

## Exercises about file and directory permission

1. List the permissions in your current directory, including hidden files.

```
shovashrestha@shovashrestha-VirtualBox:~$ ls -la
total 336
drwxr-xr-x 26 shovashrestha shovashrestha 4096 ene 13 15:20 .
drwxr-xr-x  7 root          root          4096 nov 17 18:50 ..
drwxrwxr-x  2 shovashrestha shovashrestha 4096 nov 17 16:20 .android
-rw-r----- 1 shovashrestha shovashrestha 6837 ene 12 19:17 .bash_history
-rw-r--r--  1 shovashrestha shovashrestha 220 oct 29 15:59 .bash_logout
-rw-r--r--  1 shovashrestha shovashrestha 3771 oct 29 15:59 .bashrc
drwx----- 19 shovashrestha shovashrestha 4096 ene 12 19:21 .cache
drwx----- 16 shovashrestha shovashrestha 4096 dic 17 18:35 .config
drwxrwxr-x  3 shovashrestha shovashrestha 4096 dic 17 18:59 css
-rw-rw-r--  1 shovashrestha shovashrestha 96597 dic 17 19:00 css.zip
drwxr-xr-x  2 shovashrestha shovashrestha 4096 dic  3 17:33 Desktop
drwxr-xr-x  2 shovashrestha shovashrestha 4096 ene 12 19:20 Documents
drwxr-xr-x  2 shovashrestha shovashrestha 4096 oct 29 16:09 Downloads
-rw-rw-r--  1 shovashrestha shovashrestha 656 dic  9 16:58 error
drwxr-xr-x  6 root          root          4096 nov 18 20:42 exercises
drwx-----  3 shovashrestha shovashrestha 4096 ene 12 17:28 .gnupg
drwxrwxr-x  5 shovashrestha shovashrestha 4096 nov 17 20:50 IdeaProjects
-rw-rw-r--  1 shovashrestha shovashrestha 889 dic 17 17:58 indice.html
-rw-rw-r--  1 shovashrestha shovashrestha 1435 dic  2 17:27 inform
drwxrwxr-x  4 shovashrestha shovashrestha 4096 nov 17 16:19 .java
drwxrwxr-x  3 shovashrestha shovashrestha 4096 nov 17 20:45 .jdk
-rw-rw-r--  1 shovashrestha shovashrestha 2841 dic  2 16:48 list
drwx-----  3 shovashrestha shovashrestha 4096 oct 29 16:09 .local
drwxrwxr-x  3 shovashrestha shovashrestha 4096 dic 10 18:10 marcos
-rw-rw-r--  1 shovashrestha shovashrestha 65189 dic  3 19:00 marcos.zip
drwx-----  5 shovashrestha shovashrestha 4096 nov 17 16:11 .mozilla
drwxr-xr-x  2 shovashrestha shovashrestha 4096 oct 29 16:09 Music
-rw-rw-r--  1 shovashrestha shovashrestha 153 dic  2 16:39 people2.txt
```

2. Create a file called perm1. Now, check the default permissions and user and group ownership

```
shovashrestha@shovashrestha-VirtualBox:~$ mkdir perm1
shovashrestha@shovashrestha-VirtualBox:~$ ls -la | grep perm1
drwxrwxr-x  2 shovashrestha shovashrestha 4096 ene 13 15:51 perm1
```

3. Change permissions of perm1 so that everyone can read and only the owner user can write. Specify the command in all possible ways.

chmod 744 perm1

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod 744 perm1
shovashrestha@shovashrestha-VirtualBox:~$ ls -la | grep perm1
drwxr--r--  2 shovashrestha shovashrestha 4096 ene 13 15:58 perm1
```

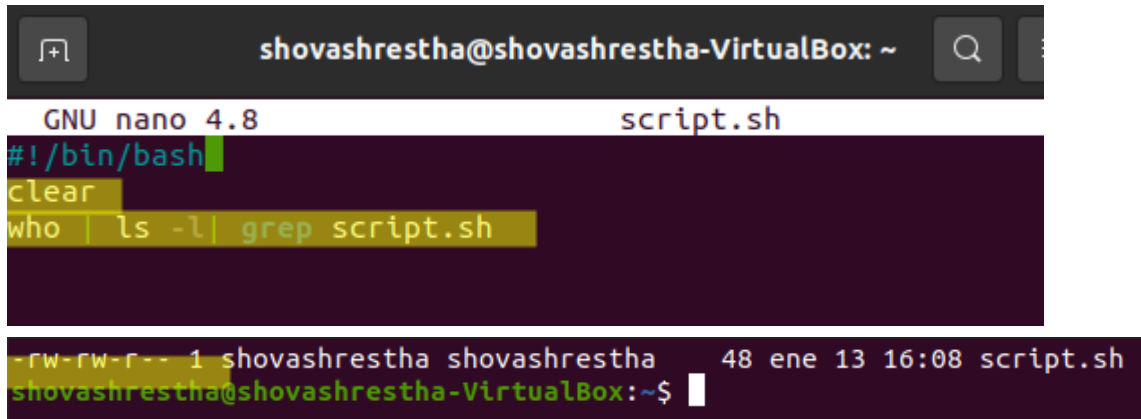
chmod g-wx, o-x perm1

4. Create a file called script.sh, including the content below. List the default permissions.

```
#!/bin/bash
```

```
clear
```

```
who
```

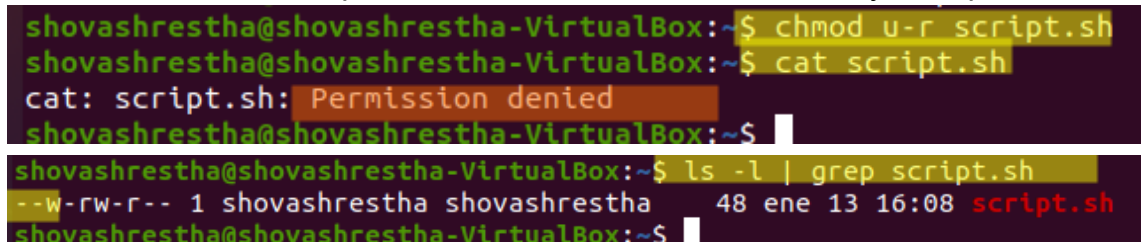


The screenshot shows a terminal window titled 'shovashrestha@shovashrestha-VirtualBox: ~'. The nano 4.8 editor is open for 'script.sh'. The file content is: 

```
#!/bin/bash  
clear  
who | ls -l | grep script.sh
```

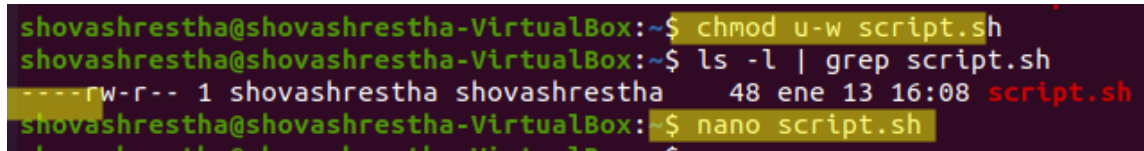
 Below the editor, the command `ls -l` is executed, showing the file permissions: `-rw-rw-r-- 1 shovashrestha shovashrestha 48 ene 13 16:08 script.sh`. The prompt returns to the shell.

5. Remove the read permission from the owner and try to open the file

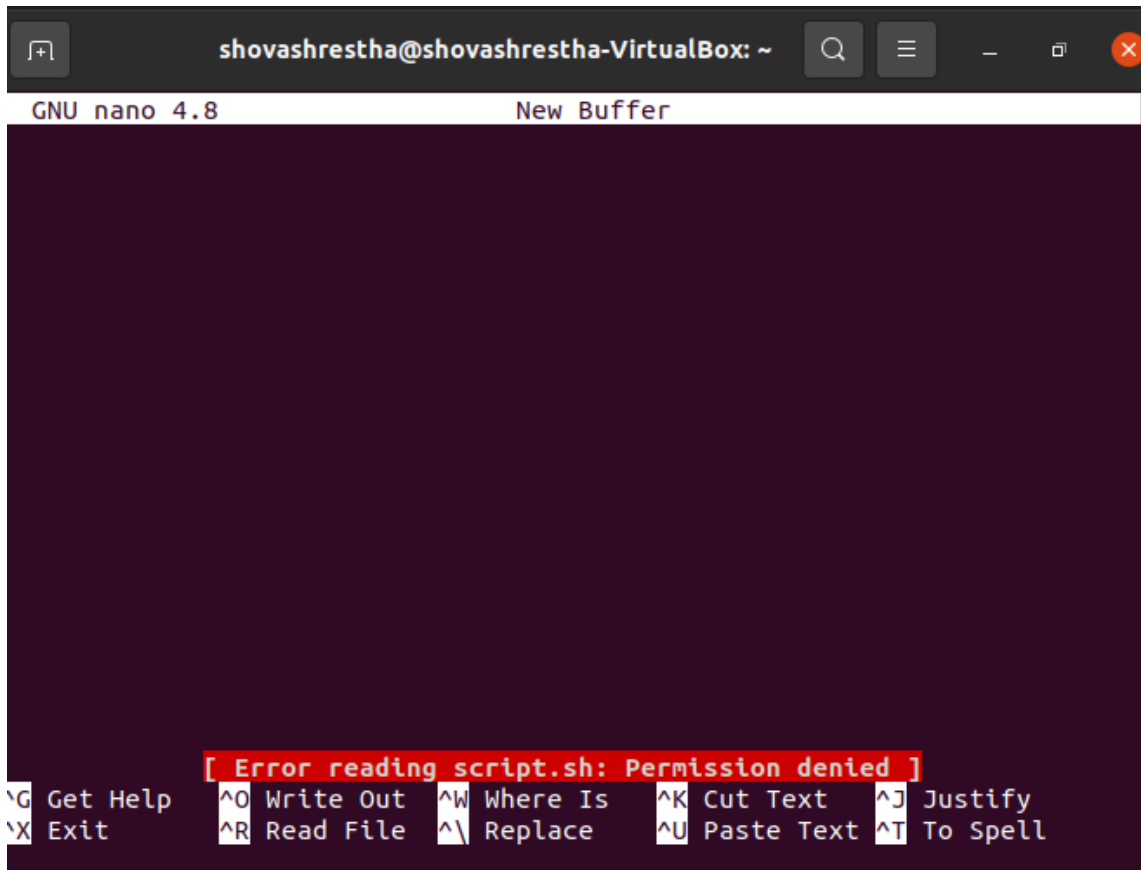


The screenshot shows the terminal with the following commands and output:   
`shovashrestha@shovashrestha-VirtualBox:~$ chmod u-r script.sh`  
`shovashrestha@shovashrestha-VirtualBox:~$ cat script.sh`  
`cat: script.sh: Permission denied`  
`shovashrestha@shovashrestha-VirtualBox:~$`  
Then, `ls -l` is run, showing: `--w-rw-r-- 1 shovashrestha shovashrestha 48 ene 13 16:08 script.sh`. The prompt returns to the shell.

6. Remove the write permission from the owner on the file script.sh. Add the line below. Is it possible? Why? **I don't have any permission**



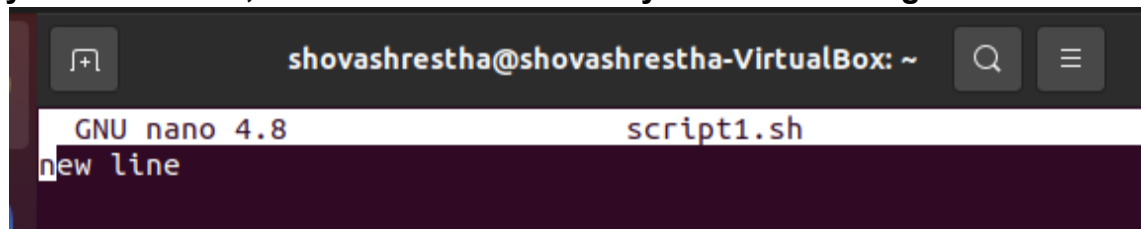
The screenshot shows the terminal with the following commands and output:   
`shovashrestha@shovashrestha-VirtualBox:~$ chmod u-w script.sh`  
`shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep script.sh`  
`----rw-r-- 1 shovashrestha shovashrestha 48 ene 13 16:08 script.sh`  
`shovashrestha@shovashrestha-VirtualBox:~$ nano script.sh`  
The prompt returns to the shell.



The screenshot shows a terminal window titled 'shovashrestha@shovashrestha-VirtualBox: ~'. Inside, the GNU nano 4.8 editor is open with a 'New Buffer' title bar. A red error message is displayed: '[ Error reading script.sh: Permission denied ]'. At the bottom, a help menu lists various keyboard shortcuts: ^G Get Help, ^X Exit, ^O Write Out, ^R Read File, ^W Where Is, ^\ Replace, ^K Cut Text, ^U Paste Text, ^J Justify, and ^T To Spell.

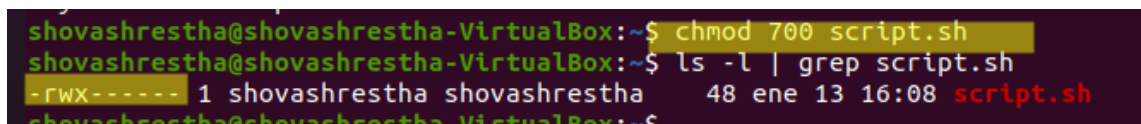
new line

you can write, but not in that file you are creating another file.



The screenshot shows the same terminal window. The nano editor is now editing a file named 'script1.sh'. The text 'new line' is visible in the editor's buffer.

7. Change the permissions on the file script.sh so that the owner can read, write and execute, but you deny all the permissions from the group and others.



The screenshot shows the terminal window with the following commands and output:  
shovashrestha@shovashrestha-VirtualBox:~\$ chmod 700 script.sh  
shovashrestha@shovashrestha-VirtualBox:~\$ ls -l | grep script.sh  
-rwx----- 1 shovashrestha shovashrestha 48 ene 13 16:08 script.sh

8. Add the line indicated in exercise 6, in case it was not possible. Try to run the file like a command.

nano script.sh

```
shovashrestha@shovashrestha-VirtualBox: ~  
GNU nano 4.8 script.sh  
#!/bin/bash  
clear  
who | ls -l | grep script.sh  
new line
```

```
-rwx----- 1 shovashrestha shovashrestha 58 ene 13 16:23 script.sh  
script.sh: line 5: new: command not found  
shovashrestha@shovashrestha-VirtualBox:~$
```

9. Remove the read permission from the owner on the file script.sh. Try to run the file. Is it possible? **No, it's not possible because if you don't have read permission you can't execute you need to read if you want to execute.**

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod u-r script.sh  
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep script.sh  
--WX----- 1 shovashrestha shovashrestha 58 ene 13 16:23 script.sh  
shovashrestha@shovashrestha-VirtualBox:~$ bash script.sh  
bash: script.sh: Permission denied  
shovashrestha@shovashrestha-VirtualBox:~$
```

10. Create a directory called "systems". Remove the write permission from it and try to copy script.sh inside.

```
shovashrestha@shovashrestha-VirtualBox:~$ mkdir system  
shovashrestha@shovashrestha-VirtualBox:~$ ls  
css      exercises  marcos.zip  perm1      system  
css.zip  IdeaProjects Music      Pictures    systems  
Desktop  indice.html people2.txt Public      Systems  
Documents inform     people3.txt script1.sh  Templates  
Downloads list       people_s.txt script.sh   validacion.html  
error    marcos     people.txt  snap       Videos  
shovashrestha@shovashrestha-VirtualBox:~$ chmod u-w system  
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system  
dr-xrwxr-x 2 shovashrestha shovashrestha 4096 ene 13 16:46 system  
shovashrestha@shovashrestha-VirtualBox:~$ cp script.sh /system  
cp: cannot open 'script.sh' for reading: Permission denied  
shovashrestha@shovashrestha-VirtualBox:~$
```

11. If you were not able to copy the file, add the write permission again and copy the file inside.

you also need to put the read permission to the file script.sh

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod u+w system
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drwxrwxr-x 2 shovashrestha shovashrestha 4096 ene 13 16:46 system
drwxr-xr-x 2 root          root          4096 nov 18 20:39 systems
shovashrestha@shovashrestha-VirtualBox:~$ cp script.sh /system
cp: cannot open 'script.sh' for reading: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$ cp script.sh system
cp: cannot open 'script.sh' for reading: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$ cp script.sh ./system
cp: cannot open 'script.sh' for reading: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$ cd system
shovashrestha@shovashrestha-VirtualBox:~/system$ cp ../script.sh system
cp: cannot open '../script.sh' for reading: Permission denied
shovashrestha@shovashrestha-VirtualBox:~/system$

root@shovashrestha-VirtualBox:/home/shovashrestha# chmod u+r script.sh
root@shovashrestha-VirtualBox:/home/shovashrestha# ls -la | grep script.sh
-rwx----- 1 shovashrestha shovashrestha 58 ene 13 16:23 script.sh
root@shovashrestha-VirtualBox:/home/shovashrestha#

root@shovashrestha-VirtualBox:/home/shovashrestha# cp script.sh system
root@shovashrestha-VirtualBox:/home/shovashrestha# cd system
root@shovashrestha-VirtualBox:/home/shovashrestha/system# ls
script.sh
root@shovashrestha-VirtualBox:/home/shovashrestha/system#
```

12. Remove the read permission from the user on the directory “systems” and try to list its contents.

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod u-r system
shovashrestha@shovashrestha-VirtualBox:~$ cd system
shovashrestha@shovashrestha-VirtualBox:~/system$ ls
ls: cannot open directory '.': Permission denied
shovashrestha@shovashrestha-VirtualBox:~/system$
```

13. Change the permissions from “system” so that the owner can read, write and execute, but the group and others can only read.

```
shovashrestha@shovashrestha-VirtualBox:~/system$ cd ..
shovashrestha@shovashrestha-VirtualBox:~$ chmod 744 system
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drwxr--r-- 2 shovashrestha shovashrestha 4096 ene 13 16:46 system
drwxr-xr-x 2 root          root          4096 nov 18 20:39 systems
shovashrestha@shovashrestha-VirtualBox:~$
```

14. Remove the execute permission from “systems”. Can you execute systems/script1.sh? Is it possible to access the directory to execute the file? NO IT'S NOT POSSIBLE BECAUSE WE NEED EXECUTE PERMISSION IF WE WANT TO EXECUTE THE SCRIPT, SO WE DON'T EITHER HAVE PERMISSION TO ACCESS TO THE DIRECTORY.



```
shovashrestha@shovashrestha-VirtualBox:~$ chmod u-x system
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drw-r--r-- 2 shovashrestha shovashrestha 4096 ene 13 16:46 system
drwxr-xr-x 2 root          root          4096 nov 18 20:39 systems
shovashrestha@shovashrestha-VirtualBox:~$ bash system/script.sh
bash: system/script.sh: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$ cd system
bash: cd: system: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$
```

15. Assign the execute permission to the directory again

chmod u+x system

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod u+x system
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | system

Command 'system' not found, did you mean:

  command 'system3' from deb simh (3.8.1-6)
  command 'systemd' from deb systemd (245.4-4ubuntu3.15)

Try: sudo apt install <deb name>

shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drwxr--r-- 2 shovashrestha shovashrestha 4096 ene 13 17:40 system
drwxr-xr-x 2 root          root          4096 nov 18 20:39 systems
```

16. Create two files called “lucy” and “charles” into “systems”. Change permissions of “charles”, so that others can write and execute.

touch lucy, charles

chmod o+wx charles

```
shovashrestha@shovashrestha-VirtualBox:~/systems$ cd ../system
shovashrestha@shovashrestha-VirtualBox:~/system$ touch lucy charles
shovashrestha@shovashrestha-VirtualBox:~/system$ ls
charles lucy script.sh
shovashrestha@shovashrestha-VirtualBox:~/system$ chmod o+wx charles
shovashrestha@shovashrestha-VirtualBox:~/system$ ls -la | grep lucy
-rw-rw-r-- 1 shovashrestha shovashrestha 0 ene 26 15:39 lucy
shovashrestha@shovashrestha-VirtualBox:~/system$ ls -la | grep charles
-rw-rw-rwx 1 shovashrestha shovashrestha 0 ene 26 15:39 charles
shovashrestha@shovashrestha-VirtualBox:~/system$
```

17. Change permissions of “lucy” so that the owner can read and execute, the group can read and write and others can only write. Specify the command in all possible ways.

chmod 562 lucy

```
shovashrestha@shovashrestha-VirtualBox:~/system$ chmod 562 lucy
shovashrestha@shovashrestha-VirtualBox:~/system$ ls -la | grep charles
-rw-rw-rwx 1 shovashrestha shovashrestha 0 ene 26 15:39 charles
shovashrestha@shovashrestha-VirtualBox:~/system$ ls -la | grep lucy
-r-xr--w- 1 shovashrestha shovashrestha 0 ene 26 15:39 lucy
```

18. Log in as root. Change the ownership of “charles” to “root”. Exit the root session. Now, try to change the permission so that others cannot read and execute. Is it possible? Why?

chown root charles

chmod o-r system/charles → is not permitted because i dont have permission

```
shovashrestha@shovashrestha-VirtualBox:~/system$ sudo su
root@shovashrestha-VirtualBox:/home/shovashrestha/system# chown root charles
root@shovashrestha-VirtualBox:/home/shovashrestha/system# ls
charles lucy script.sh
root@shovashrestha-VirtualBox:/home/shovashrestha/system# ls -l
total 4
-rw-rw-rwx 1 root shovashrestha 0 ene 26 15:39 charles
-r-xrw--w- 1 shovashrestha shovashrestha 0 ene 26 15:39 lucy
--wx----- 1 root root 58 ene 13 17:40 script.sh
root@shovashrestha-VirtualBox:/home/shovashrestha/system# cd ..
root@shovashrestha-VirtualBox:/home/shovashrestha# exit
exit
shovashrestha@shovashrestha-VirtualBox:~/system$ cd ..
shovashrestha@shovashrestha-VirtualBox:~$ chmod o-r systems/charles
chmod: cannot access 'systems/charles': No such file or directory
shovashrestha@shovashrestha-VirtualBox:~$ chmod o-r system/charles
chmod: changing permissions of 'system/charles': Operation not permitted
shovashrestha@shovashrestha-VirtualBox:~$
```

19. Change the permissions of “charles” so that everybody can do everything

chmod 777 system/charles

```
shovashrestha@shovashrestha-VirtualBox:~$ sudo chmod 777 system/charles
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep charles
-rw-rw-rwx 1 shovashrestha shovashrestha 0 ene 26 15:28 charles
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system/charles
shovashrestha@shovashrestha-VirtualBox:~$ cd system
shovashrestha@shovashrestha-VirtualBox:~/system$ ls -l | grep charles
-rwxrwxrwx 1 root shovashrestha 0 ene 26 15:39 charles
shovashrestha@shovashrestha-VirtualBox:~/system$
```

20. Change the permissions of “lucy” so that the group can read and write, but the owner and others cannot do anything. Can you open the file?

chmod 060 system/lucy → we only can read the file

```
chmod: cannot access 'systems/lucy': No such file or directory
shovashrestha@shovashrestha-VirtualBox:~$ chmod 060 system/lucy
shovashrestha@shovashrestha-VirtualBox:~$ ls -l /system
ls: cannot access '/system': No such file or directory
shovashrestha@shovashrestha-VirtualBox:~$ ls -l system
total 4
-rwxrwxrwx 1 root shovashrestha 0 ene 26 15:39 charles
----rw---- 1 shovashrestha shovashrestha 0 ene 26 15:39 lucy
--wx----- 1 root root 58 ene 13 17:40 script.sh
shovashrestha@shovashrestha-VirtualBox:~/system$
```

21. Create a group called “newgroup”. Set the group as the owner of the file “lucy” and “root” as the owner user.

groupadd newgroup

chown root:newgroup systems/lucy

```
shovashrestha@shovashrestha-VirtualBox:~$ sudo groupadd newgroup
shovashrestha@shovashrestha-VirtualBox:~$ sudo chown root:newgroup system/lucy
shovashrestha@shovashrestha-VirtualBox:~$ cat /etc/group
mysql:x:133:
newgroup:x:1004:
```

22. Add your user to the secondary group “newgroup”. Try to open the file “lucy” now. Is it possible?

```
shovashrestha@shovashrestha-VirtualBox:~$ sudo usermod -G newgroup shovashrestha
shovashrestha@shovashrestha-VirtualBox:~$ cat /etc
cat: /etc: Is a directory
shovashrestha@shovashrestha-VirtualBox:~$ cat /etc/group
root:x:0:
mysql:x:133:
newgroup:x:1004:shovashrestha
shovashrestha@shovashrestha-VirtualBox:~$
```

No I can't because I don't have permission.

```
shovashrestha@shovashrestha-VirtualBox:~$ cat system/lucy
cat: system/lucy: Permission denied
shovashrestha@shovashrestha-VirtualBox:~$
```

23. Change permissions of “lucy” so that everybody can read.

```
shovashrestha@shovashrestha-VirtualBox:~$ sudo chmod 444 system/lucy
shovashrestha@shovashrestha-VirtualBox:~$ ls -l /system |grep lucy
ls: cannot access '/system': No such file or directory
shovashrestha@shovashrestha-VirtualBox:~$ ls -l system |grep lucy
-r--r--r-- 1 root newgroup 0 ene 26 15:39 lucy
shovashrestha@shovashrestha-VirtualBox:~$ cat system/lucy
shovashrestha@shovashrestha-VirtualBox:~$
```

24. Do exercise 13 again, but this time granting permissions to the folder “system” including files and subfolders

chmod -R 744 system

```
shovashrestha@shovashrestha-VirtualBox:~$ chmod 744 system
```



```
shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drwxr--r-- 2 shovashrestha shovashrestha 4096 ene 26 15:39 system
drwxr-xr-x 2 root root 4096 nov 18 20:39 systems

shovashrestha@shovashrestha-VirtualBox:~$ sudo chmod 744 system/lucy
shovashrestha@shovashrestha-VirtualBox:~$ cat system/lucy
shovashrestha@shovashrestha-VirtualBox:~$ ls -l system
total 4
-rwxrwxrwx 1 root shovashrestha 0 ene 26 15:39 charles
-rwxr--r-- 1 root newgroup 0 ene 26 15:39 lucy
--wx----- 1 root root 58 ene 13 17:40 script.sh
shovashrestha@shovashrestha-VirtualBox:~$
```

25. Change the group owner of “systems” to “root” including files and subfolders.

```
chgrp -R root system
shovashrestha@shovashrestha-VirtualBox:~$ sudo chgrp -R root system
shovashrestha@shovashrestha-VirtualBox:~$ ls -l system
total 4
-rwxrwxrwx 1 root root 0 ene 26 15:39 charles
-rwxr--r-- 1 root root 0 ene 26 15:39 lucy
--wx----- 1 root root 58 ene 13 17:40 script.sh
shovashrestha@shovashrestha-VirtualBox:~$ ls -l syste

shovashrestha@shovashrestha-VirtualBox:~$ ls -l | grep system
drwxr--r-- 2 shovashrestha root 4096 ene 26 15:39 system
drwxr-xr-x 2 root root 4096 nov 18 20:39 systems
shovashrestha@shovashrestha-VirtualBox:~$
```

