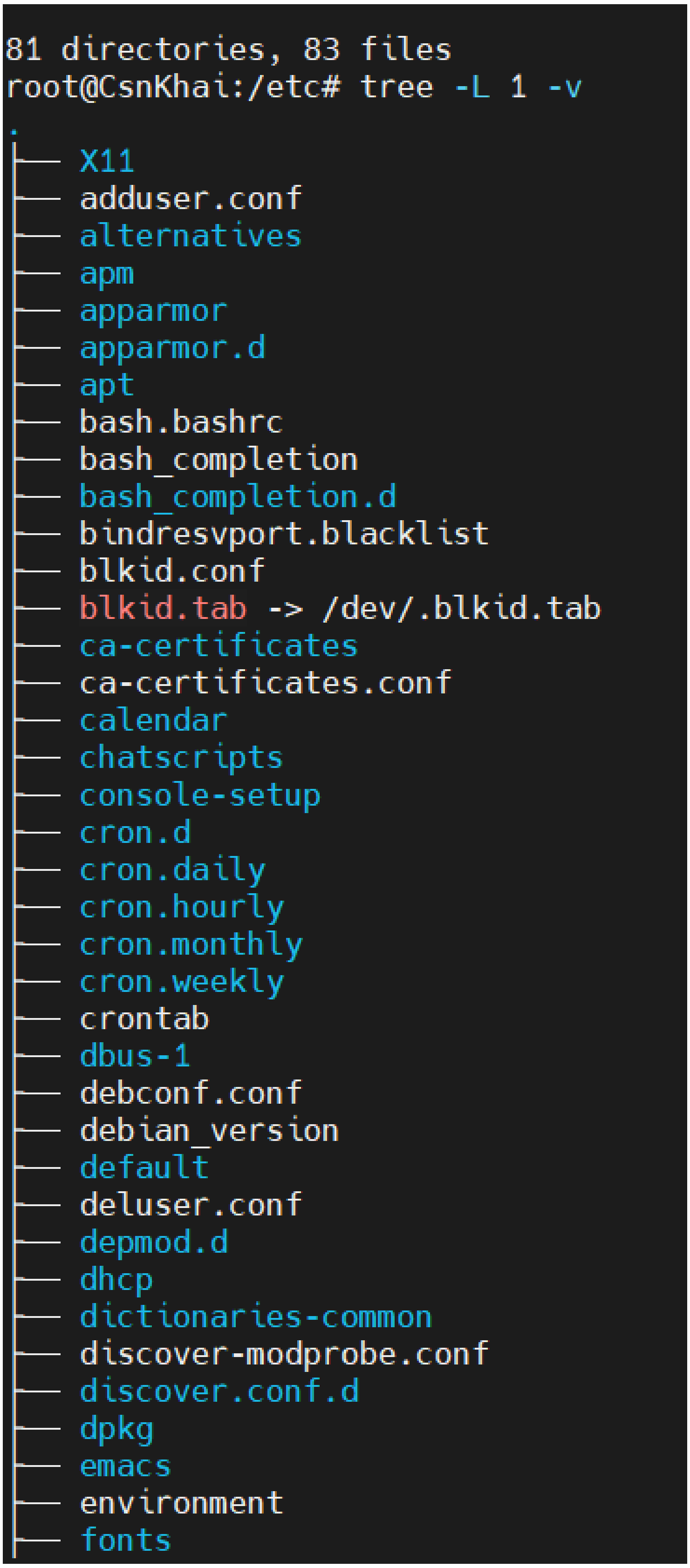


```
TREE(1)                                   General Commands Manual                                   TREE(1)

NAME
       tree - list contents of directories in a tree-like format.

SYNOPSIS
       tree  [-acdfghilnpqrstuvxACDFQNSUX]  [-L  level  [-R]]  [-H  baseHREF]  [-T  title]  [-o filename] [--nolinks] [-P pattern] [-I pattern] [--inodes]
       [--device] [--noreport] [--dirsfirst] [--version] [--help] [--filelimit #] [--si] [--prune] [--du] [--timefmt format] [directory ...]

DESCRIPTION
       Tree is a recursive directory listing program that produces a depth indented listing of files, which is colorized ala dircolors  if  the  LS_COLORS
       environment  variable is set and output is to tty.  With no arguments, tree lists the files in the current directory.  When directory arguments are
       given, tree lists all the files and/or directories found in the given directories each in turn.  Upon completion of listing  all  files/directories
       found, tree returns the total number of files and/or directories listed.

       By default, when a symbolic link is encountered, the path that the symbolic link refers to is printed after the name of the link in the format:

           name -> real-path

       If  the `-l' option is given and the symbolic link refers to an actual directory, then tree will follow the path of the symbolic link as if it were
       a real directory.

OPTIONS
       Tree understands the following command line switches:

LISTING OPTIONS
       -a     All files are printed.  By default tree does not print hidden files (those beginning with a dot `.').  In no event does tree print the  file
              system constructs `.' (current directory) and `..' (previous directory).

       -d     List directories only.

       -l     Follows  symbolic  links if they point to directories, as if they were directories. Symbolic links that will result in recursion are avoided
              when detected.

       -f     Prints the full path prefix for each file.

       -x     Stay on the current file-system only.  Ala find -xdev.

       -L level
              Max display depth of the directory tree.
 Manual page tree(1) line 1 (press h for help or q to quit)
```



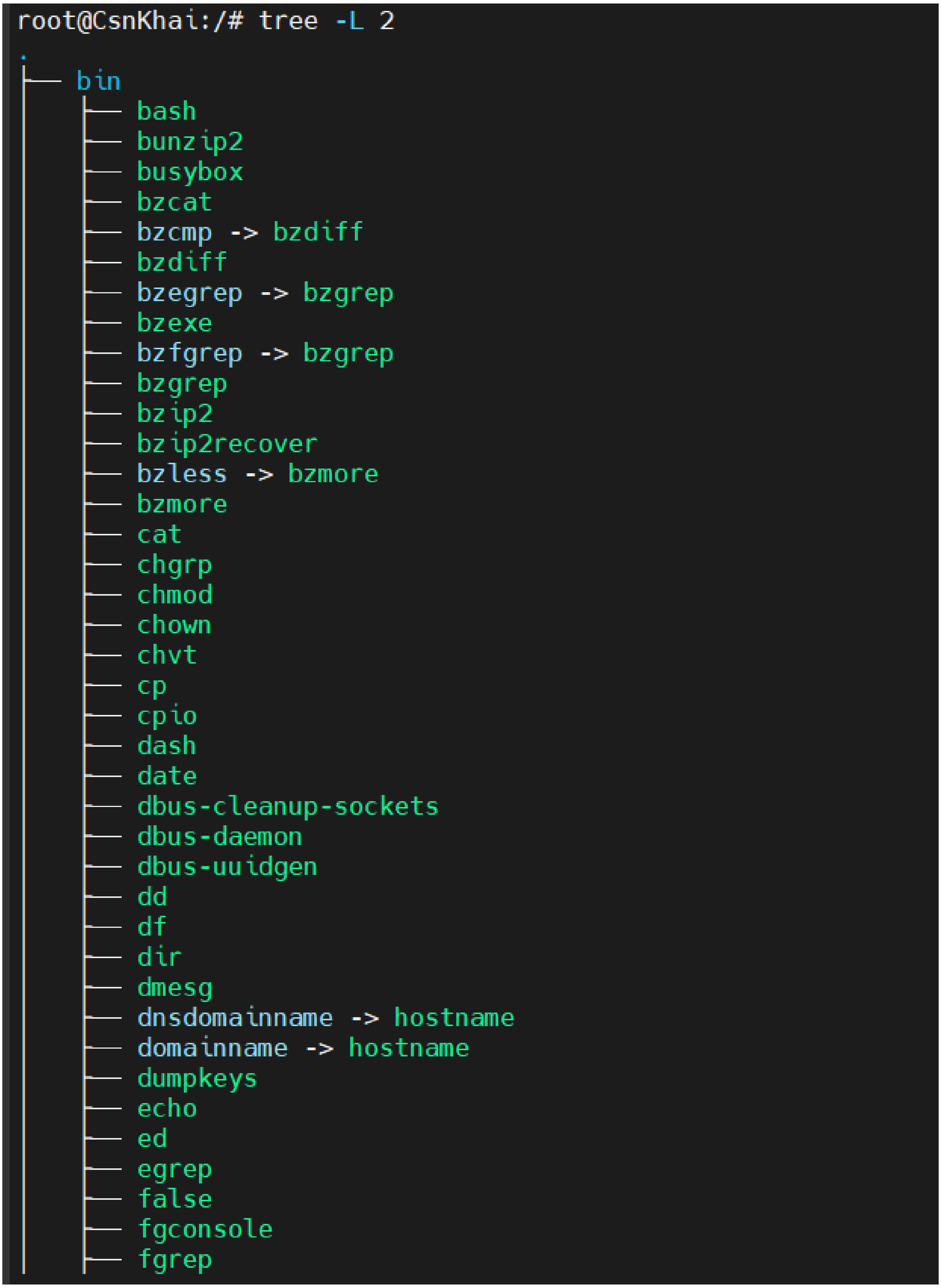
```
root@CsnKhai:/# tree -L 1
.
├── bin
├── boot
├── dev
├── etc
├── home
├── initrd.img -> boot/initrd.img-3.13.0-63-generic
├── lib
├── lost+found
├── media
├── mnt
├── opt
├── proc
├── root
├── run
├── sbin
├── srv
├── sys
├── tmp
├── usr
├── var
└── vmlinuz -> boot/vmlinuz-3.13.0-63-generic

19 directories, 2 files
root@CsnKhai:/#
```

Listing the files in /etc/ sorted alphabetically with depth 1:



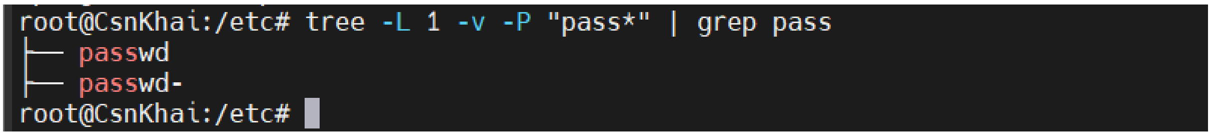
```
81 directories, 83 files
root@CsnKhai:/etc# tree -L 1 -v
.
├── X11
├── adduser.conf
├── alternatives
├── apm
├── apparmor
├── apparmor.d
├── apt
├── bash.bashrc
├── bash_completion
├── bash_completion.d
├── bindresvport.blacklist
├── blkid.conf
├── blkid.tab -> /dev/.blkid.tab
├── ca-certificates
├── ca-certificates.conf
├── calendar
├── chatscripts
├── console-setup
├── cron.d
├── cron.daily
├── cron.hourly
├── cron.monthly
├── cron.weekly
├── crontab
├── dbus-1
├── debconf.conf
├── debian_version
├── default
├── deluser.conf
├── depmod.d
├── dhcp
├── dictionaries-common
├── discover-modprobe.conf
├── discover.conf.d
├── dpkg
├── emacs
├── environment
├── fonts
```

Depth 2:



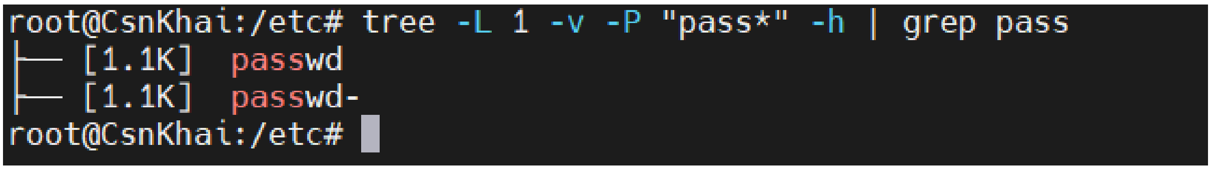
```
root@CsnKhai:/# tree -L 2
.
├── bin
│   ├── bash
│   ├── bunzip2
│   ├── busybox
│   ├── bzcat
│   ├── bzcmp -> bzdiff
│   ├── bzdiff
│   ├── bzegrep -> bzgrep
│   ├── bzexe
│   ├── bzfgrep -> bzgrep
│   ├── bzgrep
│   ├── bzip2
│   ├── bzip2recover
│   ├── bzless -> bzmore
│   ├── bzmore
│   ├── cat
│   ├── chgrp
│   ├── chmod
│   ├── chown
│   ├── chvt
│   ├── cp
│   ├── cpio
│   ├── dash
│   ├── date
│   ├── dbus-cleanup-sockets
│   ├── dbus-daemon
│   ├── dbus-uuidgen
│   ├── dd
│   ├── df
│   ├── dir
│   ├── dmesg
│   ├── dnsdomainname -> hostname
│   ├── domainname -> hostname
│   ├── dumpkeys
│   ├── echo
│   ├── ed
│   ├── egrep
│   ├── false
│   ├── fgconsole
│   ├── fgrep
```

Listing only files containing word sequence pass (grepped to show only the found filed, not the directories present):



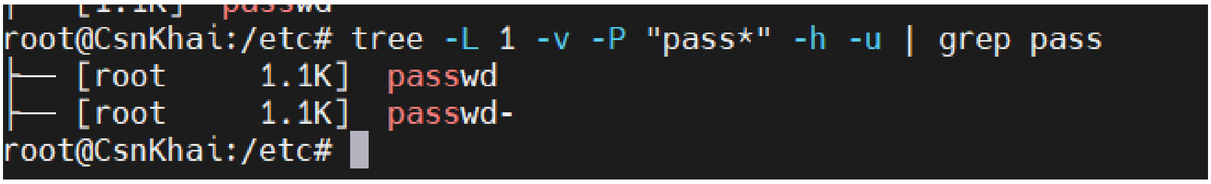
```
root@CsnKhai:/etc# tree -L 1 -v -P "pass*" | grep pass
├── passwd
├── passwd-
root@CsnKhai:/etc#
```

Listing also the size of found files (in a readable format):



```
root@CsnKhai:/etc# tree -L 1 -v -P "pass*" -h | grep pass
├── [1.1K]  passwd
├── [1.1K]  passwd-
root@CsnKhai:/etc#
```

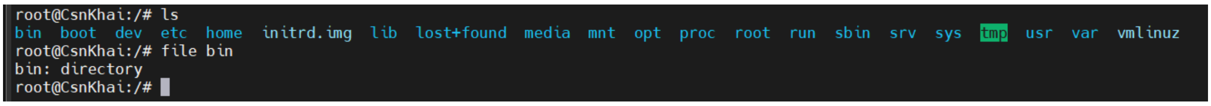
Displaying also the file owner:



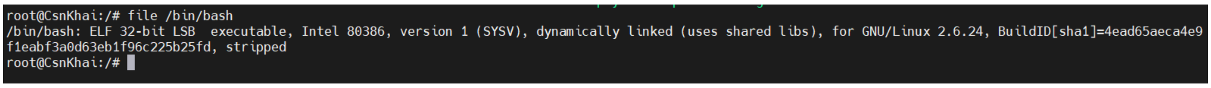
```
root@CsnKhai:/etc# tree -L 1 -v -P "pass*" -h -u | grep pass
├── [root      1.1K]  passwd
├── [root      1.1K]  passwd-
root@CsnKhai:/etc#
```

2) What command can be used to determine the type of file (for example, text or binary)? Give an example.

A command “file”:



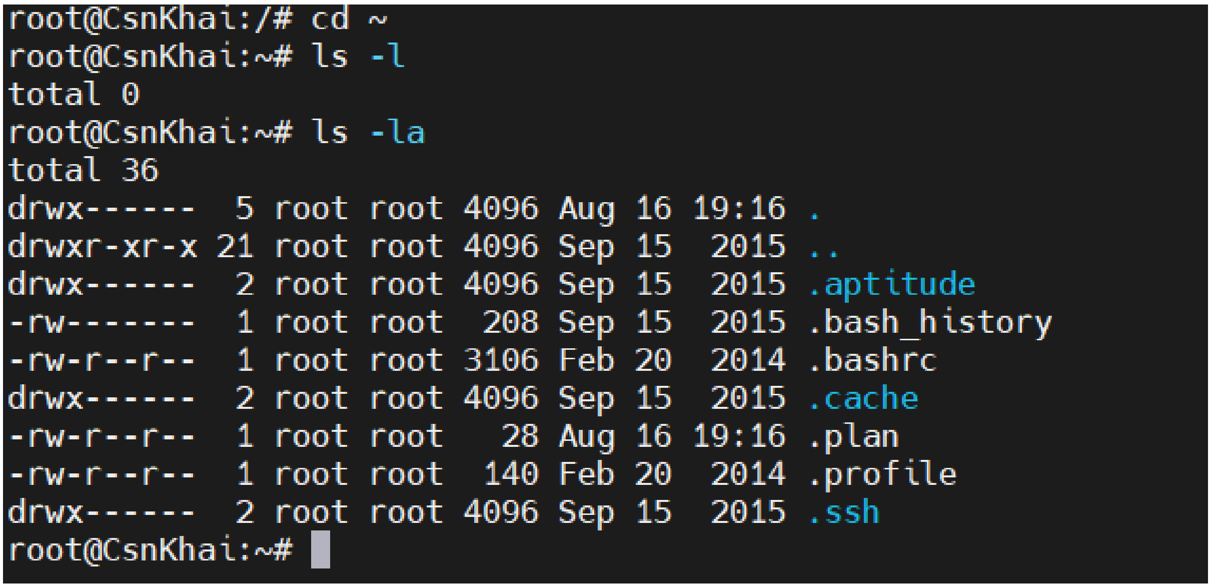
```
root@CsnKhai:/# ls
bin  boot  dev  etc  home  initrd.img  lib  lost+found  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var  vmlinuz
root@CsnKhai:/# file bin
bin: directory
root@CsnKhai:/#
```



```
root@CsnKhai:/# file /bin/bash
/bin/bash: ELF 32-bit LSB  executable, Intel 80386, version 1 (SYSV), dynamically linked (uses shared libs), for GNU/Linux 2.6.24, BuildID[sha1]=4ead65aeca4e9
f1eabf3a0d63eb1f96c225b25fd, stripped
root@CsnKhai:/#
```

3) Master the skills of navigating the file system using relative and absolute paths. How can you go back to your home directory from anywhere in the filesystem?

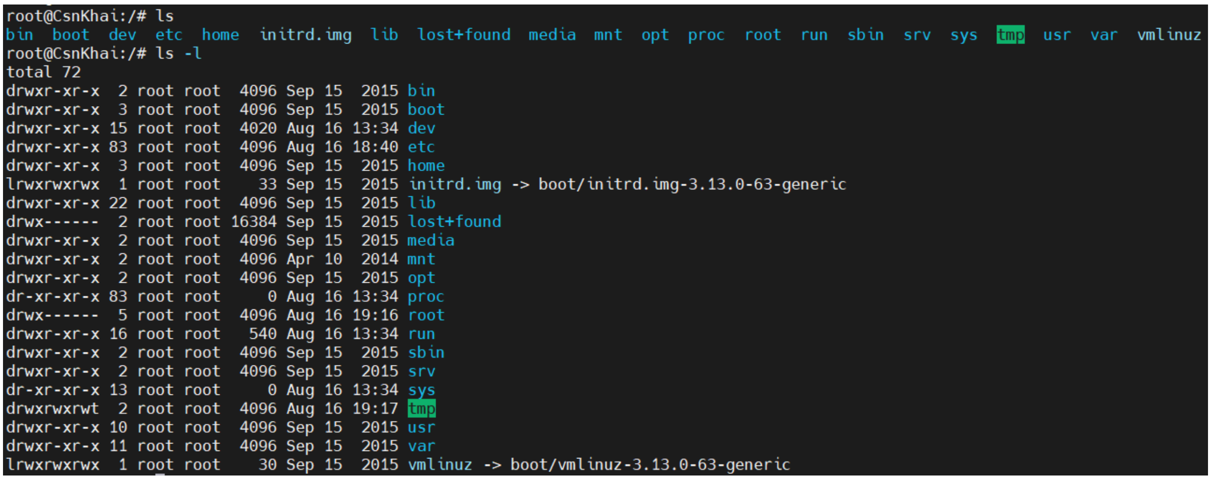
You need to use “cd ~” command:



```
root@CsnKhai:/# cd ~
root@CsnKhai:~# ls -l
total 0
root@CsnKhai:~# ls -la
total 36
drwx------  5 root root 4096 Aug 16 19:16 .
drwxr-xr-x 21 root root 4096 Sep 15  2015 ..
drwx------  2 root root 4096 Sep 15  2015 .aptitude
-rw-------  1 root root  208 Sep 15  2015 .bash_history
-rw-r--r--  1 root root 3106 Feb 20  2014 .bashrc
drwx------  2 root root 4096 Sep 15  2015 .cache
-rw-r--r--  1 root root   28 Aug 16 19:16 .plan
-rw-r--r--  1 root root  140 Feb 20  2014 .profile
drwx------  2 root root 4096 Sep 15  2015 .ssh
root@CsnKhai:~#
```

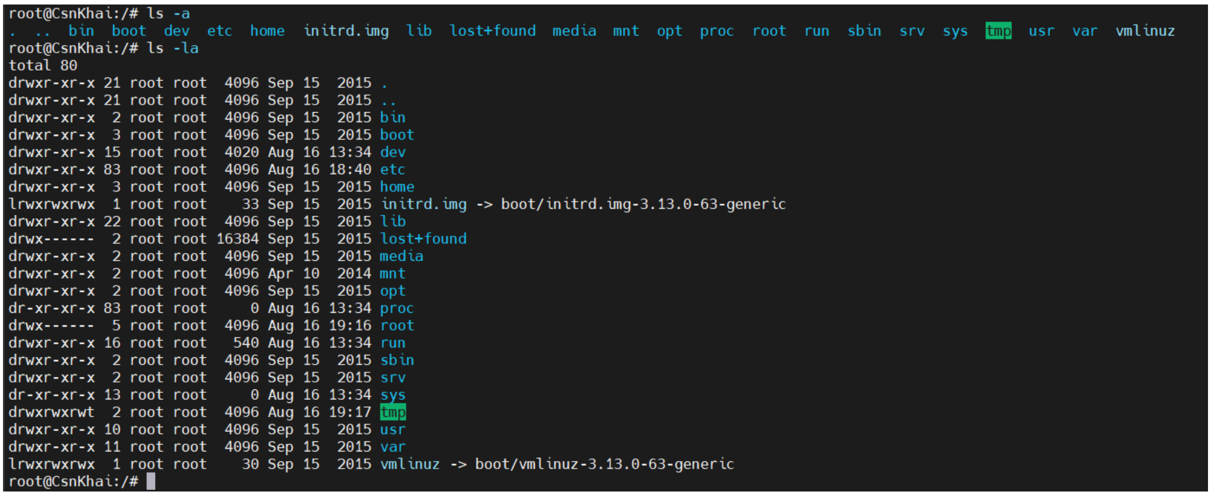
4) Become familiar with the various options for the ls command. Give examples of listing directories using different keys. Explain the information displayed on the terminal using the -l and -a switches.

Ls -l displays additional info about the file - type, permissions, owner, group, creation or modification date, size:



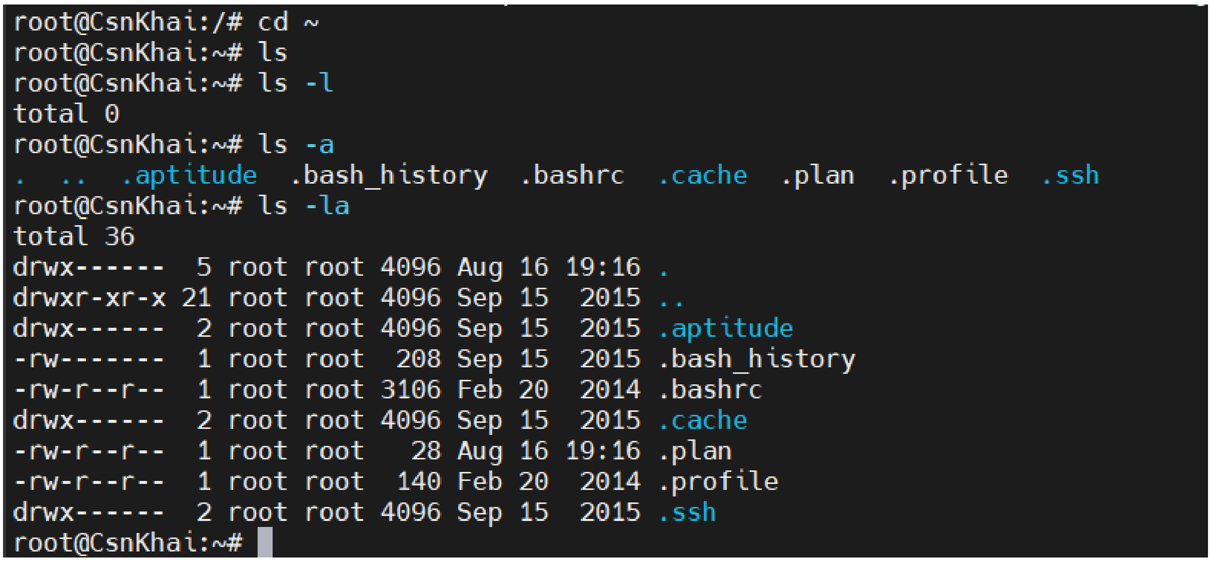
```
root@CsnKhai:/# ls
bin  boot  dev  etc  home  initrd.img  lib  lost+found  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var  vmlinuz
root@CsnKhai:/# ls -l
total 72
drwxr-xr-x  2 root root  4096 Sep 15  2015 bin
drwxr-xr-x  3 root root  4096 Sep 15  2015 boot
drwxr-xr-x 15 root root  4020 Aug 16 13:34 dev
drwxr-xr-x 83 root root  4096 Aug 16 18:40 etc
drwxr-xr-x  3 root root  4096 Sep 15  2015 home
lrwxrwxrwx  1 root root    33 Sep 15  2015 initrd.img -> boot/initrd.img-3.13.0-63-generic
drwxr-xr-x 22 root root  4096 Sep 15  2015 lib
drwx------  2 root root 16384 Sep 15  2015 lost+found
drwxr-xr-x  2 root root  4096 Sep 15  2015 media
drwxr-xr-x  2 root root  4096 Apr 10  2014 mnt
drwxr-xr-x  2 root root  4096 Sep 15  2015 opt
dr-xr-xr-x 83 root root     0 Aug 16 13:34 proc
drwx------  5 root root  4096 Aug 16 19:16 root
drwxr-xr-x 16 root root   540 Aug 16 13:34 run
drwxr-xr-x  2 root root  4096 Sep 15  2015 sbin
drwxr-xr-x  2 root root  4096 Sep 15  2015 srv
dr-xr-xr-x 13 root root     0 Aug 16 13:34 sys
drwxrwxrwt  2 root root  4096 Aug 16 19:17 tmp
drwxr-xr-x 10 root root  4096 Sep 15  2015 usr
drwxr-xr-x 11 root root  4096 Sep 15  2015 var
lrwxrwxrwx  1 root root    30 Sep 15  2015 vmlinuz -> boot/vmlinuz-3.13.0-63-generic
```

-a key enables ls command to show also the hidden files - these start with a dot:



```
root@CsnKhai:/# ls -a
.  ..  bin  boot  dev  etc  home  initrd.img  lib  lost+found  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var  vmlinuz
root@CsnKhai:/# ls -la
total 80
drwxr-xr-x 21 root root  4096 Sep 15  2015 .
drwxr-xr-x 21 root root  4096 Sep 15  2015 ..
drwxr-xr-x  2 root root  4096 Sep 15  2015 bin
drwxr-xr-x  3 root root  4096 Sep 15  2015 boot
drwxr-xr-x 15 root root  4020 Aug 16 13:34 dev
drwxr-xr-x 83 root root  4096 Aug 16 18:40 etc
drwxr-xr-x  3 root root  4096 Sep 15  2015 home
lrwxrwxrwx  1 root root    33 Sep 15  2015 initrd.img -> boot/initrd.img-3.13.0-63-generic
drwxr-xr-x 22 root root  4096 Sep 15  2015 lib
drwx------  2 root root 16384 Sep 15  2015 lost+found
drwxr-xr-x  2 root root  4096 Sep 15  2015 media
drwxr-xr-x  2 root root  4096 Apr 10  2014 mnt
drwxr-xr-x  2 root root  4096 Sep 15  2015 opt
dr-xr-xr-x 83 root root     0 Aug 16 13:34 proc
drwx------  5 root root  4096 Aug 16 19:16 root
drwxr-xr-x 16 root root   540 Aug 16 13:34 run
drwxr-xr-x  2 root root  4096 Sep 15  2015 sbin
drwxr-xr-x  2 root root  4096 Sep 15  2015 srv
dr-xr-xr-x 13 root root     0 Aug 16 13:34 sys
drwxrwxrwt  2 root root  4096 Aug 16 19:17 tmp
drwxr-xr-x 10 root root  4096 Sep 15  2015 usr
drwxr-xr-x 11 root root  4096 Sep 15  2015 var
lrwxrwxrwx  1 root root    30 Sep 15  2015 vmlinuz -> boot/vmlinuz-3.13.0-63-generic
root@CsnKhai:/#
```

Here, the hidden files are . (pointer to this directory) and .. (pointer to a higher-level directory). To show more hidden files, let's switch to root home dir:

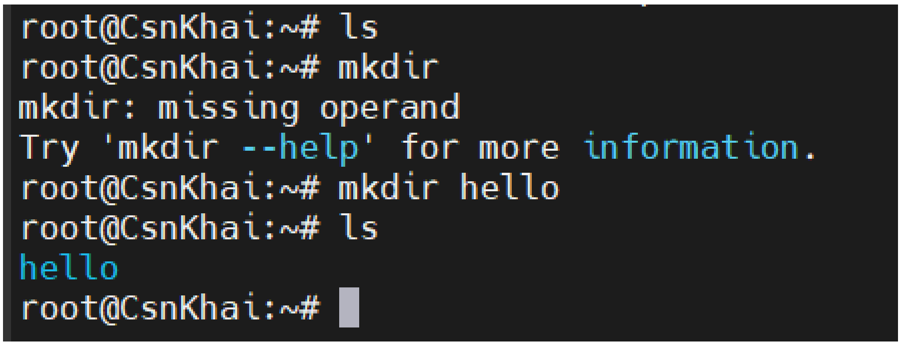


```
root@CsnKhai:/# cd ~
root@CsnKhai:~# ls
root@CsnKhai:~# ls -l
total 0
root@CsnKhai:~# ls -a
.  ..  .aptitude  .bash_history  .bashrc  .cache  .plan  .profile  .ssh
root@CsnKhai:~# ls -la
total 36
drwx------  5 root root 4096 Aug 16 19:16 .
drwxr-xr-x 21 root root 4096 Sep 15  2015 ..
drwx------  2 root root 4096 Sep 15  2015 .aptitude
-rw-------  1 root root  208 Sep 15  2015 .bash_history
-rw-r--r--  1 root root 3106 Feb 20  2014 .bashrc
drwx------  2 root root 4096 Sep 15  2015 .cache
-rw-r--r--  1 root root   28 Aug 16 19:16 .plan
-rw-r--r--  1 root root  140 Feb 20  2014 .profile
drwx------  2 root root 4096 Sep 15  2015 .ssh
root@CsnKhai:~#
```

Here is a bunch of hidden files, including .plan that was created earlier in this laboratory work.

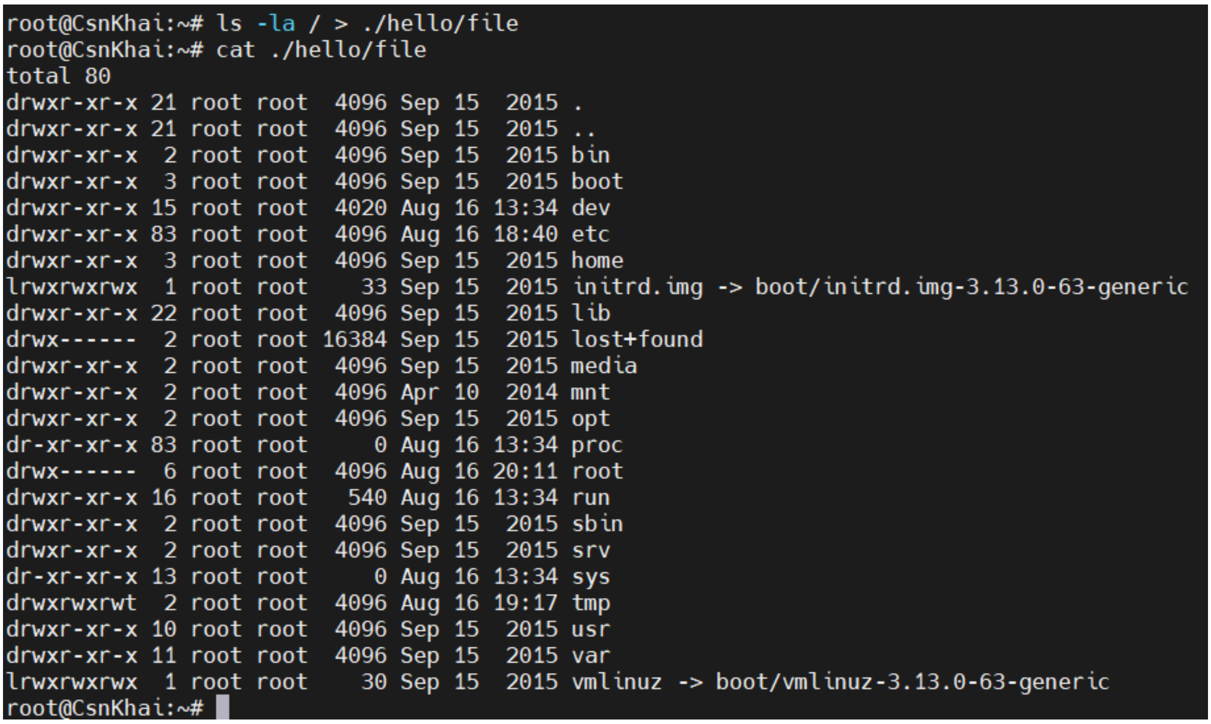
5) Perform the following sequence of operations:

- create a subdirectory in the home directory;



```
root@CsnKhai:~# ls
root@CsnKhai:~# mkdir
mkdir: missing operand
Try 'mkdir --help' for more information.
root@CsnKhai:~# mkdir hello
root@CsnKhai:~# ls
hello
root@CsnKhai:~# 
```

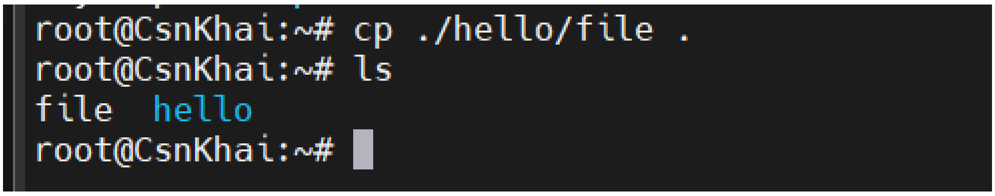
- in this subdirectory create a file containing information about directories located in the root directory (using I/O redirection operations);
- view the created file;



```
root@CsnKhai:~# ls -la / > ./hello/file
root@CsnKhai:~# cat ./hello/file
total 80
drwxr-xr-x 21 root root  4096 Sep 15  2015 .
drwxr-xr-x 21 root root  4096 Sep 15  2015 ..
drwxr-xr-x  2 root root  4096 Sep 15  2015 bin
drwxr-xr-x  3 root root  4096 Sep 15  2015 boot
drwxr-xr-x 15 root root  4020 Aug 16 13:34 dev
drwxr-xr-x 83 root root  4096 Aug 16 18:40 etc
drwxr-xr-x  3 root root  4096 Sep 15  2015 home
lrwxrwxrwx  1 root root    33 Sep 15  2015 initrd.img -> boot/initrd.img-3.13.0-63-generic
drwxr-xr-x 22 root root  4096 Sep 15  2015 lib
drwx------  2 root root 16384 Sep 15  2015 lost+found
drwxr-xr-x  2 root root  4096 Sep 15  2015 media
drwxr-xr-x  2 root root  4096 Apr 10  2014 mnt
drwxr-xr-x  2 root root  4096 Sep 15  2015 opt
dr-xr-xr-x 83 root root     0 Aug 16 13:34 proc
drwx------  6 root root  4096 Aug 16 20:11 root
drwxr-xr-x 16 root root   540 Aug 16 13:34 run
drwxr-xr-x  2 root root  4096 Sep 15  2015 sbin
drwxr-xr-x  2 root root  4096 Sep 15  2015 srv
dr-xr-xr-x 13 root root     0 Aug 16 13:34 sys
drwxrwxrwt  2 root root  4096 Aug 16 19:17 tmp
drwxr-xr-x 10 root root  4096 Sep 15  2015 usr
drwxr-xr-x 11 root root  4096 Sep 15  2015 var
lrwxrwxrwx  1 root root    30 Sep 15  2015 vmlinuz -> boot/vmlinuz-3.13.0-63-generic
root@CsnKhai:~# 
```

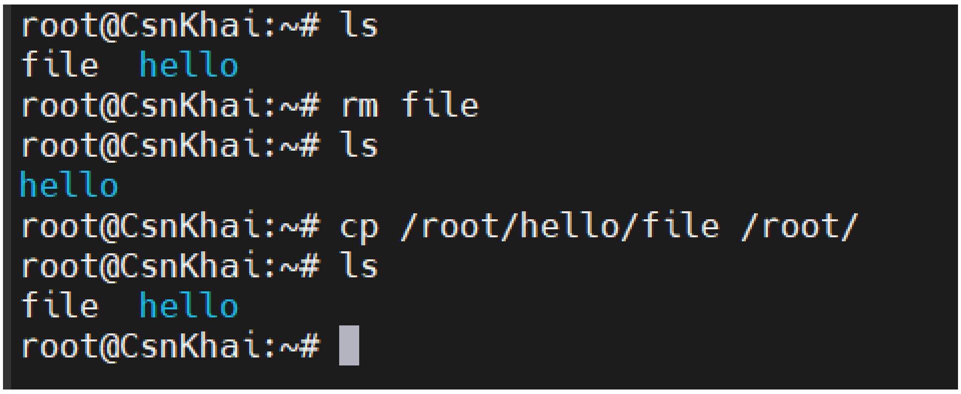
- copy the created file to your home directory using relative and absolute Addressing.

Relative addressing:



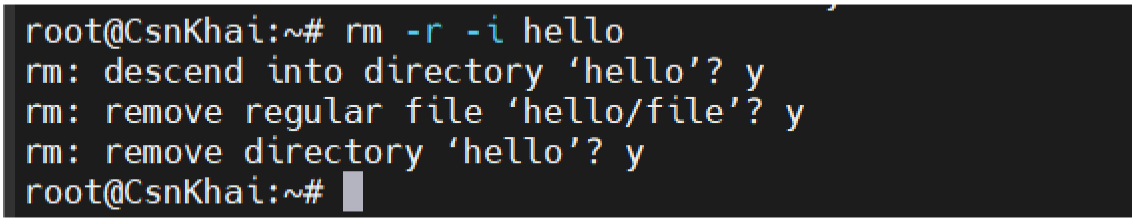
```
root@CsnKhai:~# cp ./hello/file .
root@CsnKhai:~# ls
file  hello
root@CsnKhai:~# 
```

Absolute addressing:



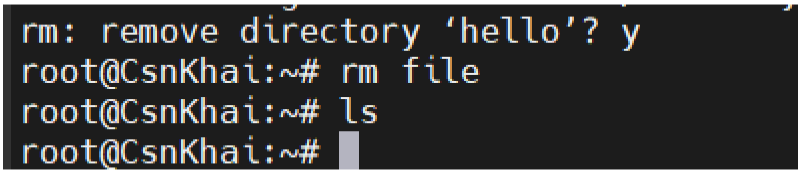
```
root@CsnKhai:~# ls
file  hello
root@CsnKhai:~# rm file
root@CsnKhai:~# ls
hello
root@CsnKhai:~# cp /root/hello/file /root/
root@CsnKhai:~# ls
file  hello
root@CsnKhai:~# 
```

- delete the previously created subdirectory with the file requesting removal;



```
root@CsnKhai:~# rm -r -i hello
rm: descend into directory ‘hello’? y
rm: remove regular file ‘hello/file’? y
rm: remove directory ‘hello’? y
root@CsnKhai:~# 
```

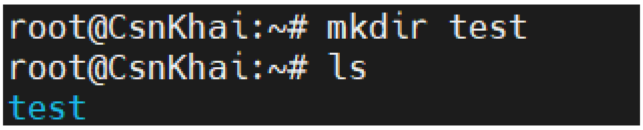
- delete the file copied to the home directory.



```
rm: remove directory ‘hello’? y
root@CsnKhai:~# rm file
root@CsnKhai:~# ls
root@CsnKhai:~# 
```

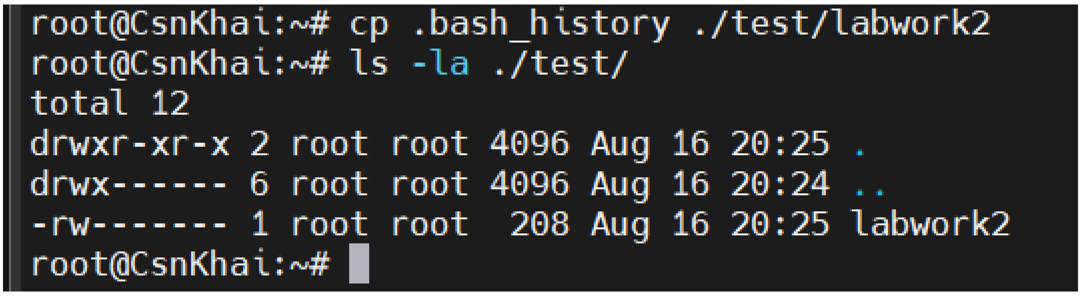
6) Perform the following sequence of operations:

- create a subdirectory test in the home directory;



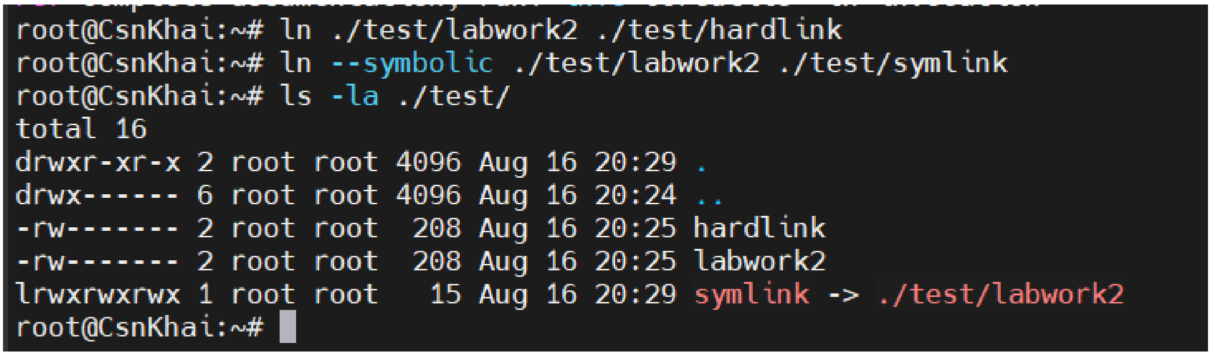
```
root@CsnKhai:~# mkdir test
root@CsnKhai:~# ls
test
```

- copy the .bash_history file to this directory while changing its name to labwork2;



```
root@CsnKhai:~# cp .bash_history ./test/labwork2
root@CsnKhai:~# ls -la ./test/
total 12
drwxr-xr-x 2 root root 4096 Aug 16 20:25 .
drwx------ 6 root root 4096 Aug 16 20:24 ..
-rw------- 1 root root  208 Aug 16 20:25 labwork2
root@CsnKhai:~# 
```

- create a hard and soft link to the labwork2 file in the test subdirectory;



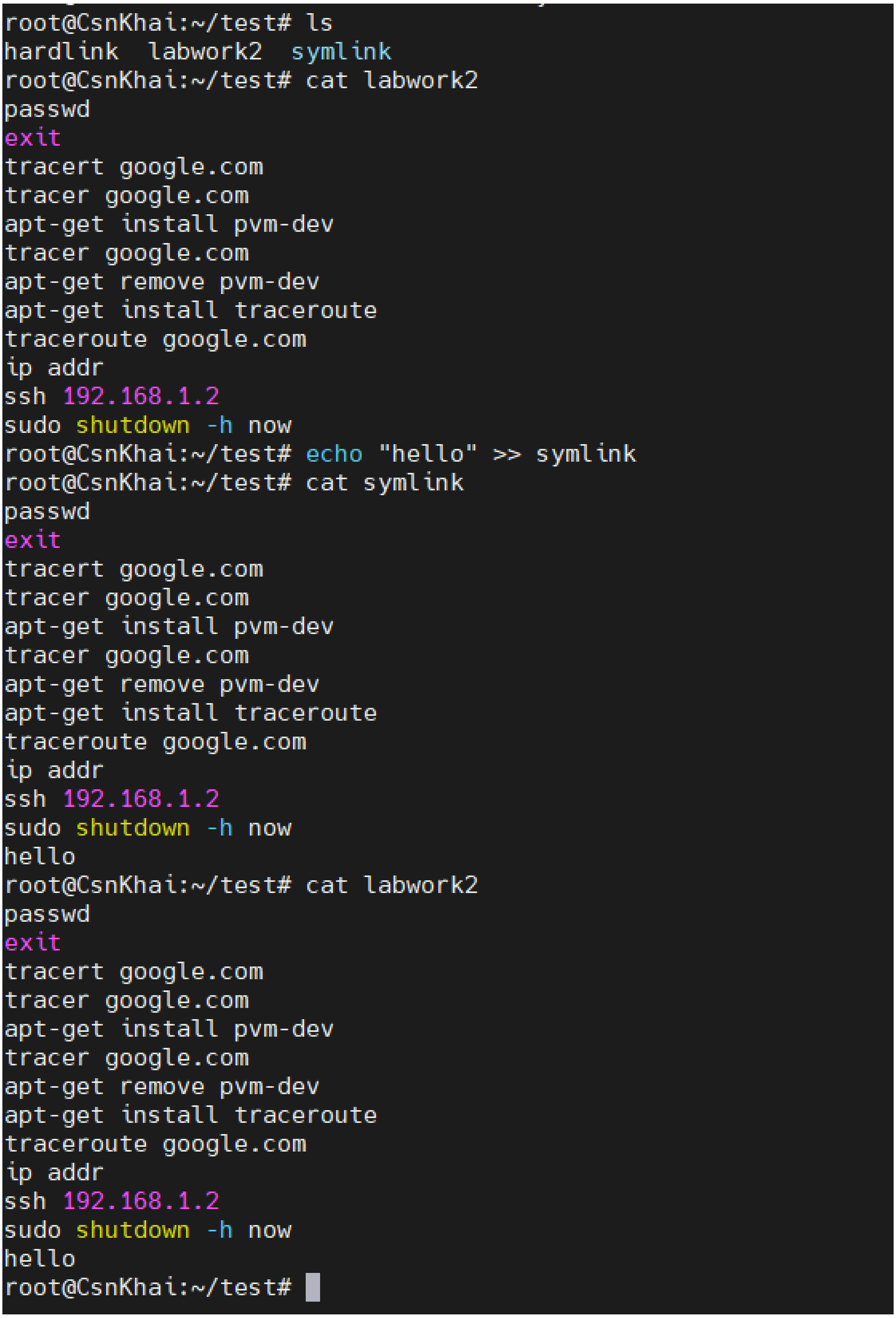
```
root@CsnKhai:~# ln ./test/labwork2 ./test/hardlink
root@CsnKhai:~# ln --symbolic ./test/labwork2 ./test/symlink
root@CsnKhai:~# ls -la ./test/
total 16
drwxr-xr-x 2 root root 4096 Aug 16 20:29 .
drwx------ 6 root root 4096 Aug 16 20:24 ..
-rw------- 2 root root  208 Aug 16 20:25 hardlink
-rw------- 2 root root  208 Aug 16 20:25 labwork2
lrwxrwxrwx 1 root root   15 Aug 16 20:29 symlink -> ./test/labwork2
root@CsnKhai:~# 
```

- how to define soft and hard link, what do these

Concepts;

Symbolic links are similar to the windows shortcuts - these are small files that are “pointing” at their base file, they exist when the base file is deleted, but point at nothing. Hard links, however, are actually the files they are representing - just another name of it. To actually delete the file on Linux, you need to delete all hard links pointing at it. Hard links are not actually separate files, they do not take additional space.

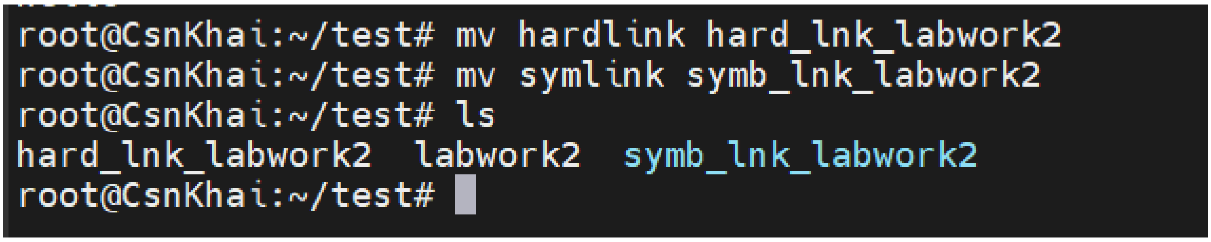
- change the data by opening a symbolic link. What changes will happen and why



```
root@CsnKhai:~/test# ls
hardlink  labwork2  symlink
root@CsnKhai:~/test# cat labwork2
passwd
exit
tracert google.com
tracer google.com
apt-get install pvm-dev
tracer google.com
apt-get remove pvm-dev
apt-get install traceroute
traceroute google.com
ip addr
ssh 192.168.1.2
sudo shutdown -h now
root@CsnKhai:~/test# echo "hello" >> symlink
root@CsnKhai:~/test# cat symlink
passwd
exit
tracert google.com
tracer google.com
apt-get install pvm-dev
tracer google.com
apt-get remove pvm-dev
apt-get install traceroute
traceroute google.com
ip addr
ssh 192.168.1.2
sudo shutdown -h now
hello
root@CsnKhai:~/test# cat labwork2
passwd
exit
tracert google.com
tracer google.com
apt-get install pvm-dev
tracer google.com
apt-get remove pvm-dev
apt-get install traceroute
traceroute google.com
ip addr
ssh 192.168.1.2
sudo shutdown -h now
hello
root@CsnKhai:~/test# 
```

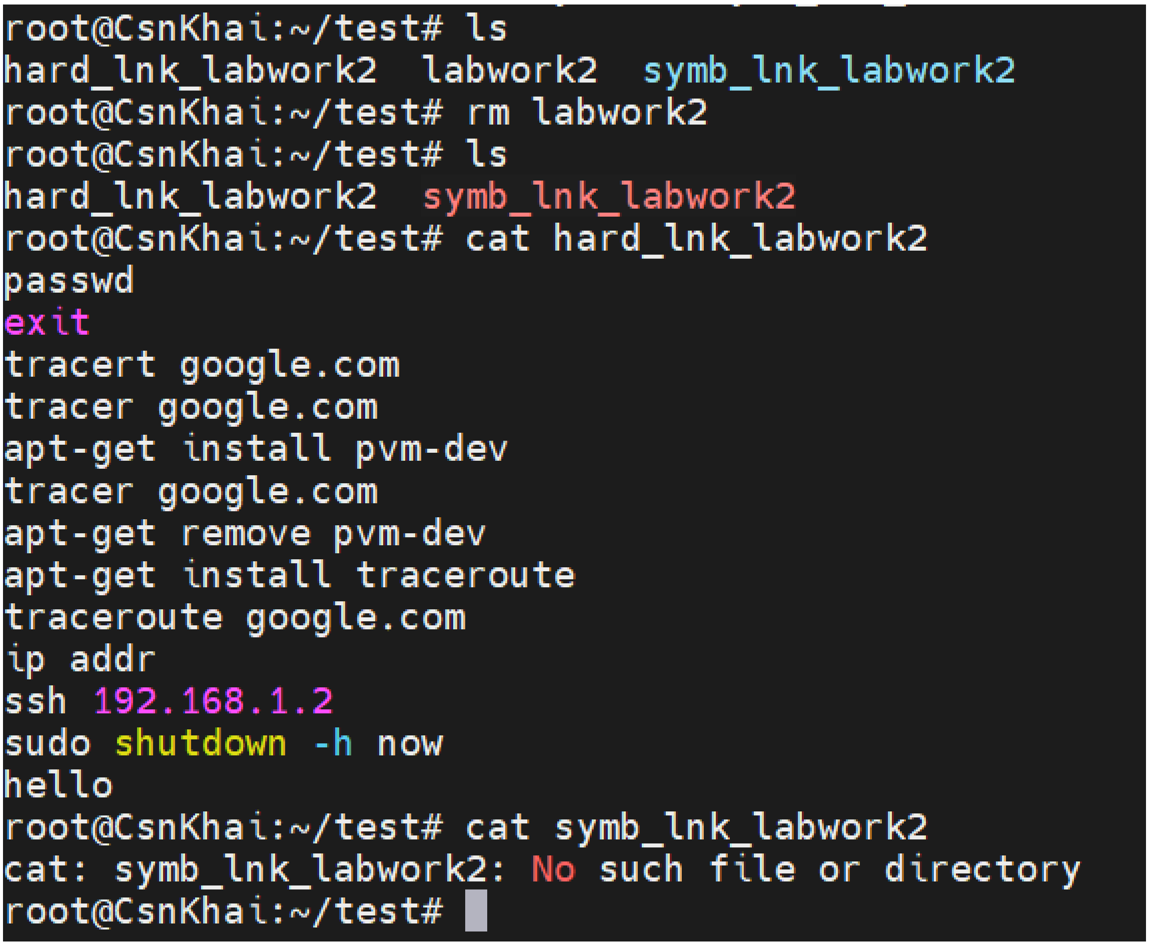
So, when added to the end of file through the symlink, “hello” appears as well in original file, as can be seen on screenshot. That happens because the symlink actually redirected change to the file it is directed at.

- rename the hard link file to hard_lnk_labwork2;
- rename the soft link file to symb_lnk_labwork2 file;



```
root@CsnKhai:~/test# mv hardlink hard_lnk_labwork2
root@CsnKhai:~/test# mv symlink symb_lnk_labwork2
root@CsnKhai:~/test# ls
hard_lnk_labwork2  labwork2  symb_lnk_labwork2
root@CsnKhai:~/test# 
```

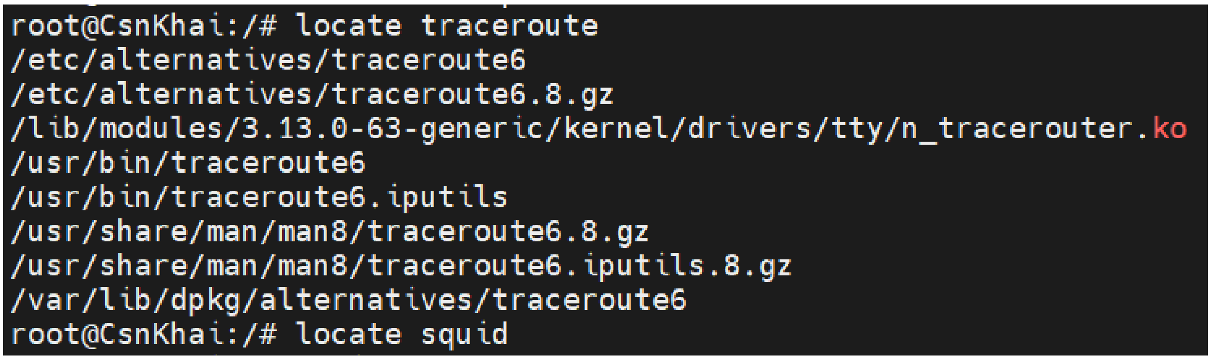
- then delete the labwork2. What changes have occurred and why?



```
root@CsnKhai:~/test# ls
hard_lnk_labwork2  labwork2  symb_lnk_labwork2
root@CsnKhai:~/test# rm labwork2
root@CsnKhai:~/test# ls
hard_lnk_labwork2  symb_lnk_labwork2
root@CsnKhai:~/test# cat hard_lnk_labwork2
passwd
exit
tracert google.com
tracer google.com
apt-get install pvm-dev
tracer google.com
apt-get remove pvm-dev
apt-get install traceroute
traceroute google.com
ip addr
ssh 192.168.1.2
sudo shutdown -h now
hello
root@CsnKhai:~/test# cat symb_lnk_labwork2
cat: symb_lnk_labwork2: No such file or directory
root@CsnKhai:~/test# 
```

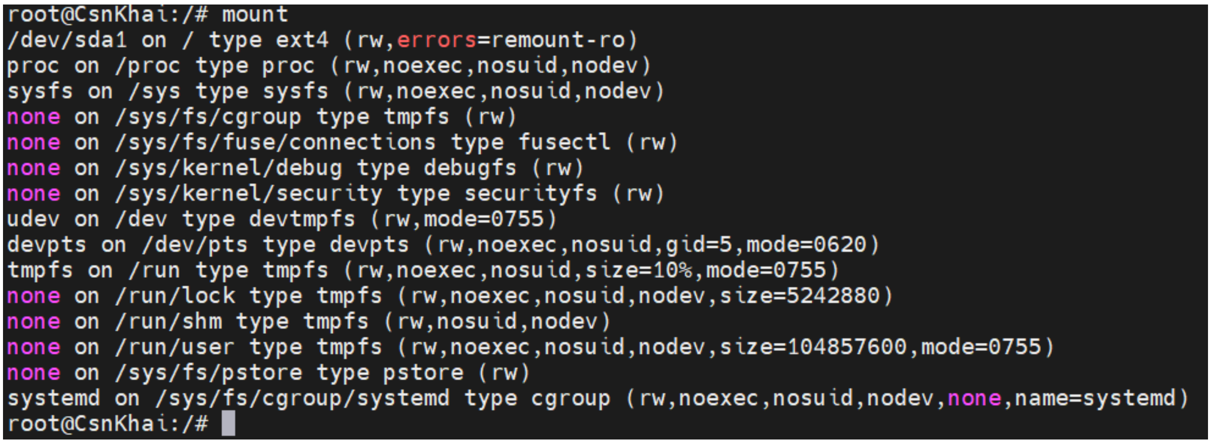
So, as can be seen, hardlink continues to work, pointing at the same file as usual. However, symbolic link was pointed directly at the file we deleted recently, so it became broken.

7) Using the locate utility, find all files that contain the squid and traceroute Sequence.



```
root@CsnKhai:/# locate traceroute
/etc/alternatives/traceroute6
/etc/alternatives/traceroute6.8.gz
/lib/modules/3.13.0-63-generic/kernel/drivers/tty/n_tracerouter.ko
/usr/bin/traceroute6
/usr/bin/traceroute6.iputils
/usr/share/man/man8/traceroute6.8.gz
/usr/share/man/man8/traceroute6.iputils.8.gz
/var/lib/dpkg/alternatives/traceroute6
root@CsnKhai:/# locate squid
```

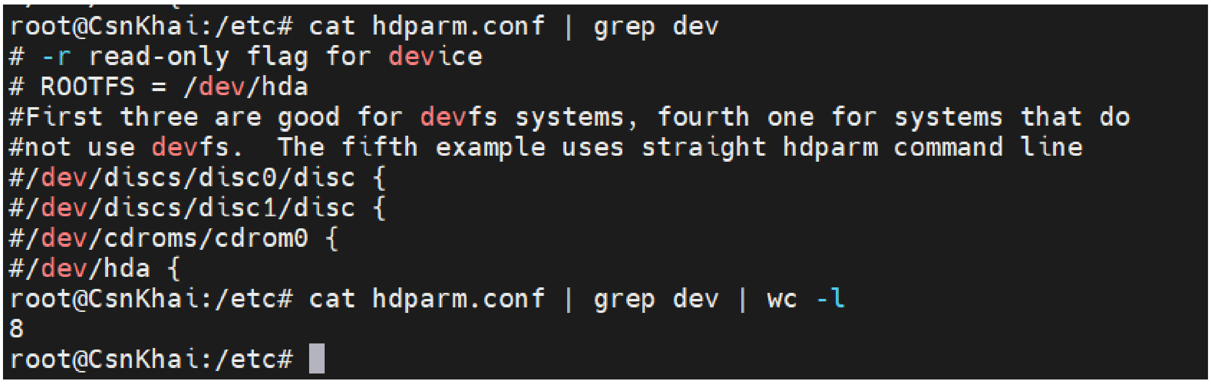
8) Determine which partitions are mounted in the system, as well as the types of these partitions.



```
root@CsnKhai:/# mount
/dev/sda1 on / type ext4 (rw,errors=remount-ro)
proc on /proc type proc (rw,noexec,nosuid,nodev)
sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
none on /sys/fs/cgroup type tmpfs (rw)
none on /sys/fs/fuse/connections type fusectl (rw)
none on /sys/kernel/debug type debugfs (rw)
none on /sys/kernel/security type securityfs (rw)
udev on /dev type devtmpfs (rw,mode=0755)
devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=0620)
tmpfs on /run type tmpfs (rw,noexec,nosuid,size=10%,mode=0755)
none on /run/lock type tmpfs (rw,noexec,nosuid,nodev,size=5242880)
none on /run/shm type tmpfs (rw,nosuid,nodev)
none on /run/user type tmpfs (rw,noexec,nosuid,nodev,size=104857600,mode=0755)
none on /sys/fs/pstore type pstore (rw)
systemd on /sys/fs/cgroup/systemd type cgroup (rw,noexec,nosuid,nodev,none,name=systemd)
root@CsnKhai:/#
```

9) Count the number of lines containing a given sequence of characters in a given
File.

We can use the cat command to display the file contents, then using a grep command we can filter the file on a particular sequence of characters, and then we can count the lines in output using the command wc with a key -l or –lines:

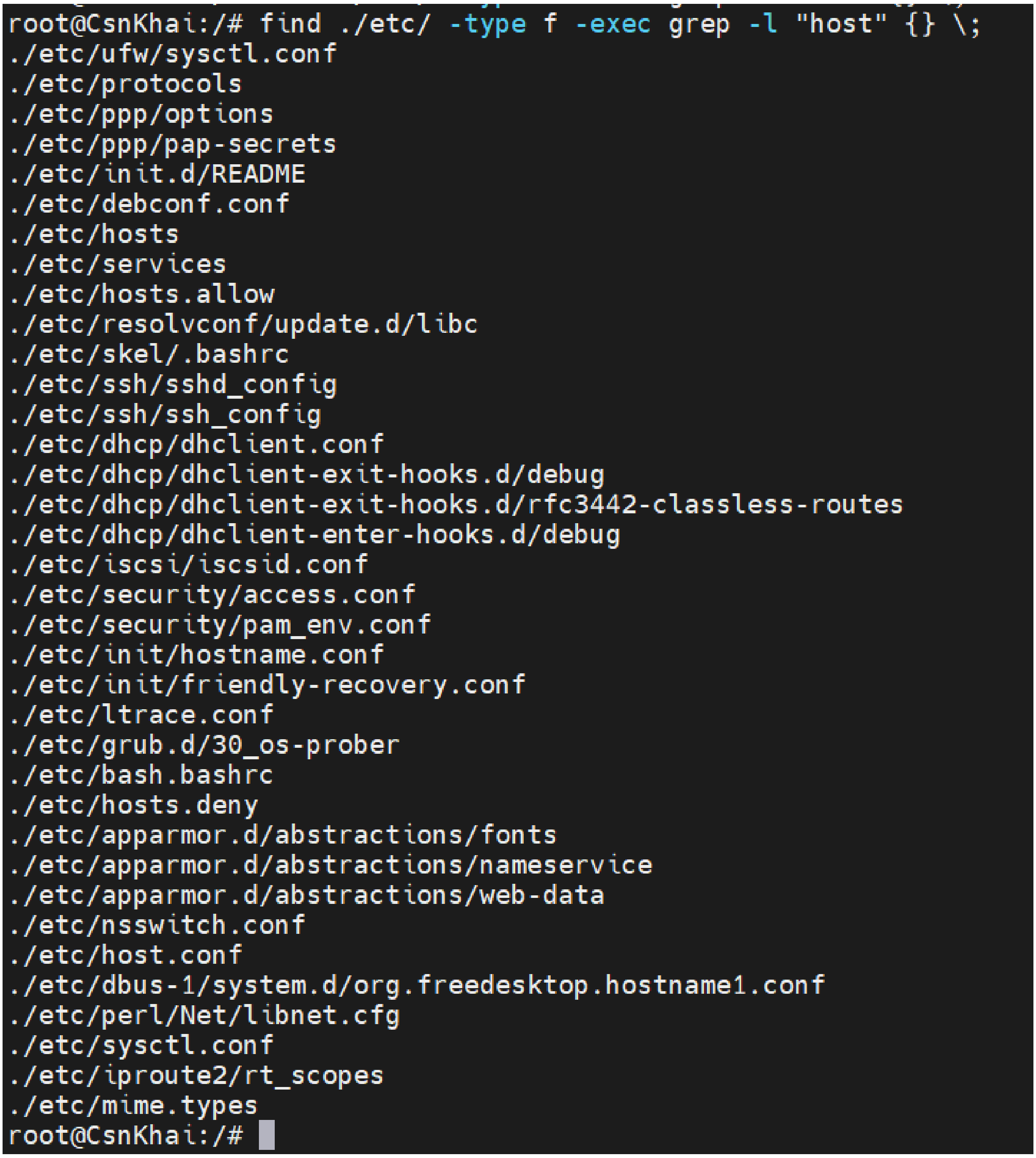


```
root@CsnKhai:/etc# cat hdparm.conf | grep dev
# -r read-only flag for device
# ROOTFS = /dev/hda
#First three are good for devfs systems, fourth one for systems that do
#not use devfs.  The fifth example uses straight hdparm command line
#/dev/discs/disc0/disc {
#/dev/discs/disc1/disc {
#/dev/cdroms/cdrom0 {
#/dev/hda {
root@CsnKhai:/etc# cat hdparm.conf | grep dev | wc -l
8
root@CsnKhai:/etc#
```

So, the command will be:

cat <filename> | grep <sequence> | wc -l

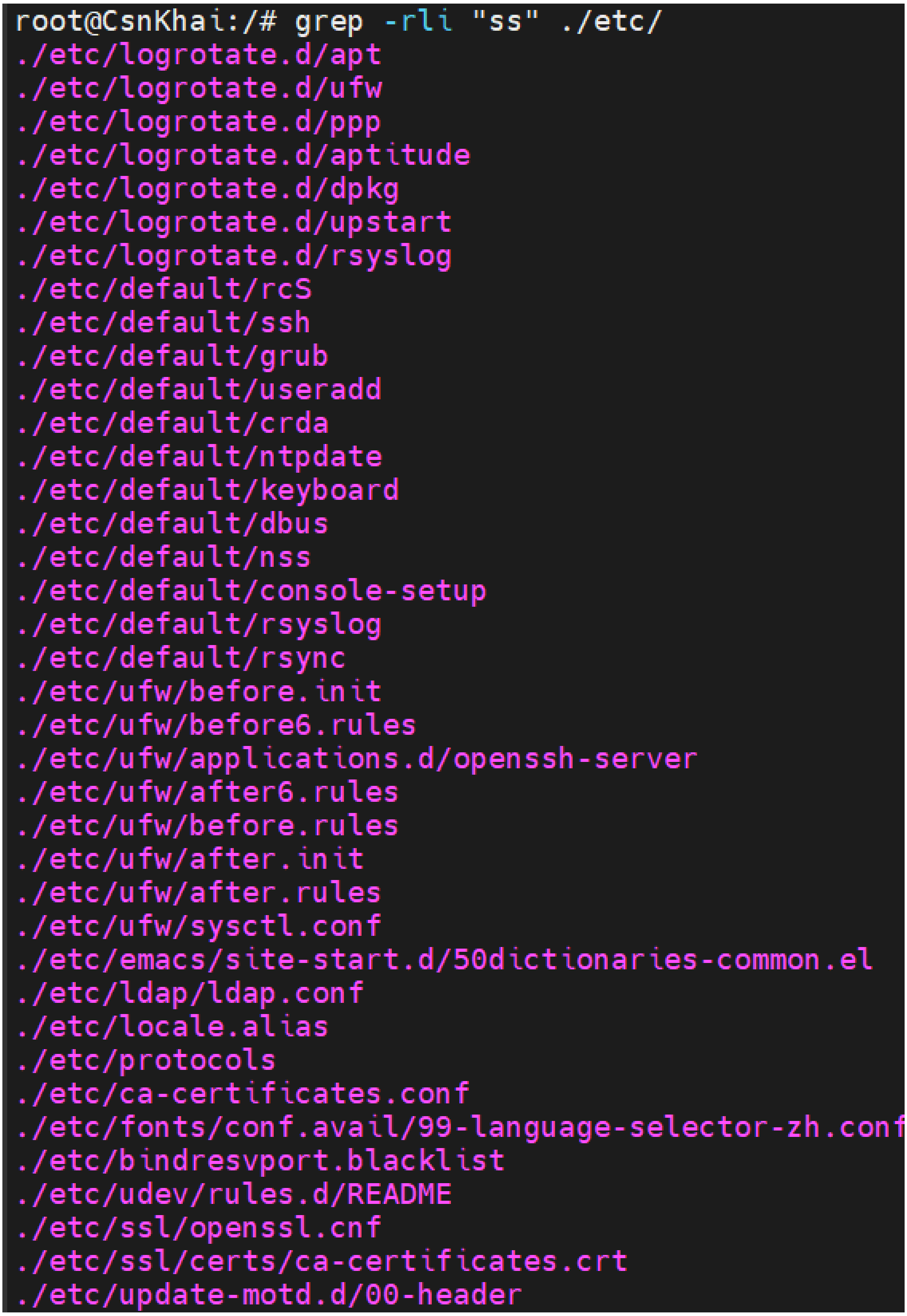
10) Using the find command, find all files in the /etc directory containing the
host character sequence.



```
root@CsnKhai:/# find ./etc/ -type f -exec grep -l "host" {} \;
./etc/ufw/sysctl.conf
./etc/protocols
./etc/ppp/options
./etc/ppp/pap-secrets
./etc/init.d/README
./etc/debconf.conf
./etc/hosts
./etc/services
./etc/hosts.allow
./etc/resolvconf/update.d/libc
./etc/skel/.bashrc
./etc/ssh/sshd_config
./etc/ssh/ssh_config
./etc/dhcp/dhclient.conf
./etc/dhcp/dhclient-exit-hooks.d/debug
./etc/dhcp/dhclient-exit-hooks.d/rfc3442-classless-routes
./etc/dhcp/dhclient-enter-hooks.d/debug
./etc/iscsi/iscsid.conf
./etc/security/access.conf
./etc/security/pam_env.conf
./etc/init/hostname.conf
./etc/init/friendly-recovery.conf
./etc/ltrace.conf
./etc/grub.d/30_os-prober
./etc/bash.bashrc
./etc/hosts.deny
./etc/apparmor.d/abstractions/fonts
./etc/apparmor.d/abstractions/nameservice
./etc/apparmor.d/abstractions/web-data
./etc/nsswitch.conf
./etc/host.conf
./etc/dbus-1/system.d/org.freedesktop.hostname1.conf
./etc/perl/Net/libnet.cfg
./etc/sysctl.conf
./etc/iproute2/rt_scopes
./etc/mime.types
root@CsnKhai:/# 
```

11) List all objects in /etc that contain the ss character sequence. How can I duplicate a similar command using a bunch of grep?

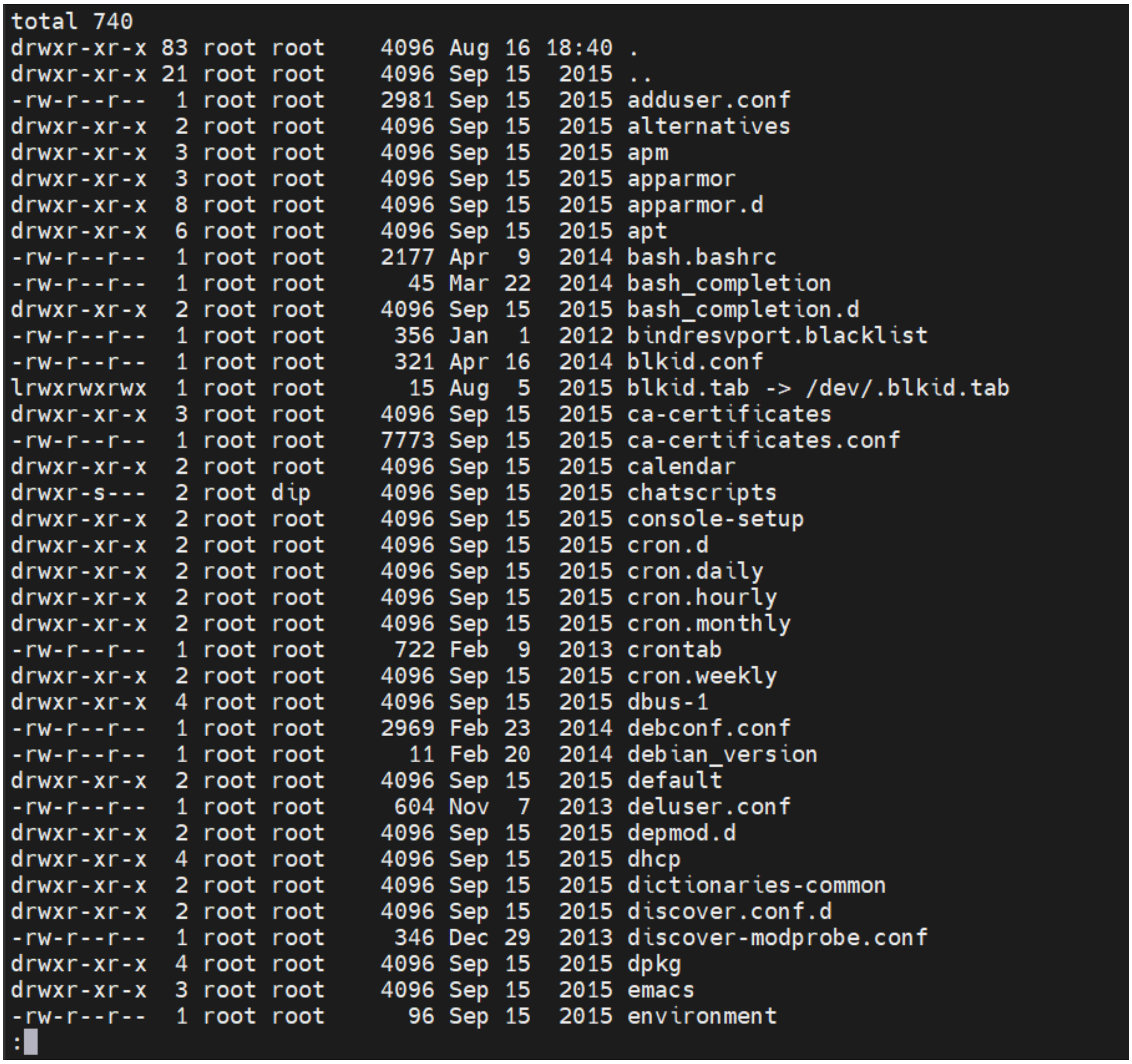
Using a grep with options -rli helps:



```
root@CsnKhai:/# grep -rli "ss" ./etc/
./etc/logrotate.d/apt
./etc/logrotate.d/ufw
./etc/logrotate.d/ppp
./etc/logrotate.d/aptitude
./etc/logrotate.d/dpkg
./etc/logrotate.d/upstart
./etc/logrotate.d/rsyslog
./etc/default/rcS
./etc/default/ssh
./etc/default/grub
./etc/default/useradd
./etc/default/crda
./etc/default/ntpdate
./etc/default/keyboard
./etc/default/dbus
./etc/default/nss
./etc/default/console-setup
./etc/default/rsyslog
./etc/default/rsync
./etc/ufw/before.init
./etc/ufw/before6.rules
./etc/ufw/applications.d/openssh-server
./etc/ufw/after6.rules
./etc/ufw/before.rules
./etc/ufw/after.init
./etc/ufw/after.rules
./etc/ufw/sysctl.conf
./etc/emacs/site-start.d/50dictionaries-common.el
./etc/ldap/ldap.conf
./etc/locale.alias
./etc/protocols
./etc/ca-certificates.conf
./etc/fonts/conf.avail/99-language-selector-zh.conf
./etc/bindresvport.blacklist
./etc/udev/rules.d/README
./etc/ssl/openssl.cnf
./etc/ssl/certs/ca-certificates.crt
./etc/update-motd.d/00-header
```

12) Organize a screen-by-screen print of the contents of the /etc directory. Hint: You must use stream redirection operations.

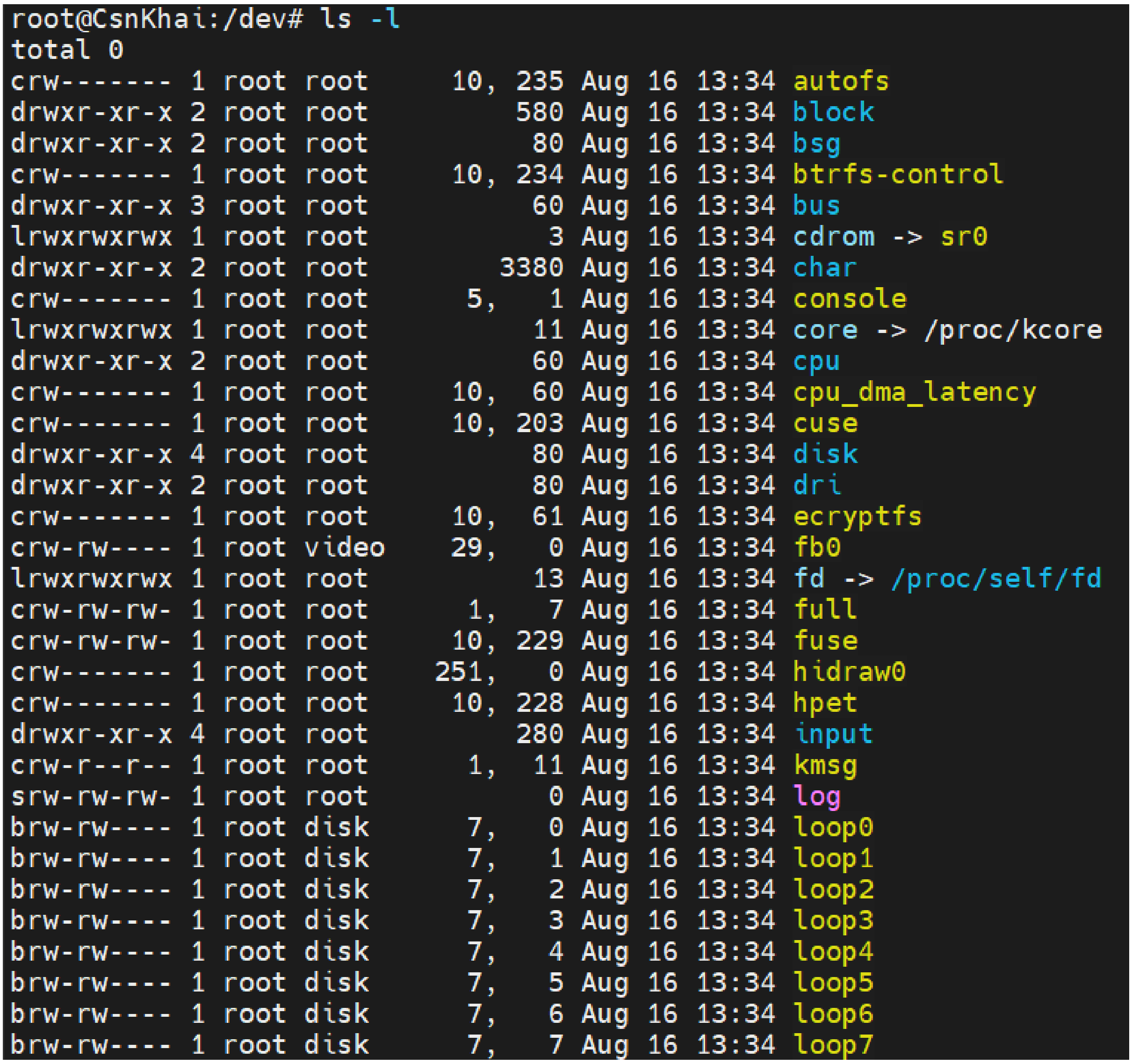
We can pipe the result of ls command into “more” or “less”:



```
total 740
drwxr-xr-x 83 root root    4096 Aug 16 18:40 .
drwxr-xr-x 21 root root    4096 Sep 15  2015 ..
-rw-r--r--  1 root root    2981 Sep 15  2015 adduser.conf
drwxr-xr-x  2 root root    4096 Sep 15  2015 alternatives
drwxr-xr-x  3 root root    4096 Sep 15  2015 apm
drwxr-xr-x  3 root root    4096 Sep 15  2015 apparmor
drwxr-xr-x  8 root root    4096 Sep 15  2015 apparmor.d
drwxr-xr-x  6 root root    4096 Sep 15  2015 apt
-rw-r--r--  1 root root    2177 Apr  9  2014 bash.bashrc
-rw-r--r--  1 root root      45 Mar 22  2014 bash_completion
drwxr-xr-x  2 root root    4096 Sep 15  2015 bash_completion.d
-rw-r--r--  1 root root     356 Jan  1  2012 bindresvport.blacklist
-rw-r--r--  1 root root     321 Apr 16  2014 blkid.conf
lrwxrwxrwx  1 root root      15 Aug  5  2015 blkid.tab -> /dev/.blkid.tab
drwxr-xr-x  3 root root    4096 Sep 15  2015 ca-certificates
-rw-r--r--  1 root root    7773 Sep 15  2015 ca-certificates.conf
drwxr-xr-x  2 root root    4096 Sep 15  2015 calendar
drwxr-s---  2 root dip     4096 Sep 15  2015 chatscripts
drwxr-xr-x  2 root root    4096 Sep 15  2015 console-setup
drwxr-xr-x  2 root root    4096 Sep 15  2015 cron.d
drwxr-xr-x  2 root root    4096 Sep 15  2015 cron.daily
drwxr-xr-x  2 root root    4096 Sep 15  2015 cron.hourly
drwxr-xr-x  2 root root    4096 Sep 15  2015 cron.monthly
-rw-r--r--  1 root root     722 Feb  9  2013 crontab
drwxr-xr-x  2 root root    4096 Sep 15  2015 cron.weekly
drwxr-xr-x  4 root root    4096 Sep 15  2015 dbus-1
-rw-r--r--  1 root root    2969 Feb 23  2014 debconf.conf
-rw-r--r--  1 root root      11 Feb 20  2014 debian_version
drwxr-xr-x  2 root root    4096 Sep 15  2015 default
-rw-r--r--  1 root root     604 Nov  7  2013 deluser.conf
drwxr-xr-x  2 root root    4096 Sep 15  2015 depmod.d
drwxr-xr-x  4 root root    4096 Sep 15  2015 dhcp
drwxr-xr-x  2 root root    4096 Sep 15  2015 dictionaries-common
drwxr-xr-x  2 root root    4096 Sep 15  2015 discover.conf.d
-rw-r--r--  1 root root     346 Dec 29  2013 discover-modprobe.conf
drwxr-xr-x  4 root root    4096 Sep 15  2015 dpkg
drwxr-xr-x  3 root root    4096 Sep 15  2015 emacs
-rw-r--r--  1 root root      96 Sep 15  2015 environment
:
```

13) What are the types of devices and how to determine the type of device? Give Examples.

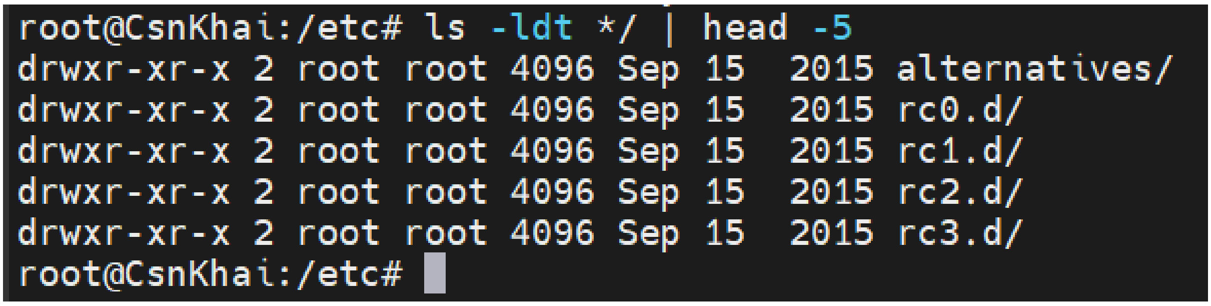
Types of devices are block device and character device. The easier way to determine what kind of device is by using ls -l command - first bit will show the type of device. B for block, C for character. Also, there are sockets, represented by S character. The example are devices in a /dev/ directory:



```
root@CsnKhai:/dev# ls -l
total 0
crw------- 1 root root     10, 235 Aug 16 13:34 autofs
drwxr-xr-x 2 root root         580 Aug 16 13:34 block
drwxr-xr-x 2 root root          80 Aug 16 13:34 bsg
crw------- 1 root root     10, 234 Aug 16 13:34 btrfs-control
drwxr-xr-x 3 root root          60 Aug 16 13:34 bus
lrwxrwxrwx 1 root root           3 Aug 16 13:34 cdrom -> sr0
drwxr-xr-x 2 root root        3380 Aug 16 13:34 char
crw------- 1 root root      5,   1 Aug 16 13:34 console
lrwxrwxrwx 1 root root          11 Aug 16 13:34 core -> /proc/kcore
drwxr-xr-x 2 root root          60 Aug 16 13:34 cpu
crw------- 1 root root     10,  60 Aug 16 13:34 cpu_dma_latency
crw------- 1 root root     10, 203 Aug 16 13:34 cuse
drwxr-xr-x 4 root root          80 Aug 16 13:34 disk
drwxr-xr-x 2 root root          80 Aug 16 13:34 dri
crw------- 1 root root     10,  61 Aug 16 13:34 ecryptfs
crw-rw---- 1 root video    29,   0 Aug 16 13:34 fb0
lrwxrwxrwx 1 root root          13 Aug 16 13:34 fd -> /proc/self/fd
crw-rw-rw- 1 root root      1,   7 Aug 16 13:34 full
crw-rw-rw- 1 root root     10, 229 Aug 16 13:34 fuse
crw------- 1 root root    251,   0 Aug 16 13:34 hidraw0
crw------- 1 root root     10, 228 Aug 16 13:34 hpet
drwxr-xr-x 4 root root         280 Aug 16 13:34 input
crw-r--r-- 1 root root      1,  11 Aug 16 13:34 kmsg
srw-rw-rw- 1 root root           0 Aug 16 13:34 log
brw-rw---- 1 root disk      7,   0 Aug 16 13:34 loop0
brw-rw---- 1 root disk      7,   1 Aug 16 13:34 loop1
brw-rw---- 1 root disk      7,   2 Aug 16 13:34 loop2
brw-rw---- 1 root disk      7,   3 Aug 16 13:34 loop3
brw-rw---- 1 root disk      7,   4 Aug 16 13:34 loop4
brw-rw---- 1 root disk      7,   5 Aug 16 13:34 loop5
brw-rw---- 1 root disk      7,   6 Aug 16 13:34 loop6
brw-rw---- 1 root disk      7,   7 Aug 16 13:34 loop7
```

14) How to determine the type of file in the system, what types of files are there?
Types of files can be determined by the first symbol of an output by ls -l command. There are these types of files in linux:
- - regular file;
d - directory;
b - block device;
c - character device;
l - symbolic link;
p - pipe (pipe, fifo);
s - socket.

15) * List the first 5 directory files that were recently accessed in the /etc
Directory.
We can list only directories through ls command via the -d key, and sort the results using the -t key. To cut the first 5 lines from the output, we can pipe it to the head -5 command:



```
root@CsnKhai:/etc# ls -ldt */ | head -5
drwxr-xr-x 2 root root 4096 Sep 15  2015 alternatives/
drwxr-xr-x 2 root root 4096 Sep 15  2015 rc0.d/
drwxr-xr-x 2 root root 4096 Sep 15  2015 rc1.d/
drwxr-xr-x 2 root root 4096 Sep 15  2015 rc2.d/
drwxr-xr-x 2 root root 4096 Sep 15  2015 rc3.d/
root@CsnKhai:/etc# 
```

Made by Ivan Kostroba.