Task1.Part1

1) Log in to the system as root.

```
student@CsnKhai:~$ sudo su
[sudo] password for student:
```

2) Use the passwd command to change the password. Examine the basic parameters of the command. What system file does it change *?

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

Basic parameters:

```
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
```

Command changes /etc/passwd plain text file:

```
discover-modprobe.conf  mime.types              subuid
dpkg                    mke2fs.conf             subuid-
emacs                   modprobe.d              sudoers
environment             modules                 sudoers.d
fonts                   mtab                    sysctl.conf
fstab                   nanorc                  sysctl.d
fstab.d                 network                 systemd
fuse.conf               networks                terminfo
gai.conf                newt                    timezone
groff                   nsswitch.conf           ucf.conf
group                   opt                     udev
group-                  os-release              ufw
grub.d                  pam.conf                updatedb.conf
gshadow                 pam.d                   update-manager
gshadow-                passwd                  update-motd.d
hdparm.conf             passwd-                 upstart-xsessions
host.conf               perl                    vim
hostname                pm                      vtrgb
hosts                   popularity-contest.conf wgetrc
hosts.allow             ppp                     X11
hosts.deny              profile                 xml
init                    profile.d               zsh_command_not_found
init.d                  protocols
```

3) Determine the users registered in the system, as well as what commands they execute. What additional information can be gleaned from the command execution?

Less /etc/passwd OR 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
/etc/passwd (END)
```

```
root@CsnKhai:/etc# cat /home/student/.bash_history
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ip a
sudo reboot
ip a
nano /etc/sysconfig/network-scripts/ifcfg-eth0
cd /etc/sysconfig/network-script
cd /etc/sysconfig
sudo su
sudo ifconfig eth0 192.168.31.28
sudo dhclient eth0
ip a
ping 8.8.8.8
ifconfig -a
sudo dhclient -v eth0
ping 8.8.8.8
sudo su
ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway 192.168.31.1
sudo ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway 192.168.31.1
ethtool eth0
ifconfig -a
man ifconfig
/etc/init.d/networking restart
ping 8.8.8.8
reboot
sudo reboot
lspci -k | grep -iA2 ether
sudo reboot
```

4) Change personal information about yourself.

sudo chfn –f “Firstname Lastname” username

```
root@CsnKhai:/etc# sudo chfn -f "Eleonora Entina" student
root@CsnKhai:/etc# getent passwd $student
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:Eleonora Entina,,,:/home/student:/bin/bash
```

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.

cat --help :

```
student@CsnKhai:~$ cat --help
Usage: cat [OPTION]... [FILE]...
Concatenate FILE(s), or standard input, to standard output.

  -A, --show-all           equivalent to -vET
  -b, --number-nonblank    number nonempty output lines, overrides -n
  -e                       equivalent to -vE
  -E, --show-ends          display $ at end of each line
  -n, --number             number all output lines
  -s, --squeeze-blank      suppress repeated empty output lines
  -t                       equivalent to -vT
  -T, --show-tabs          display TAB characters as ^I
  -u                       (ignored)
  -v, --show-nonprinting   use ^ and M- notation, except for LFD and TAB
      --help     display this help and exit
      --version  output version information and exit

With no FILE, or when FILE is -, read standard input.

Examples:
  cat f - g  Output f's contents, then standard input, then g's contents.
  cat        Copy standard input to standard output.

Report cat bugs to bug-coreutils@gnu.org
GNU coreutils home page: <http://www.gnu.org/software/coreutils/>
General help using GNU software: <http://www.gnu.org/gethelp/>
For complete documentation, run: info coreutils 'cat invocation'
```

man cat :

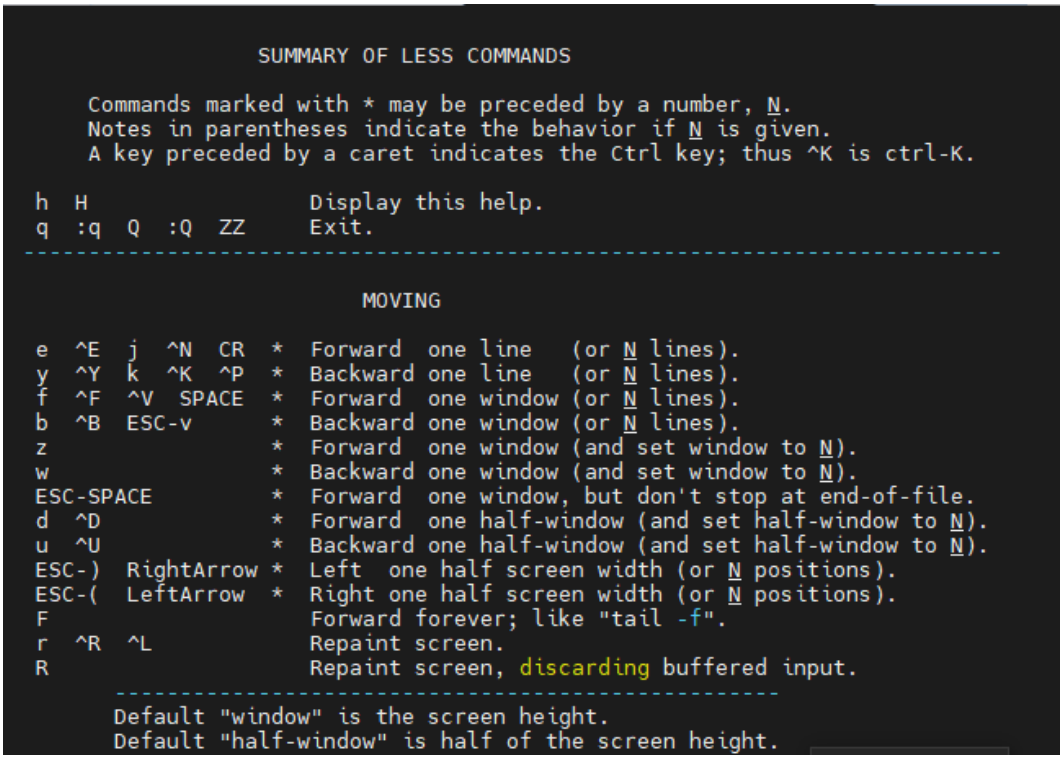
```
CAT(1)                          User Commands                          CAT(1)

NAME
       cat - concatenate files and print on the standard output

SYNOPSIS
       cat [OPTION]... [FILE]...

DESCRIPTION
       Concatenate FILE(s), or standard input, to standard output.

       -A, --show-all
              equivalent to -vET

       -b, --number-nonblank
              number nonempty output lines, overrides -n

       -e     equivalent to -vE

       -E, --show-ends
              display $ at end of each line
```

info cat :

```
File: coreutils.info,  Node: cat invocation,  Next: tac invocation,  Up: Output\
 of entire files

3.1 `cat': Concatenate and write files
======================================

`cat' copies each FILE (`-' means standard input), or standard input if
none are given, to standard output.  Synopsis:

     cat [OPTION] [FILE]...

   The program accepts the following options.  Also see *note Common
options::.

`-A'
`--show-all'
     Equivalent to `-vET'.

`-b'
`--number-nonblank'
     Number all nonempty output lines, starting with 1.

--zz-Info: (coreutils.info.gz)cat invocation, 74 lines --Top--------------------
Welcome to Info version 5.2. Type h for help, m for menu item.
```

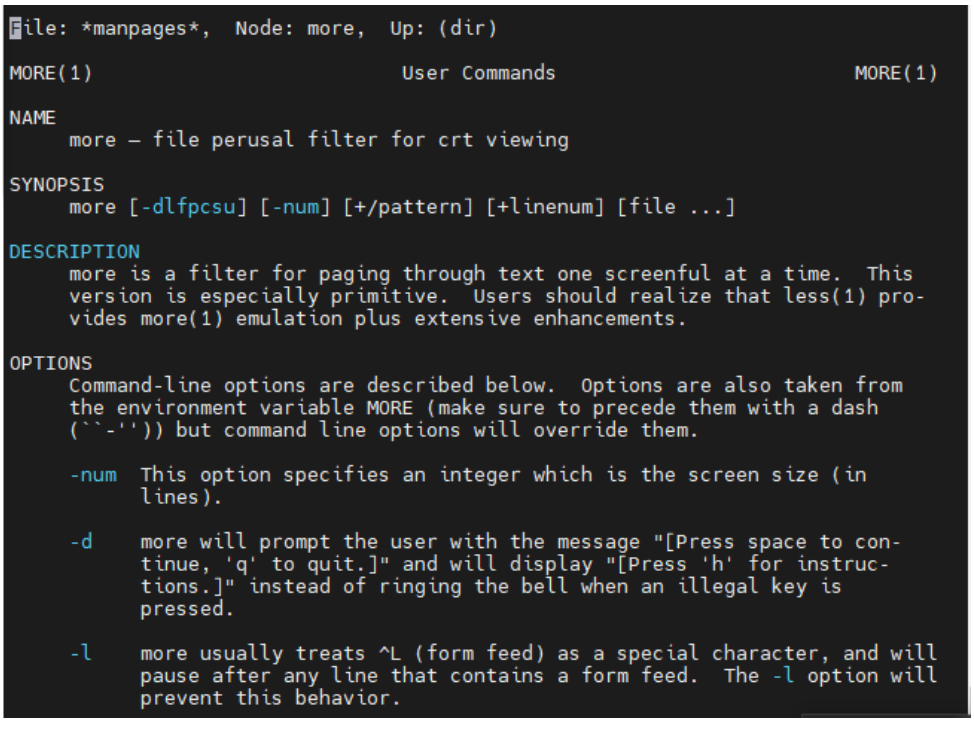
6) Explore the more and less commands using the help system. View the contents of files .bash* using commands.

less –help :



more command has no –help option.

info more:



```
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ip a
sudo reboot
ip a
nano /etc/sysconfig/network-scripts/ifcfg-eth0
cd /etc/sysconfig/network-script
cd /etc/sysconfig
sudo su
sudo ifconfig eth0 192.168.31.28
sudo dhclient eth0
ip a
ping 8.8.8.8
ifconfig -a
sudo dhclient -v eth0
ping 8.8.8.8
sudo su
ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway 192.168.31.1
sudo ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway 192.168.31.1
ethtool eth0
ifconfig -a
man ifconfig
/etc/init.d/networking restart
ping 8.8.8.8
reboot
sudo reboot
lspci -k | grep -iA2 ether
sudo reboot
.bash_history (file 1 of 3) (END) - Next: .bash_logout
```



```
::::::::::::::
.bash_history
::::::::::::::
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ip a
sudo reboot
ip a
nano /etc/sysconfig/network-scripts/ifcfg-eth0
cd /etc/sysconfig/network-script
cd /etc/sysconfig
sudo su
sudo ifconfig eth0 192.168.31.28
sudo dhclient eth0
ip a
ping 8.8.8.8
ifconfig -a
sudo dhclient -v eth0
ping 8.8.8.8
sudo su
ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway 192.1
sudo ifconfig address 192.168.31.28 netmask 255.255.255.0 gateway
ethtool eth0
ifconfig -a
man ifconfig
/etc/init.d/networking restart
ping 8.8.8.8
reboot
sudo reboot
lspci -k | grep -iA2 ether
--More--(98%)
```

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

finger student :

```
root@CsnKhai:/home/student# finger student
Login: student                          Name: Eleonora Entina
Directory: /home/student                Shell: /bin/bash
On since Wed Feb 16 08:28 (UTC) on tty1    3 hours 39 minutes idle
     (messages off)
On since Wed Feb 16 08:32 (UTC) on pts/0 from 10.0.2.2
   7 seconds idle
No mail.
No Plan.
```

No plan here yet.

man finger :

```
FILES
     ~/.nofinger      If finger finds this file in a user's home directory, it
                      will, for finger requests originating outside the local
                      host, firmly deny the existence of that user.  For this
                      to work, the finger program, as started by fingerd(8),
                      must be able to see the .nofinger file. This generally
                      means that the home directory containing the file must
                      have the other-users-execute bit set (o+x). See
                      chmod(1).  If you use this feature for privacy, please
                      test it with ``finger @localhost'' before relying on it,
                      just in case.

     ~/.plan

     ~/.project

     ~/.pgpkey        These files are printed as part of a long-format
                      request. The .plan file may be arbitrarily long.
```

nano .plan (in home directory) :

```
 GNU nano 2.2.6                File: .plan                           Modified

Linux tasks
:)
```

Here I describe my plan.

finger student :

```
root@CsnKhai:/home/student# finger student
Login: student                          Name: Eleonora Entina
Directory: /home/student                Shell: /bin/bash
On since Wed Feb 16 08:28 (UTC) on tty1    3 hours 47 minutes idle
     (messages off)
On since Wed Feb 16 08:32 (UTC) on pts/0 from 10.0.2.2
   4 seconds idle
No mail.
Plan:
Linux tasks
:)
```

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.

ls -a -l

```
root@CsnKhai:/home/student# ls -a -l
total 32
drwxr-xr-x 3 student student 4096 Feb 16 08:32 .
drwxr-xr-x 3 root    root    4096 Sep 15  2015 ..
-rw------- 1 student student  649 Feb 15 18:43 .bash_history
-rw-r--r-- 1 student student  220 Sep 15  2015 .bash_logout
-rw-r--r-- 1 student student 3637 Sep 15  2015 .bashrc
drwx------ 2 student student 4096 Sep 15  2015 .cache
-rw-r--r-- 1 student student  675 Sep 15  2015 .profile
-rw------- 1 student student  106 Feb 16 08:32 .Xauthority
```

Task 1. Part 2

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.

Use man tree to find needed option:

```
-P pattern
       List only those files that match the wild-card pattern.  Note:
       you must use the -a option to also consider those files begin-
       ning with a dot `.' for matching.  Valid wildcard operators are
       `*' (any zero or more characters), `?' (any single character),
       `[...]' (any single character listed between brackets (optional
       - (dash) for character range may be used: ex: [A-Z]), and
       `[^...]' (any single character not listed in brackets) and `|'
       separates alternate patterns.
```

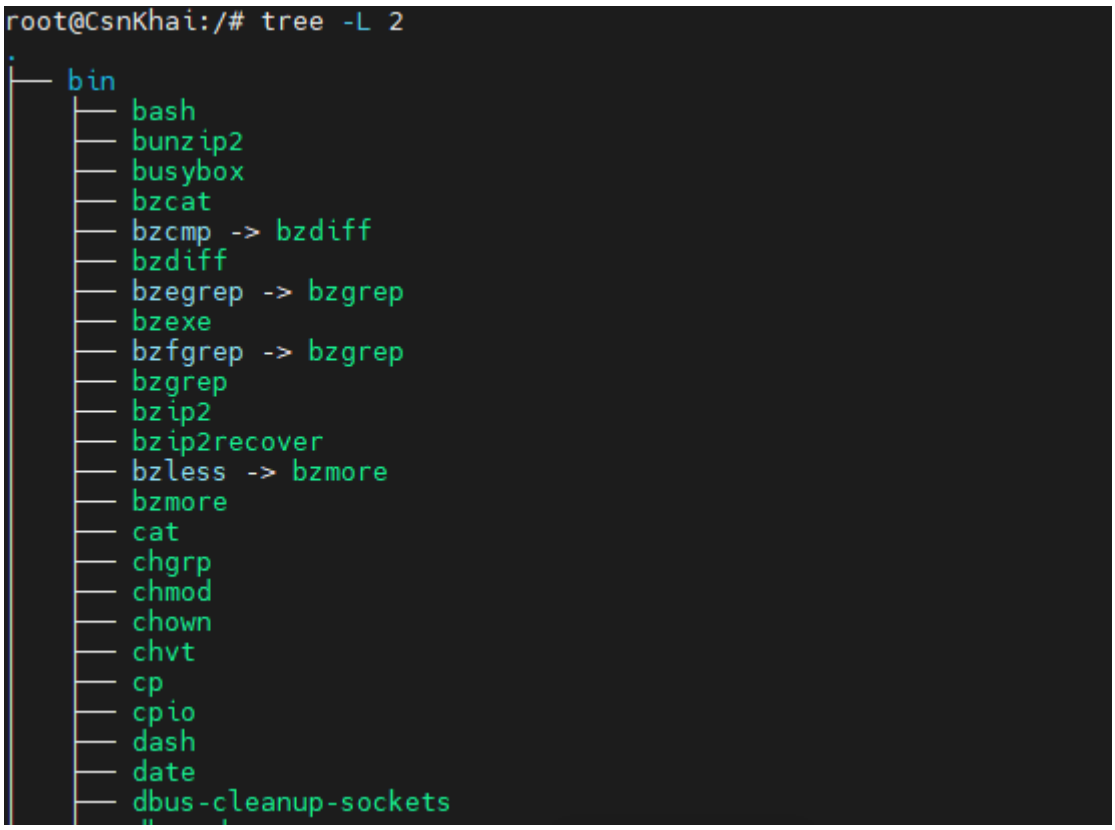
Tree /etc/ -P 'z*a*' -C :

```
root@CsnKhai:/home# tree /etc -P 'z*a*' -C
/etc
├── alternatives
├── apm
│   └── event.d
├── apparmor
```

```
154 directories, 3 files
```

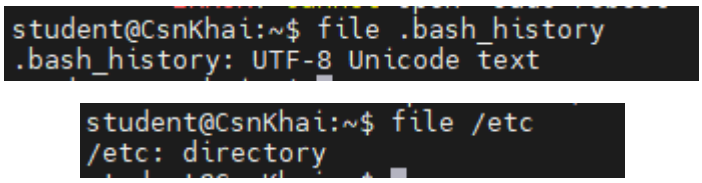
Search for a flag for descending level directories deep:

```
      [-P pattern] [-I pattern] [-o filename] [--version] [--help] [--
      [--device] [--noreport] [--nolinks] [--dirsfirst] [--charset cha
      [--filelimit[=]#] [--si] [--timefmt[=]<f>] [<directory list>]
------- Listing options -------
-a            All files are listed.
-d            List directories only.
-l            Follow symbolic links like directories.
-f            Print the full path prefix for each file.
-x            Stay on current filesystem only.
-L level      Descend only level directories deep.
-R            Rerun tree when max dir level reached.
-P pattern    List only those files that match the pattern given.
-I pattern    Do not list files that match the given pattern.
--noreport    Turn off file/directory count at end of tree listing.
--charset X   Use charset X for terminal/HTML and indentation line out
--filelimit # Do not descend dirs with more than # files in them.
--timefmt <f> Print and format time according to the format <f>.
-o filename   Output to file instead of stdout.
```



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

file



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?

cd

or

cd ~

```
student@CsnKhai:~$ cd /etc/network
student@CsnKhai:/etc/network$ cd
student@CsnKhai:~$ cd /etc/network
student@CsnKhai:/etc/network$ cd ~
student@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 -t

It sorts the file by modification time, showing the last edited file first.

```
student@CsnKhai:/etc$ ls -t | head -2
mtab
dnsmasq.conf
```

ls -lh

Displays file size in easy to read format.

```
student@CsnKhai:/etc$ ls -lh
total 764K
-rw-r--r-- 1 root root   3.0K Sep 15  2015 adduser.conf
drwxr-xr-x 2 root root   4.0K Sep 15  2015 alternatives
drwxr-xr-x 3 root root   4.0K Sep 15  2015 apm
drwxr-xr-x 3 root root   4.0K Sep 15  2015 apparmor
drwxr-xr-x 8 root root   4.0K Sep 15  2015 apparmor.d
drwxr-xr-x 6 root root   4.0K Sep 15  2015 apt
-rw-r--r-- 1 root root   2.2K Apr  9  2014 bash.bashrc
-rw-r--r-- 1 root root     45 Mar 22  2014 bash_completion
drwxr-xr-x 2 root root   4.0K 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
```

ls -lt

Sorts file names displayed in the order of last modification time.

```
student@CsnKhai:/etc$ ls -lt
total 764
-rw-r--r-- 1 root root     733 Feb 17 15:17 mtab
-rw-r--r-- 1 root root   25213 Feb 17 14:05 dnsmasq.conf
-rw-r--r-- 1 root root   17081 Feb 17 13:37 ld.so.cache
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc0.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc1.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc2.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc3.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc4.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc5.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc6.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 insserv.conf.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 default
drwxr-xr-x 2 root root    4096 Feb 17 13:37 init.d
-rw-r--r-- 1 root root    1172 Feb 17 13:37 passwd
-rw-r----- 1 root shadow   842 Feb 17 13:37 shadow
-rw------- 1 root root    1162 Feb 17 13:37 passwd-
-rw------- 1 root root     842 Feb 17 13:37 shadow-
drwxr-xr-x 2 root root    4096 Feb 17 13:37 dnsmasq.d
```

ls -l -a

-l shows long listing information about the file/directory.

-a shows all hidden files (starts with '.').

```
student@CsnKhai:/etc$ ls -l -a
total 772
drwxr-xr-x 84 root root    4096 Feb 17 15:17 .
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
```

5) Perform the following sequence of operations:

- create a subdirectory in the home directory;

```
root@CsnKhai:/home/student# sudo mkdir dir-list
root@CsnKhai:/home/student# ls
dir-list
```

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

```
root@CsnKhai:/home/student# ls -l -a /root > list.txt
```

- view the created file;

```
 GNU nano 2.2.6                File: list.txt

total 36
drwx------  5 root root 4096 Feb 16 12:12 .
drwxr-xr-x 22 root root 4096 Feb 17 17:36 ..
drwx------  2 root root 4096 Sep 15  2015 .aptitude
-rw-------  1 root root 1591 Feb 17 12:33 .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   40 Feb 16 12:12 .plan
-rw-r--r--  1 root root  140 Feb 20  2014 .profile
drwx------  2 root root 4096 Sep 15  2015 .ssh
```

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

```
root@CsnKhai:/home/student# cp list.txt /home/student/backup_list.txt
```

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

```
root@CsnKhai:/home/student# rm --help
Usage: rm [OPTION]... FILE...
Remove (unlink) the FILE(s).

  -f, --force           ignore nonexistent files and arguments, never prompt
  -i                    prompt before every removal
  -I                    prompt once before removing more than three files, or
                          when removing recursively.  Less intrusive than -i,
                          while still giving protection against most mistakes
      --interactive[=WHEN]  prompt according to WHEN: never, once (-I), or
                          always (-i).  Without WHEN, prompt always
      --one-file-system  when removing a hierarchy recursively, skip any
                          directory that is on a file system different from
                          that of the corresponding command line argument
      --no-preserve-root  do not treat '/' specially
      --preserve-root   do not remove '/' (default)
  -r, -R, --recursive   remove directories and their contents recursively
  -d, --dir             remove empty directories
  -v, --verbose         explain what is being done
      --help     display this help and exit
      --version  output version information and exit
```

```
root@CsnKhai:/home/student# rm -r -i dir-list
rm: remove directory 'dir-list'? y
```

- delete the file copied to the home directory.

```
root@CsnKhai:/home/student# rm backup_list.txt
```

6) Perform the following sequence of operations:

- create a subdirectory test in the home directory;

```
root@CsnKhai:/home/student# mkdir test
```

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

```
root@CsnKhai:/home/student# cp .bash_history test/labwork2
root@CsnKhai:/home/student# cd test
root@CsnKhai:/home/student/test# ls -a
.  ..  labwork2
```

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

```
root@CsnKhai:/home/student/test# ln labwork2 labwork2_link
root@CsnKhai:/home/student/test# ls -l
total 8
-rw------- 2 root root 3308 Feb 18 06:10 labwork2
-rw------- 2 root root 3308 Feb 18 06:10 labwork2_link
```

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

```
root@CsnKhai:/home/student/test# ln -s labwork2 labwork2_softlink
root@CsnKhai:/home/student/test# ls -l
total 8
-rw------- 2 root root 3308 Feb 18 06:10 labwork2
-rw------- 2 root root 3308 Feb 18 06:10 labwork2_link
lrwxrwxrwx 1 root root    8 Feb 18 06:22 labwork2_softlink -> labwork2
```

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

```
 GNU nano 2.2.6              File: labwork2_softlink                    Modified

HELLO!!!
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
```

```
 GNU nano 2.2.6                File: labwork2

HELLO!!!
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ip a
```

```
 GNU nano 2.2.6              File: labwork2_link

HELLO!!!
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ip a
sudo reboot
ip a
```

With changing data in symbolic link, data changed everythere. That's because each soft linked file contains a separate Inode value that points to the original file.

- rename the hard link file to hard_lnk_labwork2;

```
root@CsnKhai:/home/student/test# mv labwork2_link hard_lnk_labwork2
root@CsnKhai:/home/student/test# ls -l
total 8
-rw------- 2 root root 3309 Feb 18 06:25 hard_lnk_labwork2
-rw------- 2 root root 3309 Feb 18 06:25 labwork2
lrwxrwxrwx 1 root root    8 Feb 18 06:22 labwork2_softlink -> labwork2
```

- rename the soft link file to symb_lnk_labwork2 file;

```
root@CsnKhai:/home/student/test# mv labwork2_softlink symb_lnk_labwork2
root@CsnKhai:/home/student/test# ls -l
total 8
-rw------- 2 root root 3309 Feb 18 06:25 hard_lnk_labwork2
-rw------- 2 root root 3309 Feb 18 06:25 labwork2
lrwxrwxrwx 1 root root    8 Feb 18 06:22 symb_lnk_labwork2 -> labwork2
```

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

```
root@CsnKhai:/home/student/test# rm labwork2
root@CsnKhai:/home/student/test# ls -l
total 4
-rw------- 1 root root 3309 Feb 18 06:25 hard_lnk_labwork2
lrwxrwxrwx 1 root root    8 Feb 18 06:22 symb_lnk_labwork2 -> labwork2
```

If you delete the original file, the soft link has no value, because it points to a non-existent file. But in the case of hard link, it is entirely opposite. Even

if you delete the original file, the hard link will still has the data of the original file. Because hard link acts as a mirror copy of the original file.

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

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

```
root@CsnKhai:/home/student/test# 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=syst
emd)
```

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

```
root@CsnKhai:/home/student/test# grep -w "sudo" -c hard_lnk_labwork2
80
```

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

```
root@CsnKhai:/home/student/test# find /etc -name "*.conf"
/etc/ufw/ufw.conf
/etc/ufw/sysctl.conf
/etc/pam.conf
/etc/ldap/ldap.conf
/etc/ca-certificates.conf
/etc/fonts/conf.avail/99-language-selector-zh.conf
/etc/fonts/conf.avail/69-language-selector-zh-mo.conf
/etc/fonts/conf.avail/69-language-selector-zh-sg.conf
/etc/fonts/conf.avail/69-language-selector-zh-cn.conf
/etc/fonts/conf.avail/69-language-selector-zh-hk.conf
/etc/fonts/conf.avail/30-cjk-aliases.conf
/etc/fonts/conf.avail/69-language-selector-zh-tw.conf
/etc/fonts/conf.d/99-language-selector-zh.conf
/etc/fonts/conf.d/69-language-selector-zh-mo.conf
```

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

```
root@CsnKhai:/home/student/test# find /etc -name *ss*
/etc/default/ssh
/etc/default/nss
/etc/ufw/applications.d/openssh-server
/etc/issue.net
/etc/rc3.d/S20ssh
/etc/rc5.d/S20ssh
/etc/ssl
/etc/ssl/openssl.cnf
/etc/ssl/certs/Verisign_Class_1_Public_Primary_Certification_Authority_-_G2.pem
/etc/ssl/certs/Verisign_Class_1_Public_Primary_Certification_Authority_-_G3.pem
/etc/ssl/certs/Buypass_Class_2_Root_CA.pem
/etc/ssl/certs/Verisign_Class_4_Public_Primary_Certification_Authority_-_G3.pem
/etc/ssl/certs/Buypass_Class_2_CA_1.pem
/etc/ssl/certs/DigiCert_High_Assurance_EV_Root_CA.pem
/etc/ssl/certs/NetLock_Express_=Class_C=_Root.pem
/etc/ssl/certs/Sonera_Class_1_Root_CA.pem
/etc/ssl/certs/Swisscom_Root_CA_1.pem
/etc/ssl/certs/Verisign_Class_2_Public_Primary_Certification_Authority_-_G2.pem
```

```
root@CsnKhai:/home/student/test# ls -R /etc | grep ss
insserv
insserv.conf
insserv.conf.d
issue
issue.net
nsswitch.conf
passwd
passwd-
ssh
ssl
upstart-xsessions
lzless
lzless.1.gz
dbus-accessibility
dbus-accessibility-strict
dbus-session
```

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

```
root@CsnKhai:/home/student/test# ls -la /etc | less
total 772
drwxr-xr-x 84 root root    4096 Feb 17 15:17 .
drwxr-xr-x 22 root root    4096 Feb 18 07:21 ..
-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
```

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

- c - character
- b - block
- p - pipe
- s – socket

14) How to determine the type of file in the system, what types of files are there?

Regular File (“-”)

Directory File

Special Files (There are five types of files in the special category)

Link File

Character Device File

Socket File

Named Pipe File

Block File

```
root@CsnKhai:/# ls -la
total 88
drwxr-xr-x 22 root root  4096 Feb 18 07:21 .
drwxr-xr-x 22 root root  4096 Feb 18 07:21 ..
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 14 root root  4000 Feb 17 15:17 dev
drwxr-xr-x  2 root root  4096 Feb 17 17:30 dir-list
drwxr-xr-x 84 root root  4096 Feb 17 15:17 etc
drwxr-xr-x  4 root root  4096 Feb 18 06:00 home
lrwxrwxrwx  1 root root    33 Sep 15  2015 initrd.img -> boot/initrd.img-3.1
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 82 root root     0 Feb 17 15:17 proc
drwx------  5 root root  4096 Feb 16 12:12 root
drwxr-xr-x 17 root root   580 Feb 18 06:25 run
drwxr-xr-x  2 root root  4096 Sep 15  2015 sbin
drwxr-xr-x  2 root root  4096 Sep 15  2015 srv
```

15) * List the first 5 directory files that were recently accessed in the /etc directory.

```
student@CsnKhai:~$ ls -ltc /etc | head -n 6
total 764
-rw-r--r-- 1 root root     733 Feb 17 15:17 mtab
-rw-r--r-- 1 root root   25213 Feb 17 14:05 dnsmasq.conf
-rw-r--r-- 1 root root   17081 Feb 17 13:37 ld.so.cache
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc0.d
drwxr-xr-x 2 root root    4096 Feb 17 13:37 rc1.d
```