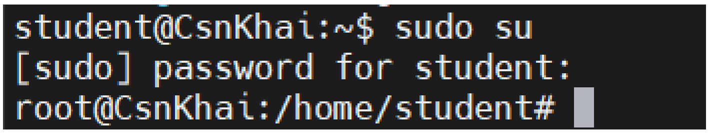
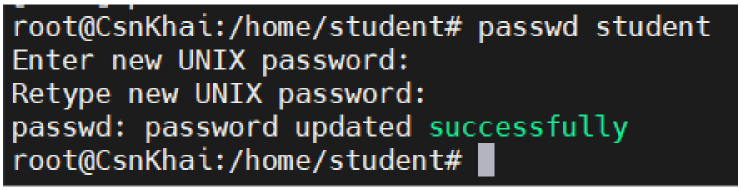
Task1.Part1

1) Log in to the system as root.



```
student@CsnKhai:~$ sudo su
[sudo] password for student:
root@CsnKhai:/home/student#
```

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

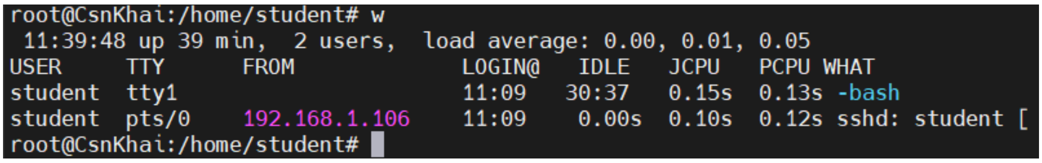


```
root@CsnKhai:/home/student# passwd student
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@CsnKhai:/home/student#
```

The passwd command might modify /etc/passwd. This file contains essential user account information, including the username, user ID, group ID, home directory, and shell. While the password itself is not stored here (modern systems use shadow passwords for security), the passwd command might modify other user-related fields.

The passwd command also can modify /etc/shadow. This file stores the encrypted passwords and related password information in a more secure manner than the /etc/passwd file. The passwd command interacts with this file to update the encrypted password.

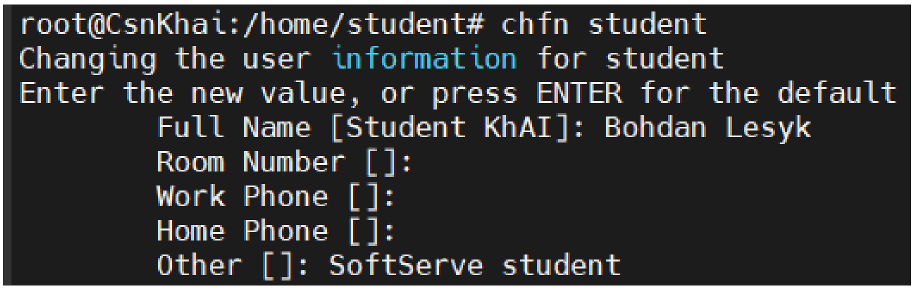
3) Determine the users registered in the system, as well as what commands they execute. What additional information can be gleaned from the command execution?



```
root@CsnKhai:/home/student# w
 11:39:48 up 39 min,  2 users,  load average: 0.00, 0.01, 0.05
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
student  tty1                      11:09   30:37   0.15s  0.13s -bash
student  pts/0    192.168.1.106    11:09    0.00s  0.10s  0.12s sshd: student [
root@CsnKhai:/home/student#
```

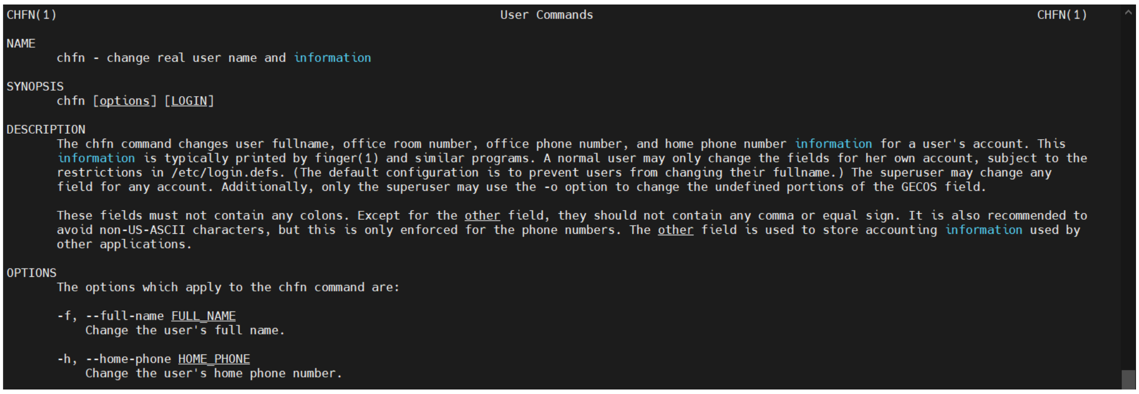
- USER: The username of the logged-in user.
- TTY: The terminal (device) associated with the user's session.
- FROM: The remote host or IP address from which the user is connected (if applicable).
- LOGIN@: The time when the user logged in.
- IDLE: The idle time in minutes since the last activity.
- JCPU: The total time the CPU has been used by all processes attached to the terminal.
- PCPU: The percentage of the CPU's total time used by the user's processes.
- WHAT: The current command being executed by the user.

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]: Bohdan Lesyk
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []: SoftServe student
```

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.



```
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.
```

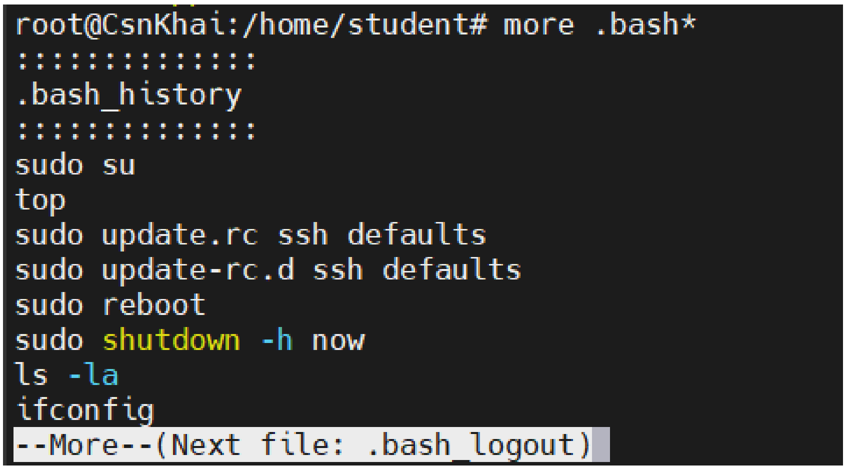
Keys for man and info commands:

-h print a help information and exit;

-v display version information and exit.

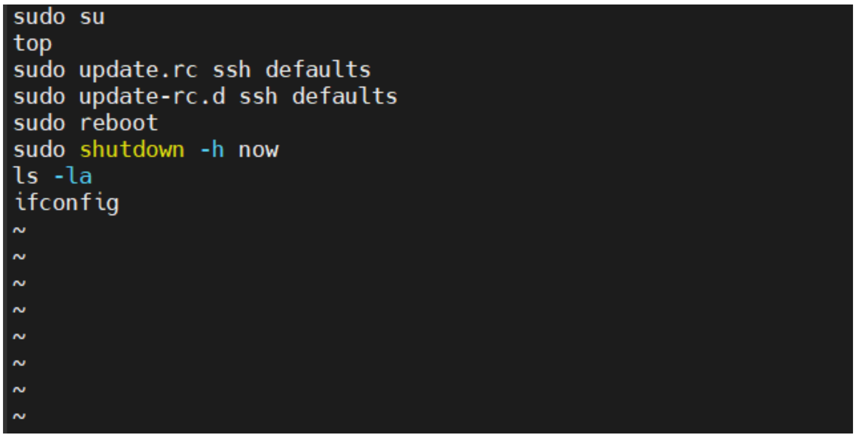
6) Explore the more and less commands using the help system. View the contents of files .bash* using commands.

more:



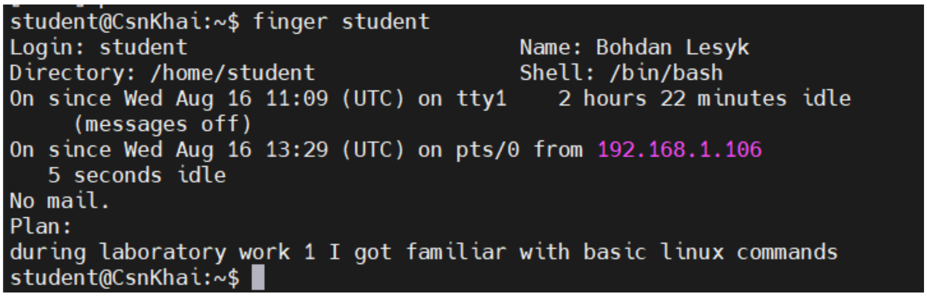
```
root@CsnKhai:/home/student# more .bash*
::::::::::::::
.bash_history
::::::::::::::
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ls -la
ifconfig
--More--(Next file: .bash_logout)
```

less:



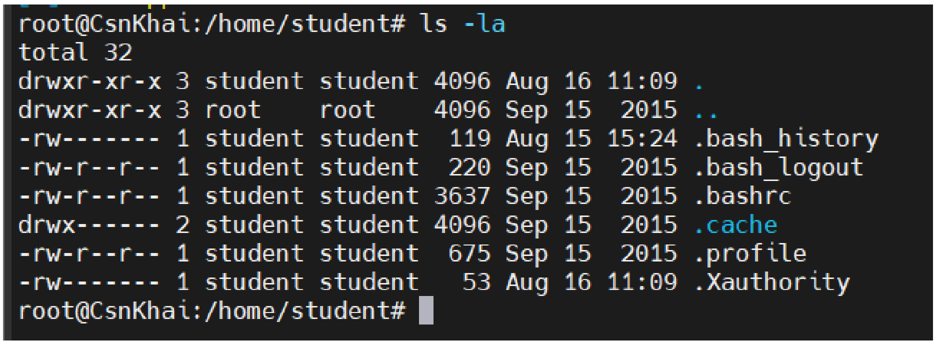
```
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ls -la
ifconfig
~
~
~
~
~
~
~
~
```

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



```
student@CsnKhai:~$ finger student
Login: student                          Name: Bohdan Lesyk
Directory: /home/student                Shell: /bin/bash
On since Wed Aug 16 11:09 (UTC) on tty1    2 hours 22 minutes idle
     (messages off)
On since Wed Aug 16 13:29 (UTC) on pts/0 from 192.168.1.106
   5 seconds idle
No mail.
Plan:
during laboratory work 1 I got familiar with basic linux commands
student@CsnKhai:~$
```

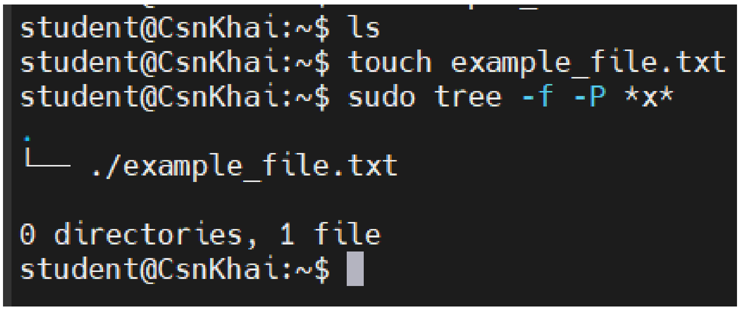
8) List the contents of the home directory using the ls command, define its files and directories. Hint: Use the help system to familiarize yourself with the ls command.



```
root@CsnKhai:/home/student# ls -la
total 32
drwxr-xr-x 3 student student 4096 Aug 16 11:09 .
drwxr-xr-x 3 root    root    4096 Sep 15  2015 ..
-rw------- 1 student student  119 Aug 15 15:24 .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   53 Aug 16 11:09 .Xauthority
root@CsnKhai:/home/student#
```

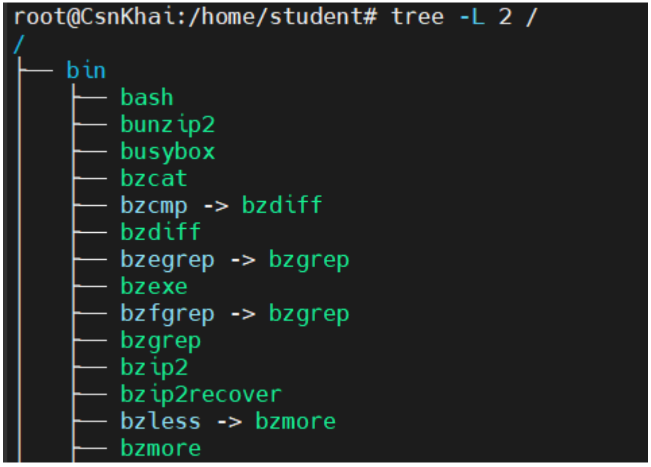
Task1.Part2

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.



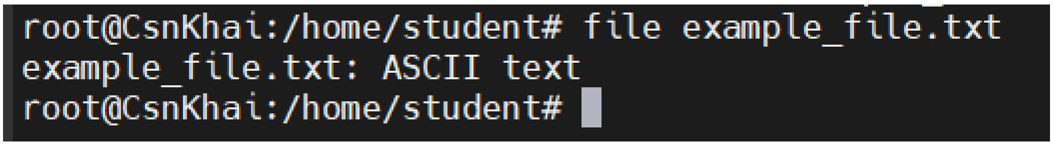
```
student@CsnKhai:~$ ls
student@CsnKhai:~$ touch example_file.txt
student@CsnKhai:~$ sudo tree -f -P *x*
.
└── ./example_file.txt

0 directories, 1 file
student@CsnKhai:~$
```



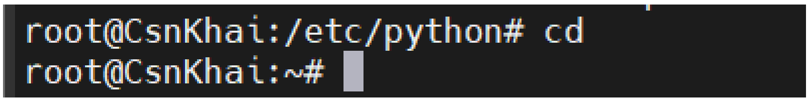
```
root@CsnKhai:/home/student# tree -L 2 /
/
├── bin
│   ├── bash
│   ├── bunzip2
│   ├── busybox
│   ├── bzcat
│   ├── bzcmp -> bzdiff
│   ├── bzdiff
│   ├── bzegrep -> bzgrep
│   ├── bzexe
│   ├── bzfgrep -> bzgrep
│   ├── bzgrep
│   ├── bzip2
│   ├── bzip2recover
│   ├── bzless -> bzmore
│   ├── bzmore
```

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



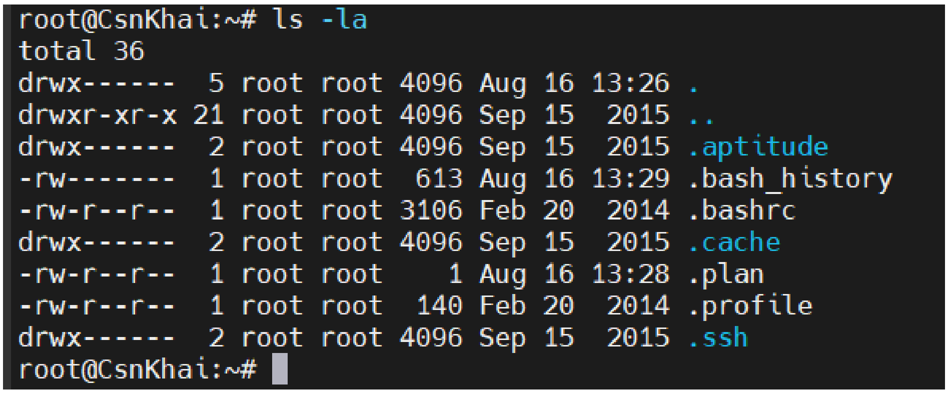
```
root@CsnKhai:/home/student# file example_file.txt
example_file.txt: ASCII text
root@CsnKhai:/home/student#
```

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?



```
root@CsnKhai:/etc/python# cd
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.



```
root@CsnKhai:~# ls -la
total 36
drwx------  5 root root 4096 Aug 16 13:26 .
drwxr-xr-x 21 root root 4096 Sep 15  2015 ..
drwx------  2 root root 4096 Sep 15  2015 .aptitude
-rw-------  1 root root  613 Aug 16 13:29 .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    1 Aug 16 13:28 .plan
-rw-r--r--  1 root root  140 Feb 20  2014 .profile
drwx------  2 root root 4096 Sep 15  2015 .ssh
root@CsnKhai:~#
```

The -l option provides a detailed listing of files and directories, including permissions, owner, group, file size, modification date, and more.

The -a option shows all files and directories, including those that start with a dot (.), which are hidden by default.

5) Perform the following sequence of operations:

- create a subdirectory in the home directory;

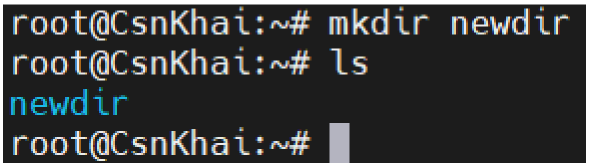
- in this subdirectory create a file containing information about directories located in the root directory (using I/O redirection operations);

- view the created file;

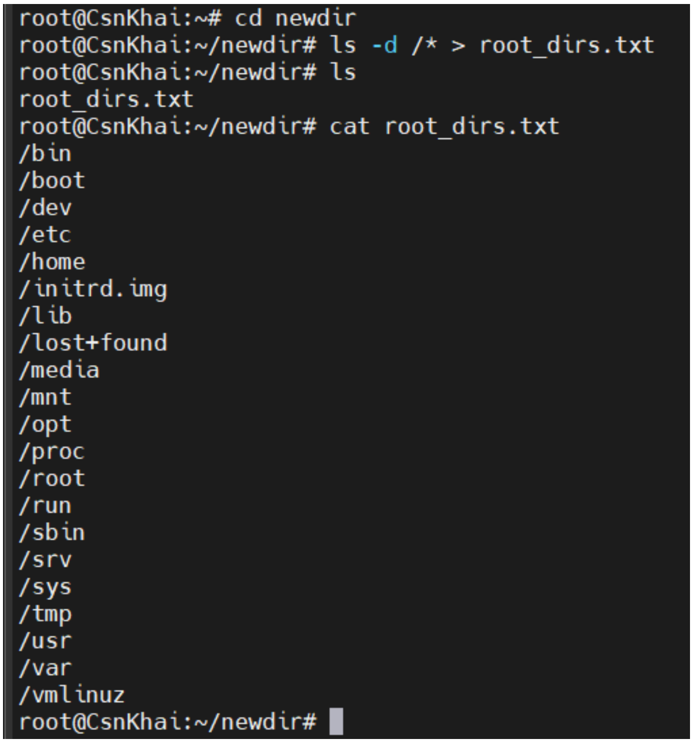
- copy the created file to your home directory using relative and absolute addressing.

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

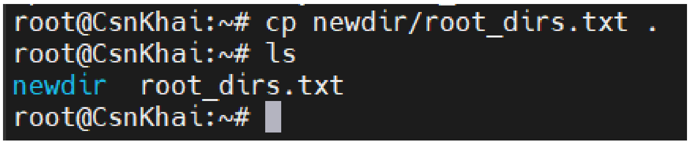
- delete the file copied to the home directory.



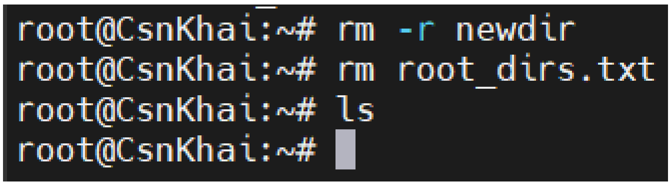
```
root@CsnKhai:~# mkdir newdir
root@CsnKhai:~# ls
newdir
root@CsnKhai:~#
```



```
root@CsnKhai:~# cd newdir
root@CsnKhai:~/newdir# ls -d /* > root_dirs.txt
root@CsnKhai:~/newdir# ls
root_dirs.txt
root@CsnKhai:~/newdir# cat root_dirs.txt
/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:~/newdir#
```



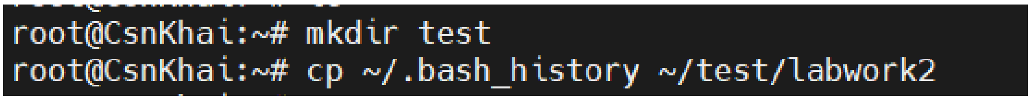
```
root@CsnKhai:~# cp newdir/root_dirs.txt .
root@CsnKhai:~# ls
newdir  root_dirs.txt
root@CsnKhai:~#
```



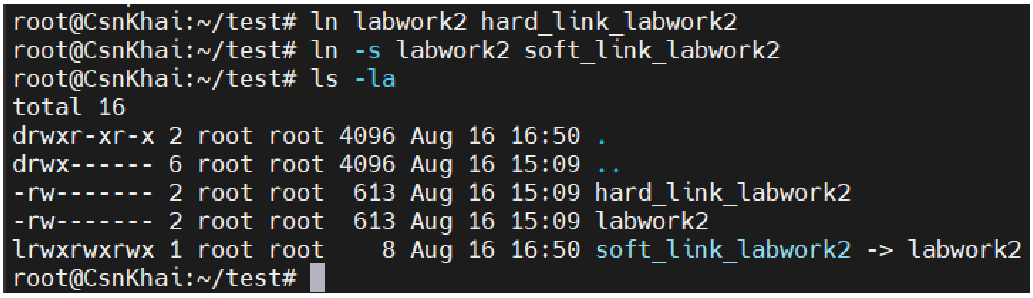
```
root@CsnKhai:~# rm -r newdir
root@CsnKhai:~# rm root_dirs.txt
root@CsnKhai:~# ls
root@CsnKhai:~#
```

6) Perform the following sequence of operations:

- create a subdirectory test in the home directory;
- copy the .bash_history file to this directory while changing its name to labwork2;
- create a hard and soft link to the labwork2 file in the test subdirectory;
- how to define soft and hard link, what do these concepts;
- change the data by opening a symbolic link. What changes will happen and why
- rename the hard link file to hard_lnk_labwork2;
- rename the soft link file to symb_lnk_labwork2 file;
- then delete the labwork2. What changes have occurred and why?



```
root@CsnKhai:~# mkdir test
root@CsnKhai:~# cp ~/.bash_history ~/test/labwork2
```

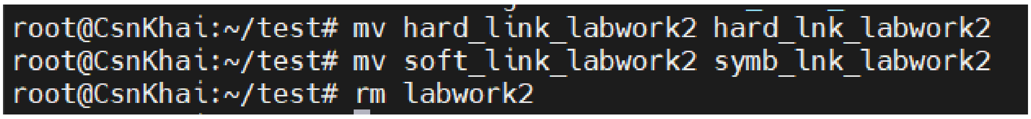


```
root@CsnKhai:~/test# ln labwork2 hard_link_labwork2
root@CsnKhai:~/test# ln -s labwork2 soft_link_labwork2
root@CsnKhai:~/test# ls -la
total 16
drwxr-xr-x 2 root root 4096 Aug 16 16:50 .
drwx------ 6 root root 4096 Aug 16 15:09 ..
-rw------- 2 root root  613 Aug 16 15:09 hard_link_labwork2
-rw------- 2 root root  613 Aug 16 15:09 labwork2
lrwxrwxrwx 1 root root    8 Aug 16 16:50 soft_link_labwork2 -> labwork2
root@CsnKhai:~/test#
```

A hard link is a reference to the same physical data on disk as the original file. It essentially creates another name for the same inode. Changes to the data are reflected in all hard links.

A soft link, is a separate file that contains a reference to the target file's pathname. It acts as a shortcut to the original file. Changes to the data in the soft link will affect the original file, but changes in the original file won't be reflected in the soft link.

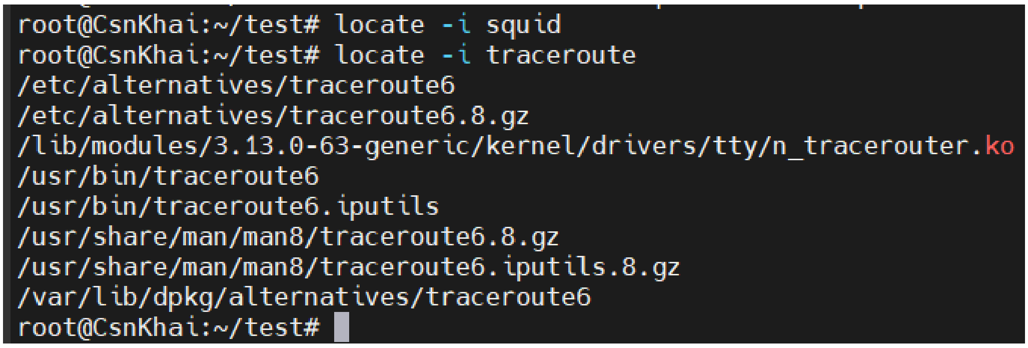
If you open the symbolic link and make changes, these changes will directly affect the target file. This is because the symlink references the same data as the original file.



```
root@CsnKhai:~/test# mv hard_link_labwork2 hard_lnk_labwork2
root@CsnKhai:~/test# mv soft_link_labwork2 symb_lnk_labwork2
root@CsnKhai:~/test# rm labwork2
```

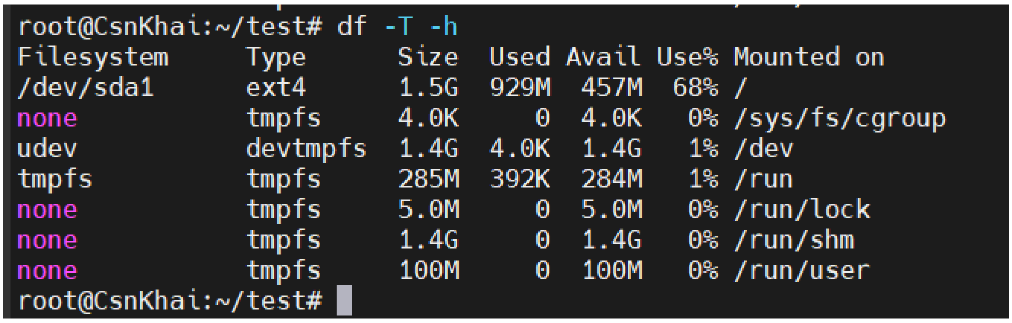
The hard link and symbolic link files will still be present, pointing to the now-deleted "labwork2" file. The hard link will still retain its data as it refers to the same inode, while the symbolic link will be broken.

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



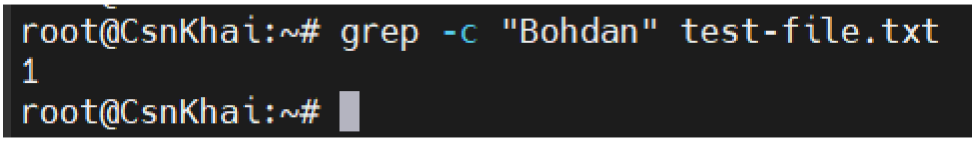
```
root@CsnKhai:~/test# locate -i squid
root@CsnKhai:~/test# locate -i traceroute
/etc/alternatives/traceroute6
/etc/alternatives/traceroute6.8.gz
/lib/modules/3.13.0-63-generic/kernel/drivers/tty/n_tracerouter.ko
/usr/bin/traceroute6
/usr/bin/traceroute6.iputils
/usr/share/man/man8/traceroute6.8.gz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

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



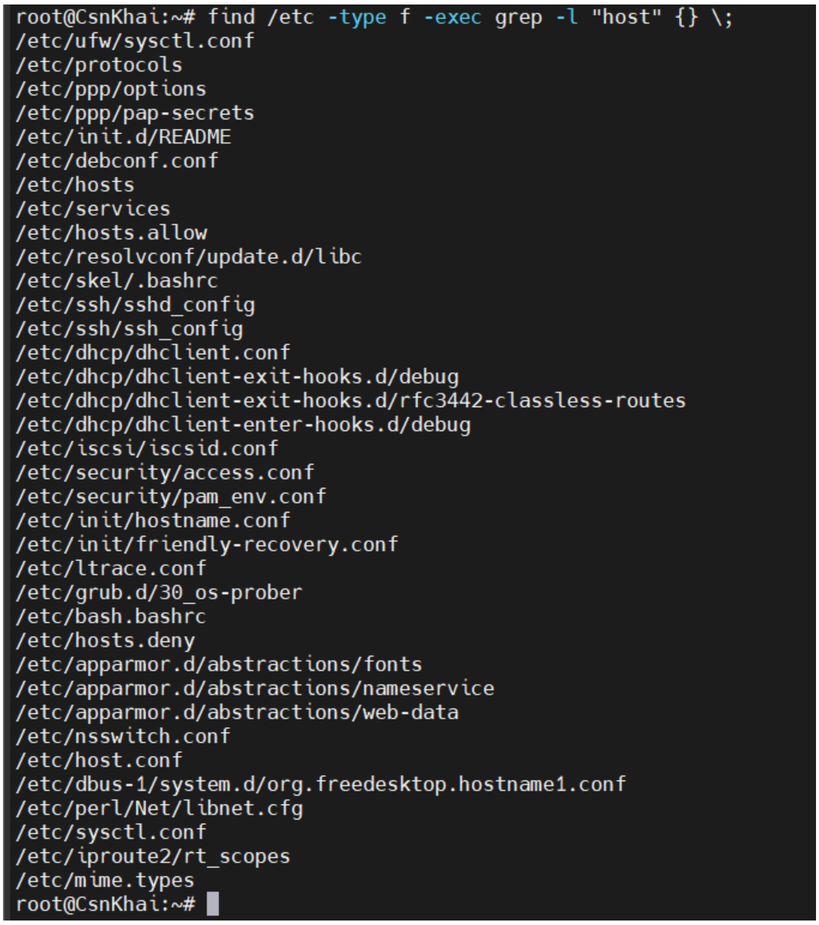
```
root@CsnKhai:~/test# df -T -h
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/sda1      ext4      1.5G  929M  457M  68% /
none           tmpfs     4.0K     0  4.0K   0% /sys/fs/cgroup
udev           devtmpfs  1.4G  4.0K  1.4G   1% /dev
tmpfs          tmpfs     285M  392K  284M   1% /run
none           tmpfs     5.0M     0  5.0M   0% /run/lock
none           tmpfs     1.4G     0  1.4G   0% /run/shm
none           tmpfs     100M     0  100M   0% /run/user
root@CsnKhai:~/test#
```

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



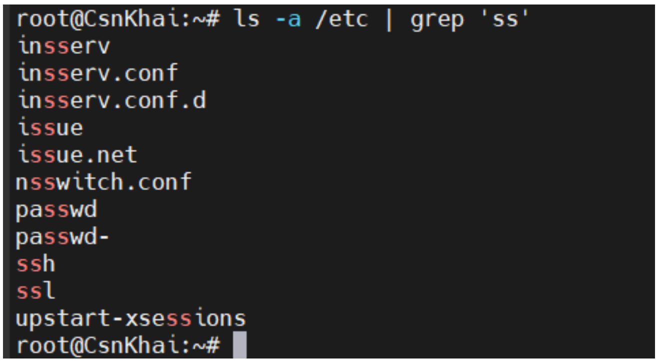
```
root@CsnKhai:~# grep -c "Bohdan" test-file.txt
1
root@CsnKhai:~#
```

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

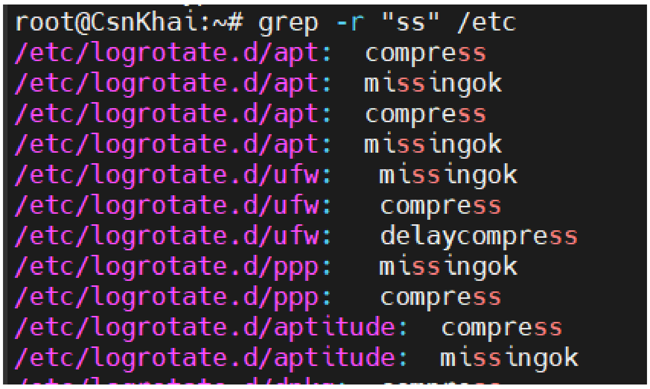


```
root@CsnKhai:~# find /etc -type f -exec grep -l "host" {} \;
/etc/ufw/sysctl.conf
/etc/protocols
/etc/ppp/options
/etc/ppp/pap-secrets
/etc/init.d/README
/etc/debconf.conf
/etc/hosts
/etc/services
/etc/hosts.allow
/etc/resolvconf/update.d/libc
/etc/skel/.bashrc
/etc/ssh/sshd_config
/etc/ssh/ssh_config
/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?

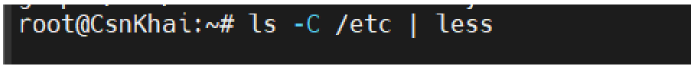


```
root@CsnKhai:~# ls -a /etc | grep 'ss'
insserv
insserv.conf
insserv.conf.d
issue
issue.net
nsswitch.conf
passwd
passwd-
ssh
ssl
upstart-xsessions
root@CsnKhai:~#
```

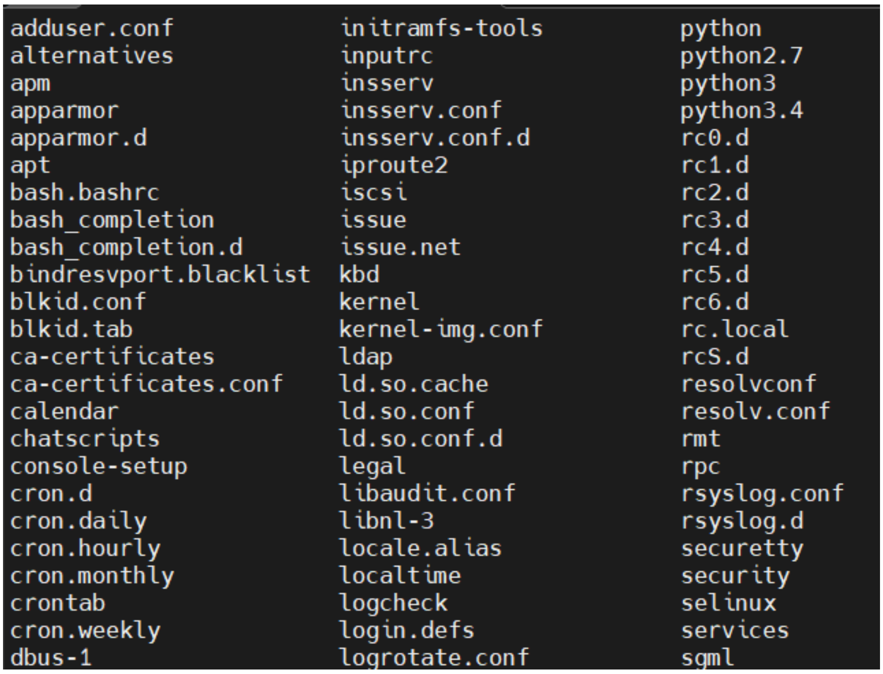


```
root@CsnKhai:~# grep -r "ss" /etc
/etc/logrotate.d/apt:  compress
/etc/logrotate.d/apt:  missingok
/etc/logrotate.d/apt:  compress
/etc/logrotate.d/apt:  missingok
/etc/logrotate.d/ufw:   missingok
/etc/logrotate.d/ufw:   compress
/etc/logrotate.d/ufw:   delaycompress
/etc/logrotate.d/ppp:   missingok
/etc/logrotate.d/ppp:   compress
/etc/logrotate.d/aptitude:  compress
/etc/logrotate.d/aptitude:  missingok
```

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



```
root@CsnKhai:~# ls -C /etc | less
```



```
adduser.conf             initramfs-tools          python
alternatives             inputrc                  python2.7
apm                      insserv                  python3
apparmor                 insserv.conf             python3.4
apparmor.d               insserv.conf.d           rc0.d
apt                      iproute2                 rc1.d
bash.bashrc              iscsi                    rc2.d
bash_completion          issue                    rc3.d
bash_completion.d        issue.net                rc4.d
bindresvport.blacklist   kbd                      rc5.d
blkid.conf               kernel                   rc6.d
blkid.tab                kernel-img.conf          rc.local
ca-certificates          ldap                     rcS.d
ca-certificates.conf     ld.so.cache              resolvconf
calendar                 ld.so.conf               resolv.conf
chatscripts              ld.so.conf.d             rmt
console-setup            legal                    rpc
cron.d                   libaudit.conf            rsyslog.conf
cron.daily               libnl-3                  rsyslog.d
cron.hourly              locale.alias             securetty
cron.monthly             localtime                security
crontab                  logcheck                 selinux
cron.weekly              login.defs               services
dbus-1                   logrotate.conf           sgml
```

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

Devices are represented as special files in the filesystem that provide access to various hardware and peripherals. There are two main types of devices: block devices and character devices.

1. Block Devices:

Block devices are used to store and retrieve data in fixed-size blocks or chunks. These devices provide random access to data, meaning you can read or write data at any specific block. Block devices are often used for storage media like hard drives and SSDs.

To determine the type of a device, you can use the ls command with the -l option to display detailed information about the device file. The device type will be indicated in the first character of the file permissions field.

2. Character Devices:

Character devices are used to communicate with devices that transfer data one character at a time, without the concept of fixed-size blocks. These devices are often used for devices like terminals, printers, and audio devices.

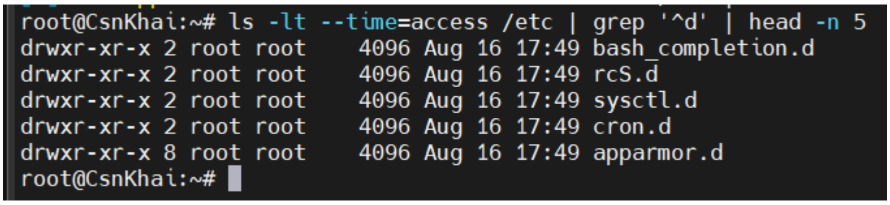
To determine the type of a character device, you can again use the ls command with the -l option.

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

In Unix-like operating systems, you can determine the type of a file using the file command. The file command analyzes the contents of a file and provides information about its type.

Here are some common types of files that the file command can identify: Regular or ordinary files, Directory files, Special files, Link files, Socket files, Named pipe files, Archive File.

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



```
root@CsnKhai:~# ls -lt --time=access /etc | grep '^d' | head -n 5
drwxr-xr-x 2 root root    4096 Aug 16 17:49 bash_completion.d
drwxr-xr-x 2 root root    4096 Aug 16 17:49 rcS.d
drwxr-xr-x 2 root root    4096 Aug 16 17:49 sysctl.d
drwxr-xr-x 2 root root    4096 Aug 16 17:49 cron.d
drwxr-xr-x 8 root root    4096 Aug 16 17:49 apparmor.d
root@CsnKhai:~#
```