SOFTSERVE PYTHON DEVELOPER INTERNSHIP

REPORT ON LINUX OPERATING SYSTE M

Report Number 1

“User information lookup program”

Intern name: Bahamboula Idourah C. Y.

City: Kharkov

Group: Kh-064-Python

Instructor: Дмитрий Узун

Kharkov

Goal: Acquire knowledge on looking up user information

Objectives:

- work with Linux operating system in virtual machine
- execute commands and screen shot the results
- report the result of the laboratory work

I. Task 1

1) Log in to system as root (see Fig 1.1)

Fig 1.1 Log in as root using sudo su command

2) Use the passwd command to change the password (see Fig 1.2). Examine the basic parameters of command (see Fig 1.3.). What system file does it change?

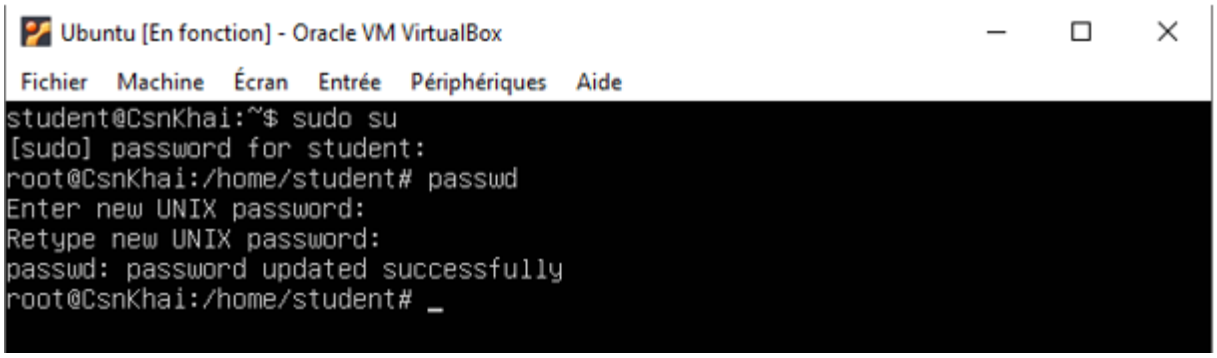


Fig 1.2 changing user password using passwd

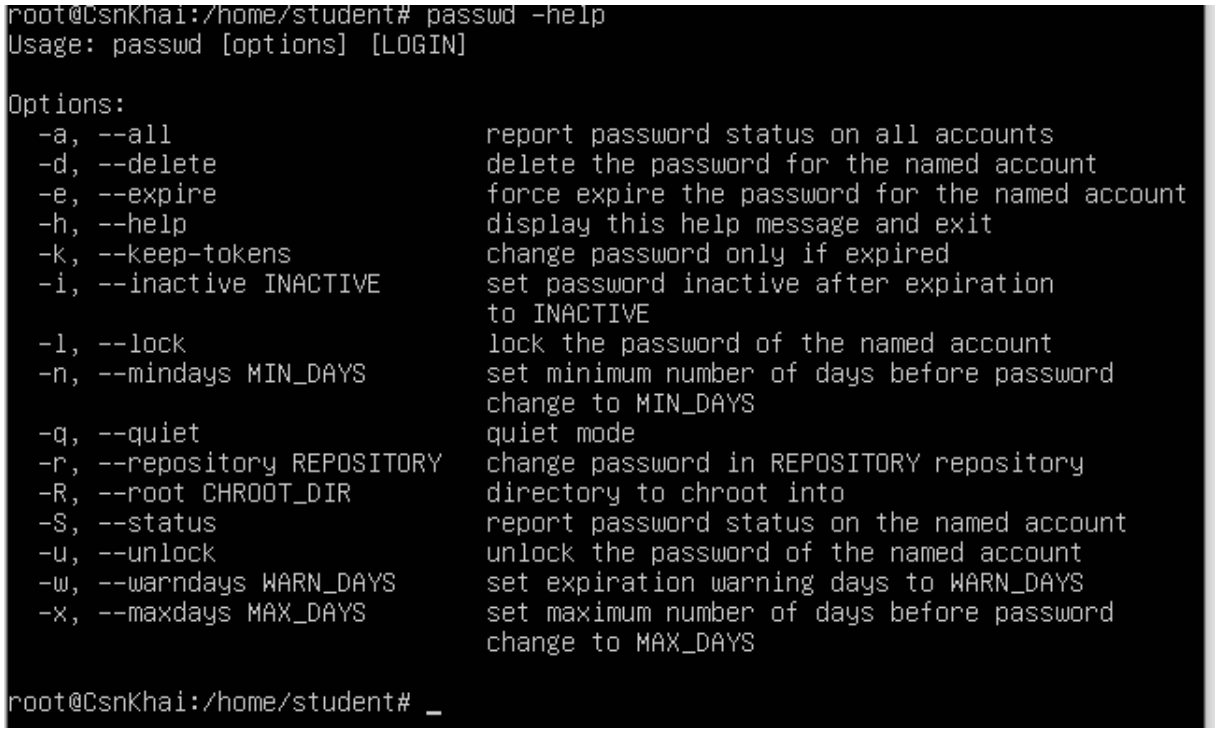
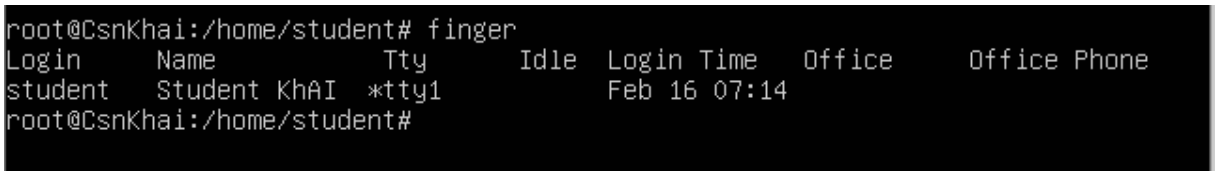


Fig 1.3 passwd parameter using help command

Passwd changes /etc/passwd

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



Using finger command, we can see the log in time, the office phone.

4) Change user personal information

```
root@CsnKhai:/home/student# chfn
Changing the user information for root
Enter the new value, or press ENTER for the default
        Full Name [Idourah Christ Yoane]:
        Room Number []: 511
        Work Phone []: +380 66 370 81 94
        Home Phone [380663708194]: +380 66 370 81 94
        Other []: idourah96@gmail.com
root@CsnKhai:/home/student#
```

5) Become familiar with the linux help system and the man inof

```
student@CsnKhai:~$ passwd -S
student P 02/14/2022 0 99999 7 -1
student@CsnKhai:~$ _
```

5.1 passwd command using –S key which report passord of the name account

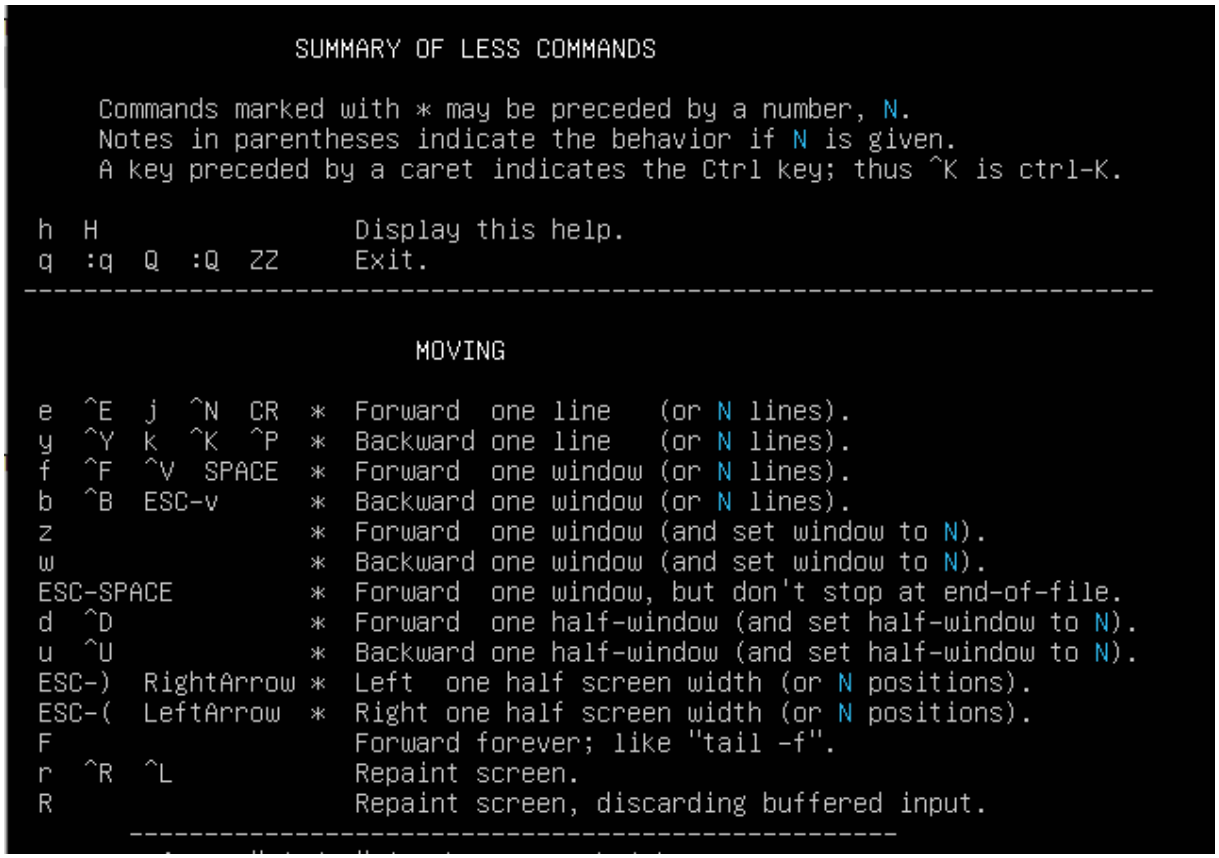
```
student@CsnKhai:~$ sudo passwd -e student
passwd: password expiry information changed.
student@CsnKhai:~$
```

5.2 passwd command using –e key to force password to expire

```
student@CsnKhai:~$ sudo chfn -f idourah
student@CsnKhai:~$ sudo chfn -h +380663708194
student@CsnKhai:~$
```

5.3 chfn –f and chfn –h. –f key to change full name and –h home phone number

6) Explore the more and less commands using the help system.




```
root@CsnKhai:/usr/share/menu# less bash
?package(bash):needs="text" section="Applications/Shells" title="Bash" command="
/bin/bash --login"
?package(bash):needs="text" section="Applications/Shells" title="Sh" command="/b
in/sh --login"
bash (END)
```

```
root@CsnKhai:/home/student/bash-file# more script.bash
#!/bin/bash
# A small bash script to say helloword as it is a tradition in modern language
echo "Helloword writting script using bash is time consuming but funny"
root@CsnKhai:/home/student/bash-file# _
```

```
root@CsnKhai:/usr/share/menu# more bash
?package(bash):needs="text" section="Applications/Shells" title="Bash" command="
/bin/bash --login"
?package(bash):needs="text" section="Applications/Shells" title="Sh" command="/b
in/sh --login"
root@CsnKhai:/usr/share/menu# _
```

7) List the contents of the home directory using the ls command

```
root@CsnKhai:/home/student/bash-file# ls
script.bash
root@CsnKhai:/home/student/bash-file# less script.bash
#!/bin/bash
# A small bash script to say helloword as it is a tradition in modern language
echo "Helloword writting script using bash is time consuming but funny"
script.bash (END)
```

```
root@CsnKhai:/home# ls
student
root@CsnKhai:/home# ls -a
.  ..  student
root@CsnKhai:/home# ls -l --author
total 4
drwxr-xr-x 4 student student student 4096 Feb 16 08:29 student
root@CsnKhai:/home# ls -al
total 12
drwxr-xr-x  3 root    root    4096 Sep 15  2015 .
drwxr-xr-x 21 root    root    4096 Sep 15  2015 ..
drwxr-xr-x  4 student student 4096 Feb 16 08:29 student
root@CsnKhai:/home#
```

Task 2

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.

```
root@CsnKhai:/home/student# tree -P fibonacci*
.
├── algorithms
│   ├── fibonacci.c
│   ├── fibonacci.cpp
│   └── fibonacci.py
└── bash-file

2 directories, 3 files
root@CsnKhai:/home/student#
```

Fig 2.1 displaying files containing Fibonacci using tree command

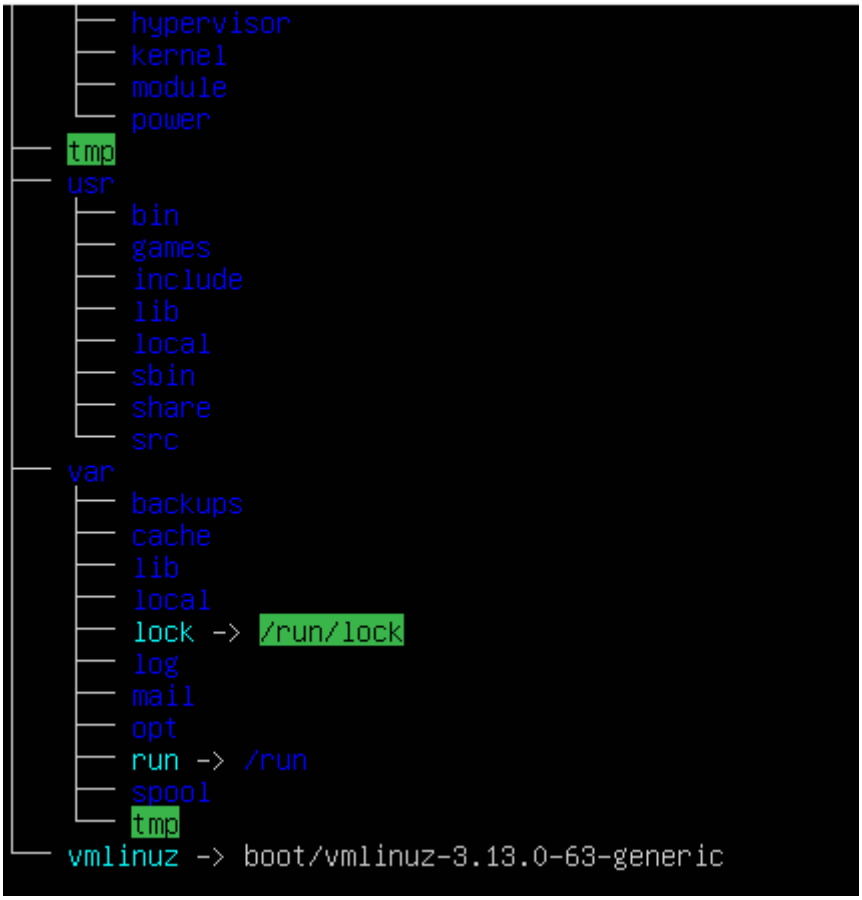


Fig 2.1.2 Listing subdirectories in root including the second level

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

```
root@CsnKhai:/home/student/algorithms# file fibonacci.c
fibonacci.c: C source, ASCII text
root@CsnKhai:/home/student/algorithms# _
```

Fig 2.2.1. File type using file command

```
root@CsnKhai:/home/student/algorithms# ls
fibonacci  fibonacci.c  fibonacci.cpp  fibonacci.py  hello.py
root@CsnKhai:/home/student/algorithms# file fibonacci
fibonacci: ELF 32-bit LSB  executable, Intel 80386, version 1 (SYSV), dynamicall
y linked (uses shared libs), for GNU/Linux 2.6.24, BuildID[sha1]=7c11ea5670dfcbc
6105a1a368abe90b2ef431639, not stripped
```

Fig 2.2.2. Showing type of file using file command

2.3. 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 file system?

```
root@CsnKhai:/proc/driver# cd /home
root@CsnKhai:/home# cd student/
root@CsnKhai:/home/student# ls
algorithms  bash-file  class1  homework1  output  text
root@CsnKhai:/home/student# ls algorithms/
fibonacci  fibonacci.c  fibonacci.cpp  fibonacci.py  hello.py
root@CsnKhai:/home/student#
```

Fig 2.3.1.Navigating the file system using relative and absolute path

2.4. 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:/home/student# ls -a algorithms/
.  ..  fibonacci  fibonacci.c  fibonacci.cpp  fibonacci.py  hello.py
root@CsnKhai:/home/student# ls -l algorithms/
total 20
-rwxr-xr-x 1 root root 7326 Feb 16 21:29 fibonacci
-rw-r--r-- 1 root root  206 Feb 16 21:29 fibonacci.c
-rw-r--r-- 1 root root   85 Feb 16 21:27 fibonacci.cpp
-rw-r--r-- 1 root root    0 Feb 16 20:37 fibonacci.py
-rw-r--r-- 1 root root   37 Feb 16 20:22 hello.py
root@CsnKhai:/home/student# ls -l -author
total 48K
-rw-r--r-- 1 student  220 Sep 15  2015 .bash_logout
-rw-r--r-- 1 student  675 Feb 16 07:14 .profile
-rw-r--r-- 1 student 3.6K Feb 16 07:14 .bashrc
-rw------- 1 student  103 Feb 16 07:14 .bash_history
-rw-r--r-- 1 root      16 Feb 16 08:19 text
drwxr-xr-x 3 root    4.0K Feb 16 08:25 ..
drwxr-xr-x 2 root    4.0K Feb 16 08:31 bash-file
drwx------ 2 student 4.0K Feb 16 08:45 .cache
-rw-r--r-- 1 root      12 Feb 16 20:13 output
-rw-r--r-- 1 root      17 Feb 16 20:17 homework1
-rw-r--r-- 1 root       0 Feb 16 20:36 class1
drwxr-xr-x 5 student 4.0K Feb 16 20:36 .
drwxr-xr-x 2 root    4.0K Feb 16 21:30 algorithms
root@CsnKhai:/home/student# _
```

2.5. 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

```
root@CsnKhai:/# ls -al > /home/test/root-listings
root@CsnKhai:/# cat /home/test/root-listings
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 14 root root  4000 Feb 16 19:42 dev
drwxr-xr-x 83 root root  4096 Feb 16 21:16 etc
drwxr-xr-x  4 root root  4096 Feb 16 21:53 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 Feb 16 21:16 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 78 root root     0 Feb 16 19:42 proc
drwx------  5 root root  4096 Sep 15  2015 root
drwxr-xr-x 16 root root   540 Feb 16 21:16 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 Feb 16 19:42 sys
drwxrwxrwt  2 root root  4096 Feb 16 21:29 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-gen
eric
root@CsnKhai:/# _
```

```
root@CsnKhai:/# cp /home/test/root-listings  /home
root@CsnKhai:/# cd /home
root@CsnKhai:/home# cp test/root-listings  /home
root@CsnKhai:/home#
```

– Delete the previously created subdirectory with the file requesting removal;
– Delete the file copied to the home directory.

```
root@CsnKhai:/home# rm -r test/
root@CsnKhai:/home# rm root-listings
root@CsnKhai:/home#
```

2.6. 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;

```
root@CsnKhai:/home# cp student/.bash_history test;mv test/.bash_history test/lab
work2
root@CsnKhai:/home# ls -al test
total 12
drwxr-xr-x 2 root root 4096 Feb 16 23:31 .
drwxr-xr-x 4 root root 4096 Feb 16 23:28 ..
-rw------- 1 root root  103 Feb 16 23:31 labwork2
root@CsnKhai:/home# cat test/labwork2
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
root@CsnKhai:/home#
```

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

```
root@CsnKhai:/home/test# ls
hardlink_labwork2  labwork2  softlink_labwork2
root@CsnKhai:/home/test# cat labwork2
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ls -al
root@CsnKhai:/home/test#
```

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

Hard Link:

A hard link acts as a copy (mirrored) of the selected file. It accesses the data available in the original file.

If the earlier selected file is deleted, the hard link to the file will still contain the data of that file.

Soft Link:

A soft link (also known as symbolic link) acts as a pointer or a reference to the file name. It does not access the data available in the original file.

If the earlier file is deleted, the soft link will be pointing to a file that does not exist anymore.

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

```
root@CsnKhai:/home/test# mv hardlink_labwork2  hard_link_labwork2
root@CsnKhai:/home/test# mv softlink_labwork2  symb_link_labwork2
root@CsnKhai:/home/test# ls
hard_link_labwork2  labwork2  symb_link_labwork2
root@CsnKhai:/home/test# _
```

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

```
root@CsnKhai:/home/test# rm labwork2
root@CsnKhai:/home/test# cat symb_link_labwork2
cat: symb_link_labwork2: No such file or directory
root@CsnKhai:/home/test# cat hard_link_labwork2
sudo su
top
sudo update.rc ssh defaults
sudo update-rc.d ssh defaults
sudo reboot
sudo shutdown -h now
ls -al
root@CsnKhai:/home/test# _
```

After deleting labwok2 we the symbolic link is not more existent because symbolic is pointer to a file and when the latter is deleted the symbolic link cannot point to a file that does not exist.

2.7. Using the locate utility; find all files that contain the squid and traceroute sequence.

```
student@CsnKhai:~$ locate squid
student@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
student@CsnKhai:~$ _
```

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

```
root@CsnKhai:/home# 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:/home/student# df -aTh
Filesystem     Type        Size  Used Avail Use% Mounted on
/dev/sda1      ext4        1.5G  1.1G  282M  80% /
proc           proc           0     0     0    - /proc
sysfs          sysfs          0     0     0    - /sys
none           tmpfs       4.0K     0  4.0K   0% /sys/fs/cgroup
none           fusectl        0     0     0    - /sys/fs/fuse/connections
none           debugfs        0     0     0    - /sys/kernel/debug
none           securityfs     0     0     0    - /sys/kernel/security
udev           devtmpfs    112M  4.0K  112M   1% /dev
devpts         devpts         0     0     0    - /dev/pts
tmpfs          tmpfs        25M  384K   24M   2% /run
none           tmpfs       5.0M     0  5.0M   0% /run/lock
none           tmpfs       121M     0  121M   0% /run/shm
none           tmpfs       100M     0  100M   0% /run/user
none           pstore         0     0     0    - /sys/fs/pstore
systemd        cgroup         0     0     0    - /sys/fs/cgroup/systemd
root@CsnKhai:/home/student# _
```

```
root@CsnKhai:/dev# lsblk -f
NAME   FSTYPE LABEL MOUNTPOINT
sda
└─sda1 ext4         /
sr0
root@CsnKhai:/dev#
```

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

```
root@CsnKhai:/home/student# grep Linux text | wc -l
6
root@CsnKhai:/home/student#
```

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

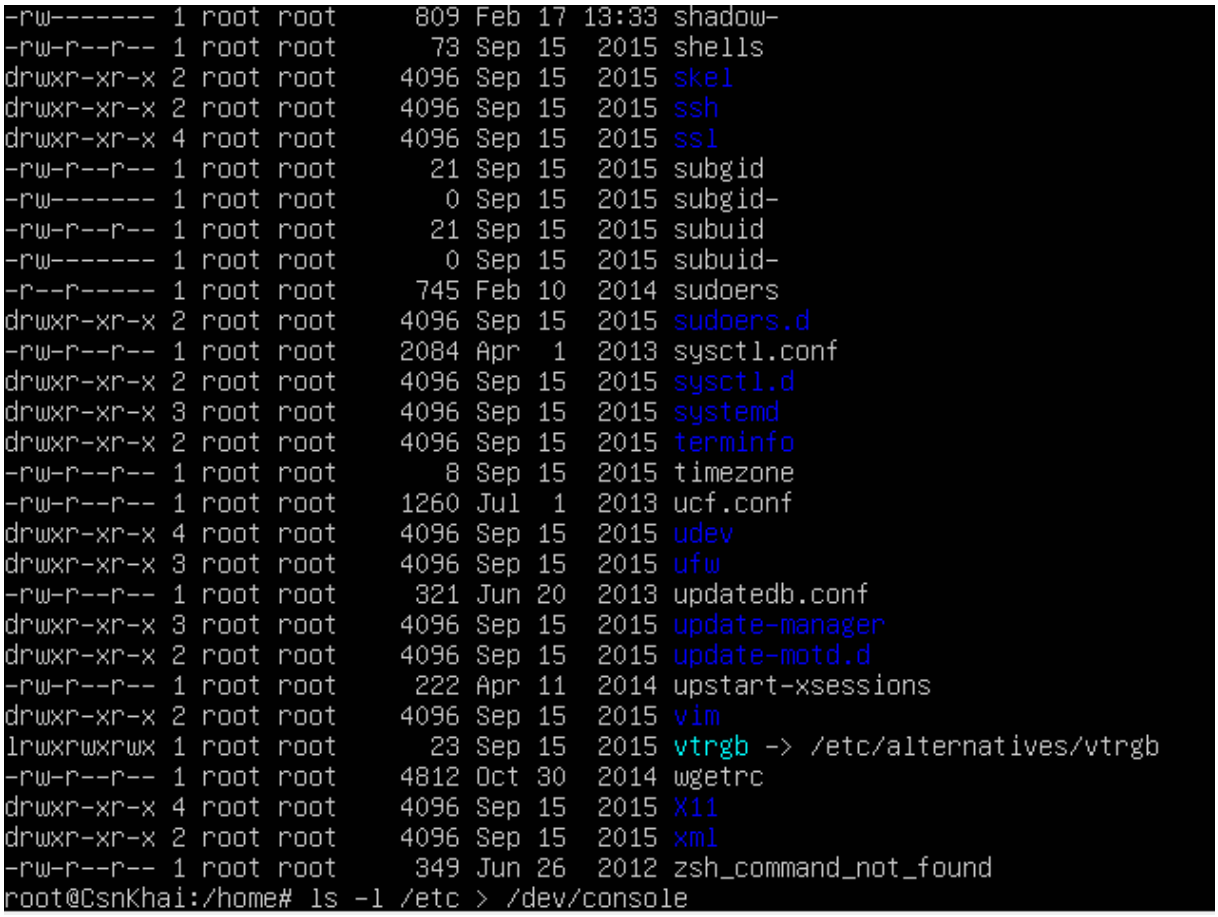
```
root@CsnKhai:/# find /etc -name host*
/etc/hosts
/etc/hosts.allow
/etc/init/hostname.conf
/etc/hostname
/etc/hosts.deny
/etc/host.conf
root@CsnKhai:/# _
```

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

```
/etc/nsswitch.conf
/etc/insserv.conf.d
/etc/dbus-1/session.conf
/etc/dbus-1/session.d
/etc/passwd
/etc/X11/Xsession.d
/etc/X11/Xsession.d/99upstart
/etc/X11/Xsession.d/00upstart
/etc/sysctl.d/10-console-messages.conf
/etc/libnl-3/classid
/etc/bash_completion.d/insserv
/etc/insserv.conf
/etc/rc1.d/K20ssh
/etc/rc4.d/S20ssh
/etc/rc6.d/K20ssh
student@CsnKhai:~$ find /etc | grep ss
```

Command executed is: find /etc | grep ss

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

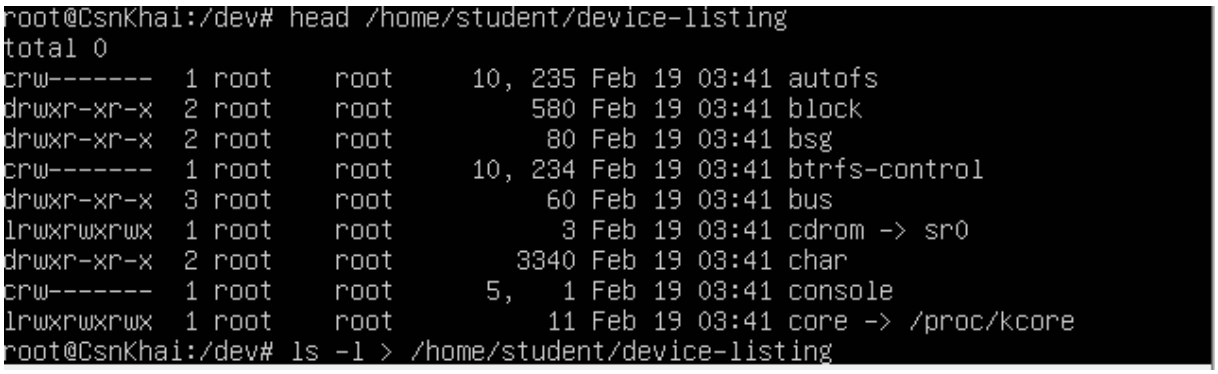


Command executed was: ls –l /ect > /dev/console

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

There are two types of devices:

- character devices: talks to devices in a character by character (1 byte at a time);
- block devices: talk to devices 1 block at a time (1 block = 512 bytes to 32KB);



Command executed was: ls –l > /home/student/device-listing

We went to /dev directory then display the content of the directory while redetecting it to a file call device-listing ls –l > /home/student/ then display the first line of that file using head command.

Note: we create that file at /home/student directory because it is a bad practice adding files in root directories.

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

Conclusion

In this paper, I report the result of my laboratory work using Linux operating system (Ubuntu distribution) on a virtual machine (virtualBox). The goal was to acquire knowledge on Linux commands to look up user information while completing this laboratory work I was able to change user information such as full name, home phone number and password.

The labwork consists of two parts; the first is to lookup user information using command like finger, and change those information-using commands like chfn or passwd. The second part consist of mastering the art of traveling through

user directory, checking file type, examine hard and symbolic links, checking for devices and their type, checking for file system etc.

After completion, it is with a brain full of important Linux tools to navigate user directories, change user information and track changing into Linux OS. With all being said, I can proudly say that the goal and objectives set in the beginning of this work is successfully achieved.