Linux Management Permissions

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DW1E – 18/01/2022

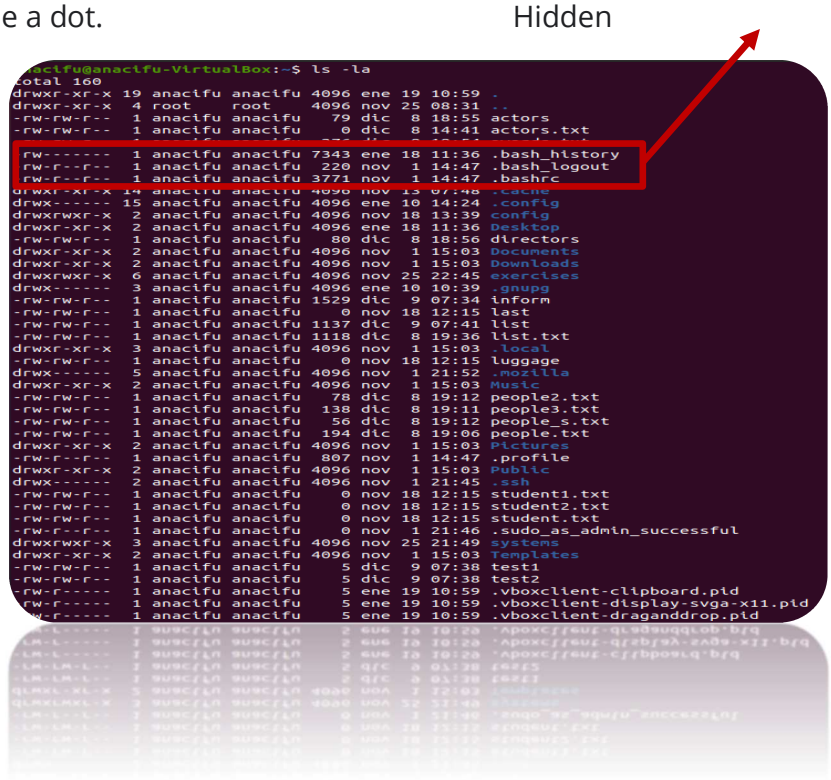
Exercises about file and directory permission

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

$ ls -la

The simple command of **ls -l** means, **to list files and directories**. It has an option of **-l**, which lists the contents in a long format like the picture below. It allows you to look through the file system.

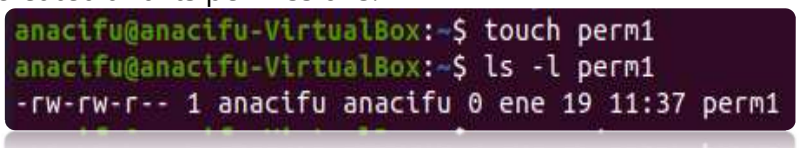
-a: which list the hidden files. Hidden files and directories are those that bear in front of the name a dot. Hidden



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

$ touch perm1
$ ls -l perm1

The **touch** command is used to create an empty file and using **ls-l perm1** we can see this file created and its permissions.



```
anacifu@anacifu-VirtualBox:~$ find perm1
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.

The **chmod** command accepts options in two forms: **symbolic and octal**.

SIMBOLIC: Permissions may be specified symbolically, using the symbols u (user), g (group), o (other), a (all), r (read), w (write), x (execute), + (add permission), - (take away permission) and = (assign permission).

OCTAL: Permissions may also be specified as a sequence of 3 octal digits. Each octal digit represents the access permissions for the user/owner, group and others respectively. The mappings of permissions onto their corresponding octal digits where 0 means no permissions and 7 all permissions.

$ chmod u=rw,go=r perm1

This means that user (u) can read(r) and write (w), groups and others only can read (r) in the perm1 file.

```
anacifu@anacifu-VirtualBox:~$ chmod u=rw,go=r perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-r--r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
```

$ chmod a=r,u+w perm1

This means that all (a) can read and user can also write in the perm1 file.

```
anacifu@anacifu-VirtualBox:~$ chmod 664 perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-rw-r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
anacifu@anacifu-VirtualBox:~$ chmod a=r,u+w perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-r--r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
```

$ chmod a=rw,go-w perm1

This means that all (a) can read (r) and write (w) and groups and others have written (w) permission denied in the perm1 file.

```
anacifu@anacifu-VirtualBox:~$ chmod 664 perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-rw-r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
anacifu@anacifu-VirtualBox:~$ chmod a=rw,go-w perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-r--r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
```

$ chmod 644 perm1

This means that user can read and write, groups can only read like others in the perm1 file.

```
anacifu@anacifu-VirtualBox:~$ chmod 664 perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-rw-r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
anacifu@anacifu-VirtualBox:~$ chmod 644 perm1
anacifu@anacifu-VirtualBox:~$ ls -l perm1
-rw-r--r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
```

4. Create a file called script1.sh, including the content below. List the default permissions.

#!/bin/bash
clear
who

$ nano script1.sh

.sh: A file with .sh extensión is a scripting language commands file that contains computer program to be run by Unix shell. It can contain a series of commands that run sequentially to carry out operations such as files processing, execution of programs and other such tasks.

The **nano** command is a simple text editor. This create and open the file and you can add content inside.

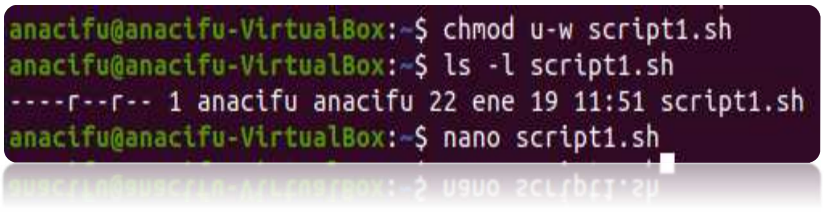
#!: its function is to indicate to the system that a set of instructions will then be presented and thus processed. The second part, /bin/bash, indicates the shell that will be used to execute the commands.
-rw-r—r--: is the default configuration when the file is created.

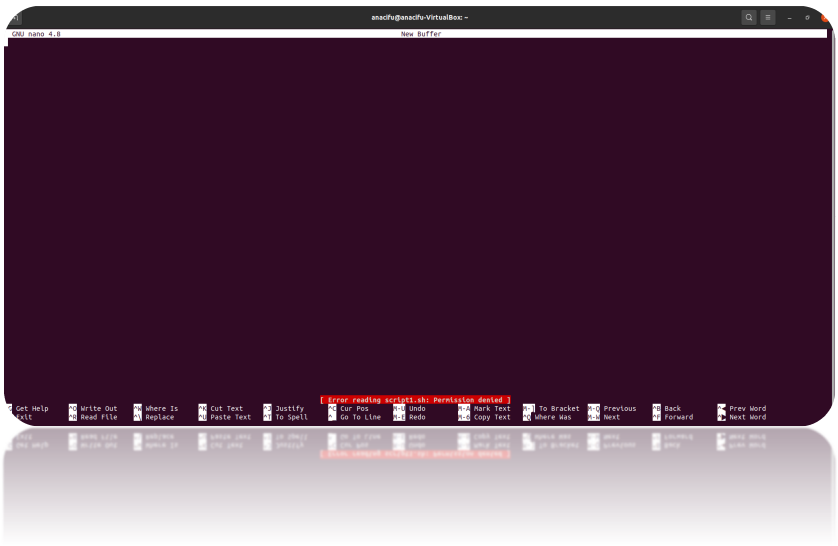
```
anacifu@anacifu-VirtualBox:~$ nano script1.sh
anacifu@anacifu-VirtualBox:~$ ls -l script1.sh
-rw-rw-r-- 1 anacifu anacifu 22 ene 19 11:51 script1.sh
```

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

$ chmod u-r script1.sh

This means that user have read permission denied and for that reason, you cannot open the file.

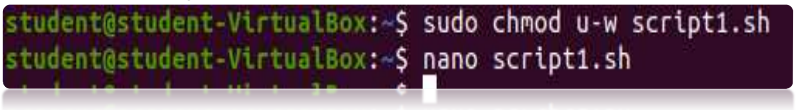


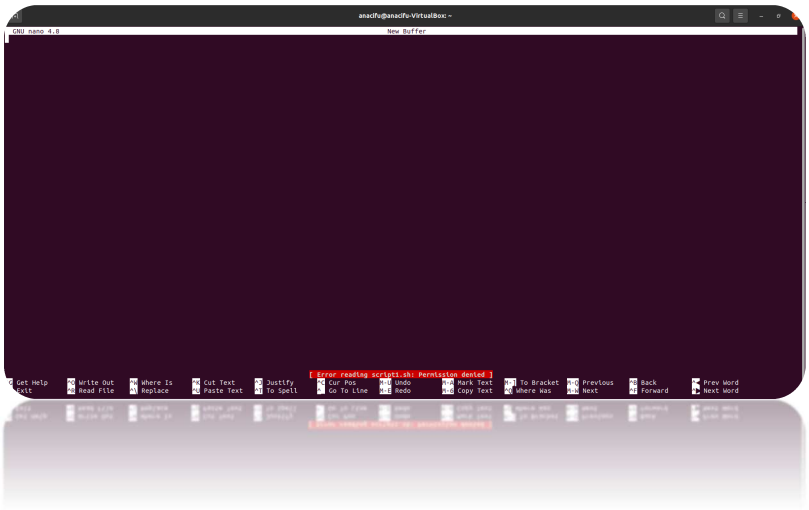


6. Remove the write permission from the owner on the file script1.sh. Add the line below. Is it possible? Why?
new line

$ chmod u-w script1.sh

It is not possible to add anything in this file because you do not even have the possibility to read the text, the file is not accessible.

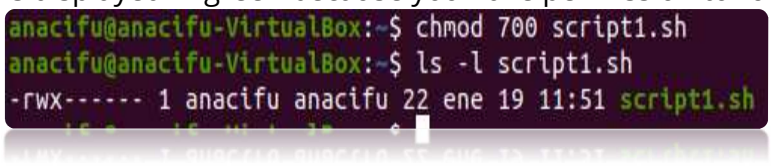




7. Change the permissions on the file script1.sh so that the owner can read, write and execute, but you deny all the permissions from the group and others.

$ chmod 700 script1.sh

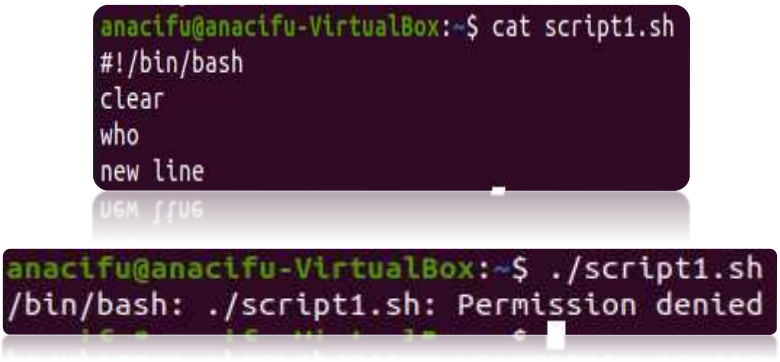
The file color is displayed in green because you have permission to run it.



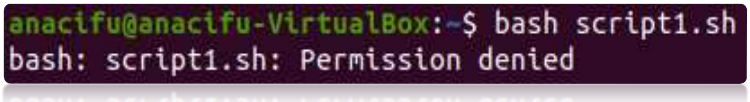
8. Add the line indicated in exercise 6, in case it was not possible. Try to run the file like a command.

$ nano script1.sh

$ ./script1.sh -> This is one of the ways to run a file like a command from the current directory. In this case it is not possible.

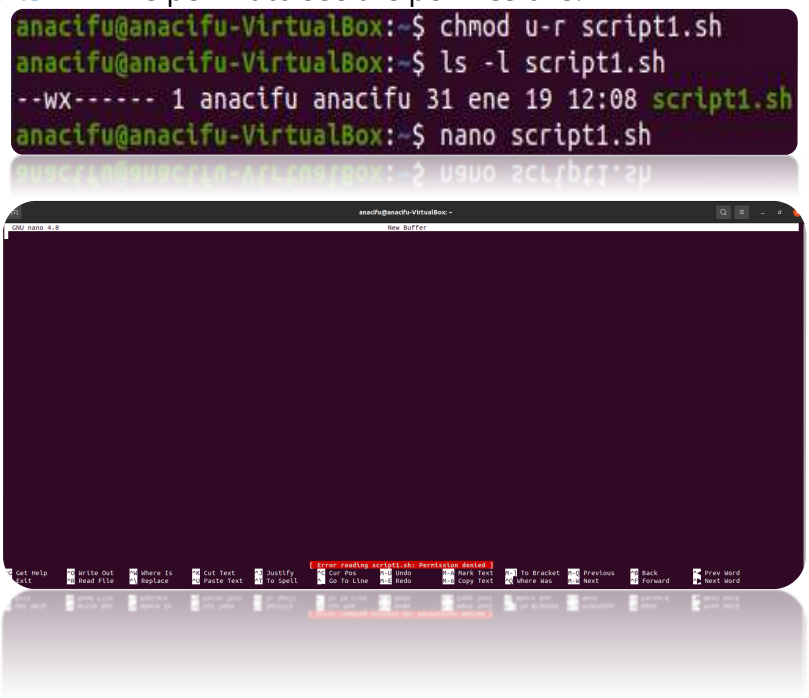


$ bash script1.sh -> This is another option to run the file. In this case it is not possible.



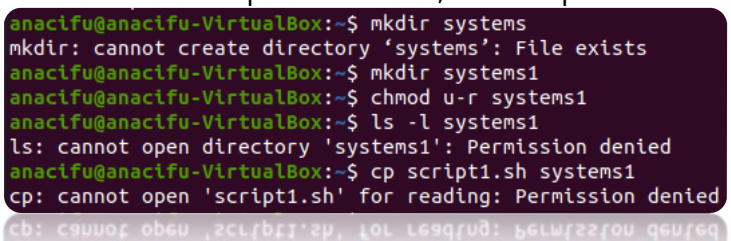
9. Remove the read permission from the owner on the file script1.sh. Try to run the file. Is it possible?

$ chmod u-r script1.sh -> This is one way to deny read permission in one file.
$ ls -l script1.sh -> This permit to see the permissions.

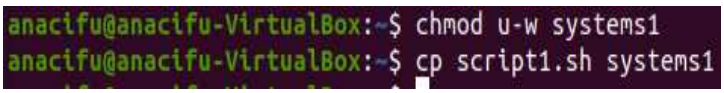


10. Create a directory called “systems”. Remove the write permission from it and try to copy script1.sh inside.

$ mkdir systems1 -> The mkdir command is used to create a directory.
$ chmod u-w systems1 -> This is used to remove the user’s write permission
$ cp script1.sh systems1 -> The **cp** command is used to copy a file or directory.
In this case we do not have read permission so, it is not possible to copy.



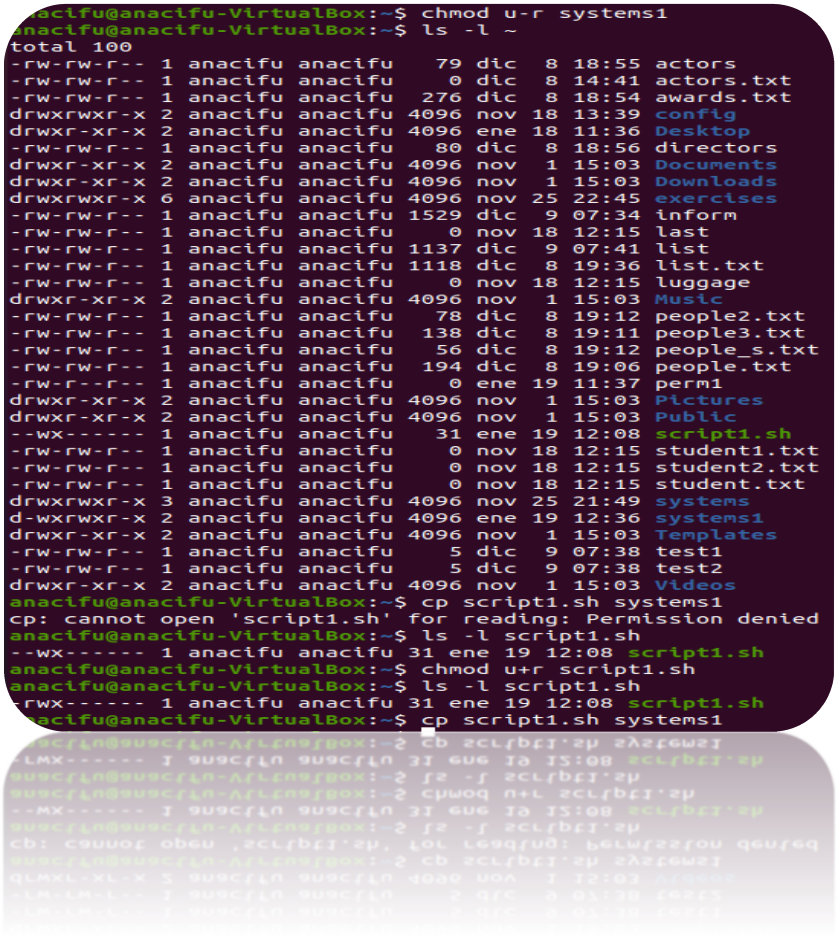
I made a mistake when I wrote the command so I correct it.



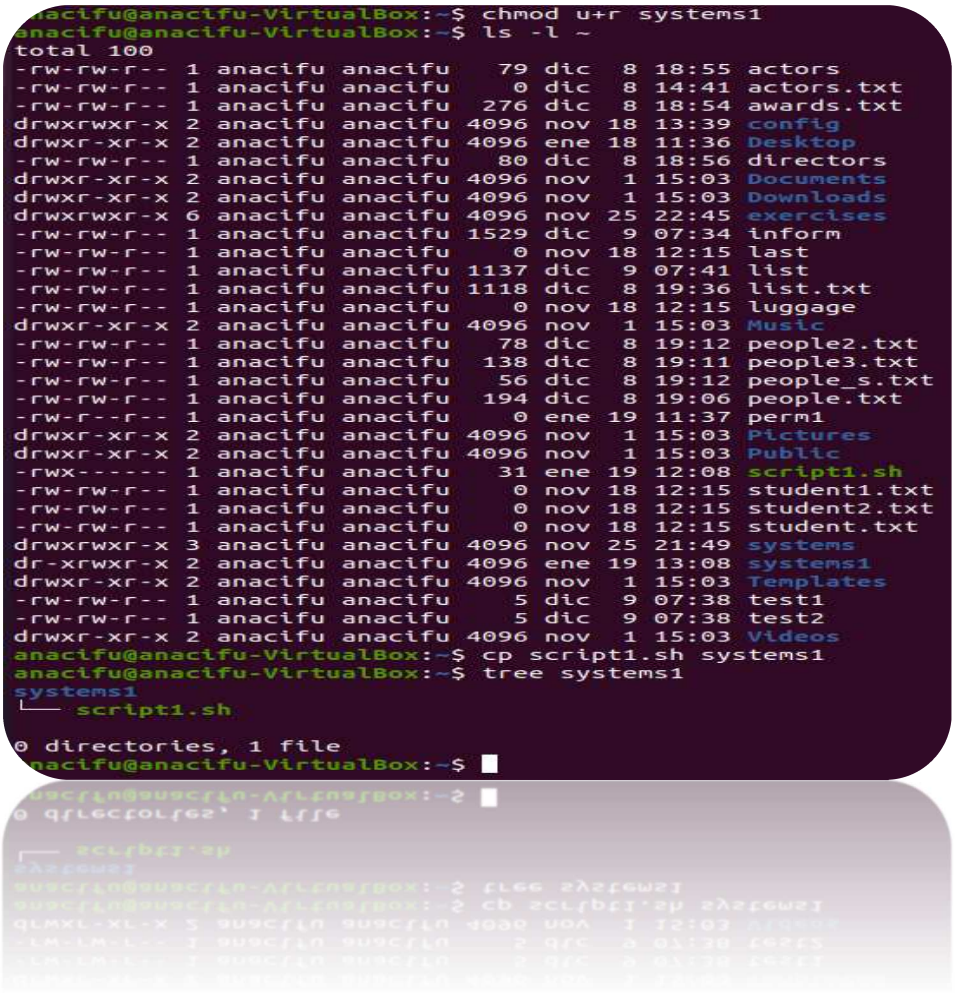
11. If you were not able to copy the file, add the write permission again and copy the file inside.

$ chmod u-w systems1 -> This is used to deny write permission in a file or directory.

$ cp script1.sh systems1 -> The **cp** command is used to copy a file or directory.
I am not able to copy the file because I made a mistake when I wrote the command and now it is fixed.



This is the result after correction:

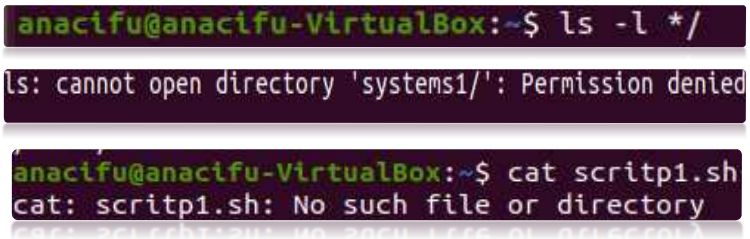


12. Remove the read permission from the user on the directory “systems” and try to list its contents.

$ chmod u-r systems1

$ cat systems1 -> The **cat** command is commonly used to view the contents of a file, to redirect, create and concatenate files. The access in this case is denied.

$ ls -l */ -> This is a command to list all the directories. The access in this case is denied.



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

$ chmod 744 systems1

$ ls -l */ -> This is a command to list all the directories. The access is now granted.

```
anacifu@anacifu-VirtualBox:~$ chmod 744 systems1
anacifu@anacifu-VirtualBox:~$ ls -l */

systems1/:
total 4
-rwx------ 1 anacifu anacifu 31 ene 19 13:27 script1.sh
```

14. Remove the execute permission from "systems". Can you execute systems/script1.sh? Is it possible to access the directory to execute the file?

$ chmod u-x systems1
$ systems1/script1.sh
It is not possible to execute the file

```
anacifu@anacifu-VirtualBox:~$ systems1/script1.sh
bash: systems1/script1.sh: Permission denied
```

15. Assign the execute permission to the directory again

$ chmod u+x systems1

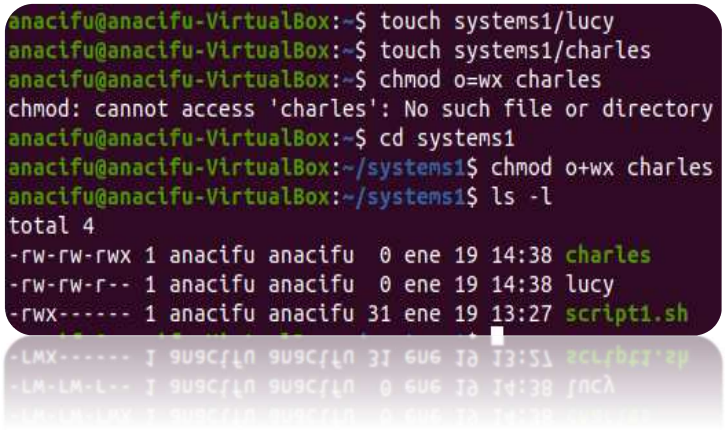
```
anacifu@anacifu-VirtualBox:~$ ls -l
total 100
-rw-rw-r-- 1 anacifu anacifu    79 dic  8 18:55 actors
-rw-rw-r-- 1 anacifu anacifu     0 dic  8 14:41 actors.txt
-rw-rw-r-- 1 anacifu anacifu   276 dic  8 18:54 awards.txt
drwxrwxr-x 2 anacifu anacifu  4096 nov 18 13:39 config
drwxr-xr-x 2 anacifu anacifu  4096 ene 18 11:36 Desktop
-rw-rw-r-- 1 anacifu anacifu    80 dic  8 18:56 directors
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Documents
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Downloads
drwxrwxr-x 6 anacifu anacifu  4096 nov 25 22:45 exercises
-rw-rw-r-- 1 anacifu anacifu  1529 dic  9 07:34 inform
-rw-rw-r-- 1 anacifu anacifu     0 nov 18 12:15 last
-rw-rw-r-- 1 anacifu anacifu  1802 ene 19 13:45 list
-rw-rw-r-- 1 anacifu anacifu  1118 dic  8 19:36 list.txt
-rw-rw-r-- 1 anacifu anacifu     0 nov 18 12:15 luggage
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Music
-rw-rw-r-- 1 anacifu anacifu    78 dic  8 19:12 people2.txt
-rw-rw-r-- 1 anacifu anacifu   138 dic  8 19:11 people3.txt
-rw-rw-r-- 1 anacifu anacifu    56 dic  8 19:12 people_s.txt
-rw-rw-r-- 1 anacifu anacifu   194 dic  8 19:06 people.txt
-rw-r--r-- 1 anacifu anacifu     0 ene 19 11:37 perm1
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Pictures
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Public
-rwx------ 1 anacifu anacifu    31 ene 19 12:08 script1.sh
-rw-rw-r-- 1 anacifu anacifu     0 nov 18 12:15 student1.txt
-rw-rw-r-- 1 anacifu anacifu     0 nov 18 12:15 student2.txt
-rw-rw-r-- 1 anacifu anacifu     0 nov 18 12:15 student.txt
drwxr--r-- 2 anacifu anacifu  4096 ene 19 13:08 systems1
-rw-rw-r-- 1 anacifu anacifu     5 dic  9 07:38 test1
-rw-rw-r-- 1 anacifu anacifu     5 dic  9 07:38 test2
drwxr-xr-x 2 anacifu anacifu  4096 nov  1 15:03 Videos
anacifu@anacifu-VirtualBox:~$
```

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

$ touch systems1/lucy
$ touch systems1/Charles
$ cd systems1

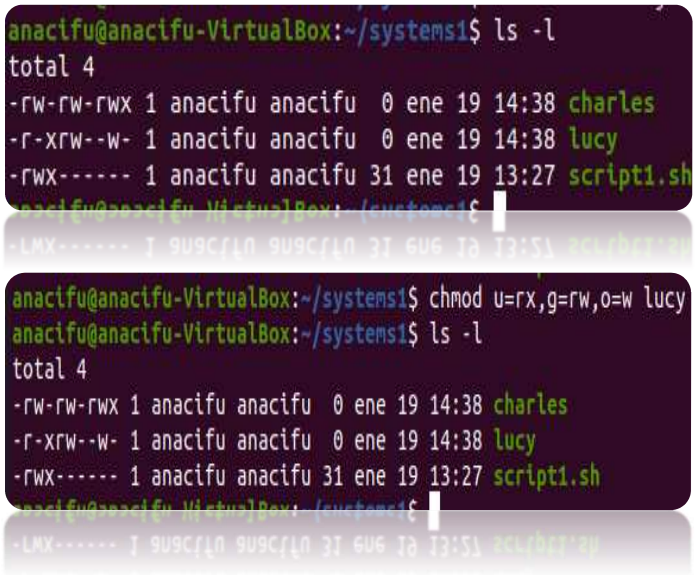
$ chmod o+wx charles

We use the **touch** command to create empty files inside systems1. Then, you must access inside systems1 directory **(cd systems1)** in order to change the permissions of Charles file.



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 u+rw,g+rw,o+w lucy
$chmod 562 lucy



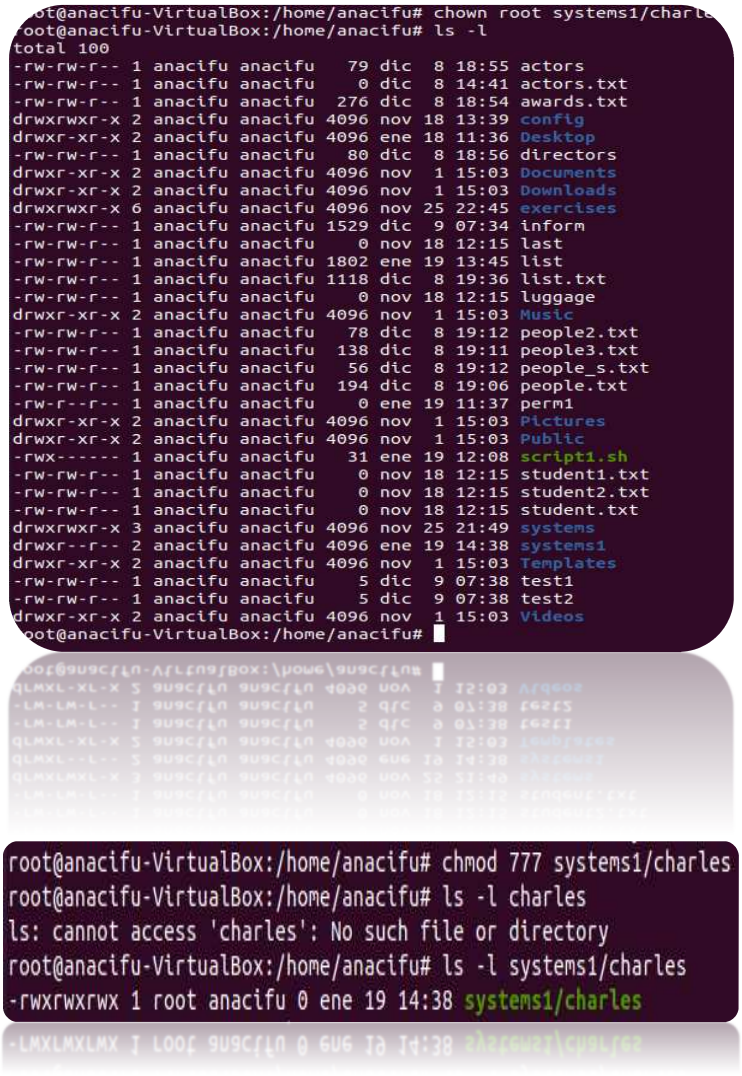
Linux Management Permissions 2

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?

$ sudo su
 # chown root charles

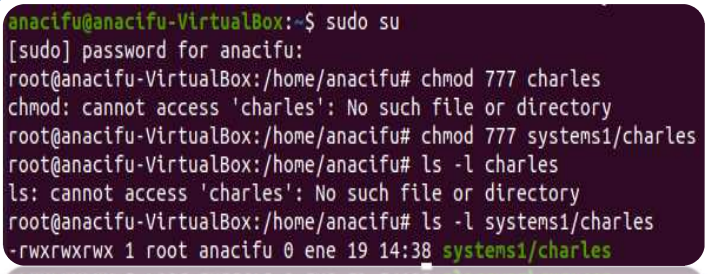
The **chown** command is used to change the file Owner or group. The sintaxis is as follows: first the command, second owner_name and finally file_name. In this case it is not permitted to change the owner because the owner is root.

 # chown root systems1/charles-> it is possible to change the owner of the charles file to root.



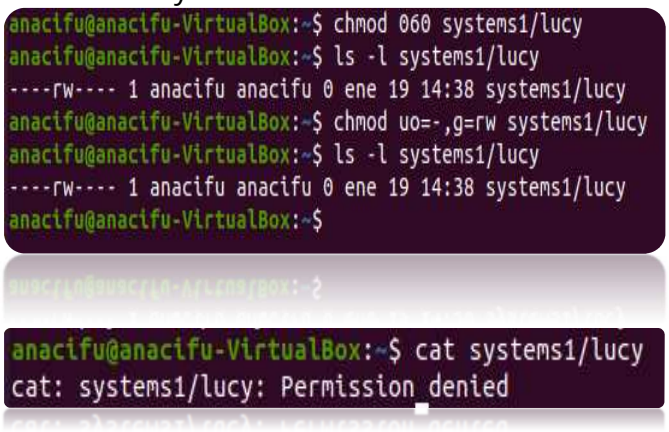
19. Change the permissions of “charles” so that everybody can do everything

 # chmod 777 systems1/charles



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 uo=-,g=rw systems1/lucy-> This is one way to change permissions.
$ chmod 060 systems1/lucy-> This is the other way to do the same.
$ cat systems1/lucy-> It is not possible to open the file because the owner has no permission to read the file lucy.



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

$ sudo su
 # groupadd newgroup-> This is the command to create a group.
 # chown root lucy; chgrp newgroup lucy
The **chgrp** command in Linux is used to change the group ownership of a file or directory. All files in Linux belong to an owner and a group. You can set the owner by using **“chown”** command, and the group by the **“chgrp”** command.

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

 # usermod -a -G newgroup anacifu-> The **usermod** command is used to modify users. The **-a (append):** Adds the user to the complementary groups. Use only the -G option. The **-G** (or also --groups) option allows us to modify all the additional groups to which the user belongs. If the user is a member of an additional group that is not in the list of new additional groups, the user will be removed from the group.

I am not the owner of the file but I belong to the group “newgroup” but since it has read and write permissions it can be opened.

```
root@anacifu-VirtualBox:/home/anacifu/systems1# usermod -a -G newgroup anacifu
root@anacifu-VirtualBox:/home/anacifu/systems1# ls -l
total 4
-rwxrwxrwx 1 anacifu anacifu   0 ene 19 14:38 charles
----rw---- 1 root    newgroup  0 ene 19 14:38 lucy
-rwx------ 1 anacifu anacifu  31 ene 19 13:27 script1.sh
```

```
root@anacifu-VirtualBox:/home/anacifu/systems1# cat lucy
root@anacifu-VirtualBox:/home/anacifu/systems1# cat>>lucy
Hello world
How is it going?^C
root@anacifu-VirtualBox:/home/anacifu/systems1# cat lucy
Hello world
How is it going?root@anacifu-VirtualBox:/home/anacifu/systems1# cat>>lucy

^C
root@anacifu-VirtualBox:/home/anacifu/systems1# cat lucy
Hello world
How is it going?
```

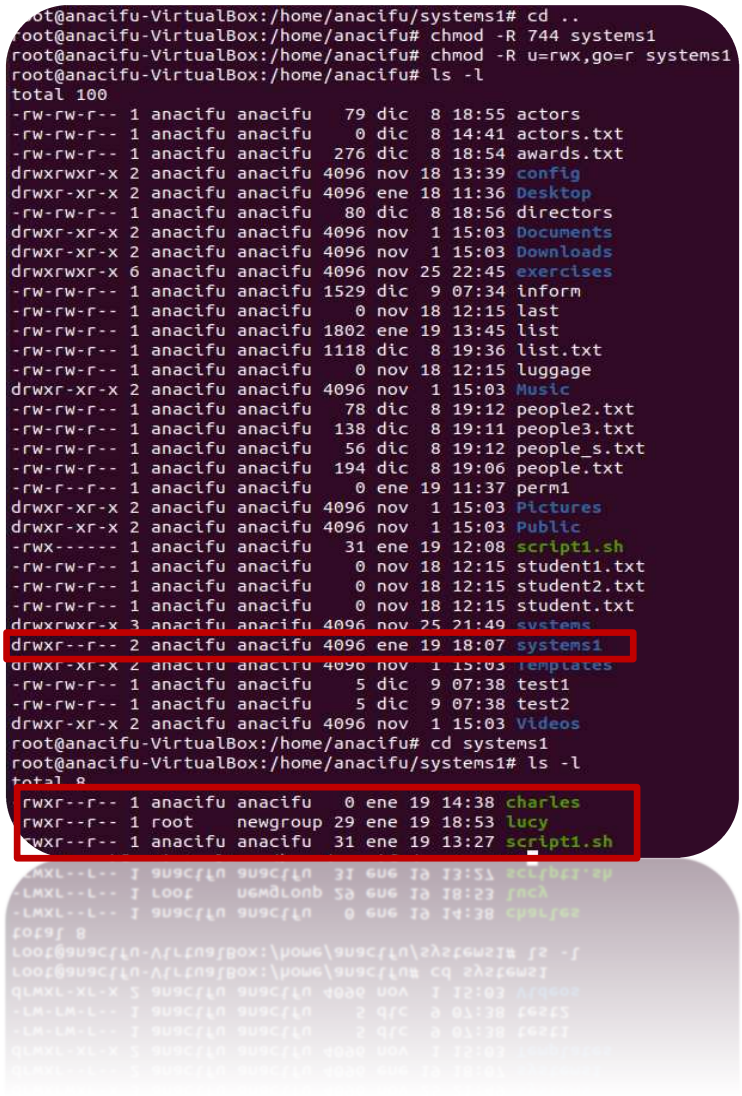
23. Change permissions of “lucy” so that everybody can read.

 # chmod a=r lucy

```
root@anacifu-VirtualBox:/home/anacifu/systems1# chmod a=r lucy
root@anacifu-VirtualBox:/home/anacifu/systems1# ls -l
total 8
-rwxrwxrwx 1 anacifu anacifu   0 ene 19 14:38 charles
-r--r--r-- 1 root    newgroup 29 ene 19 18:53 lucy
-rwx------ 1 anacifu anacifu  31 ene 19 13:27 script1.sh
```

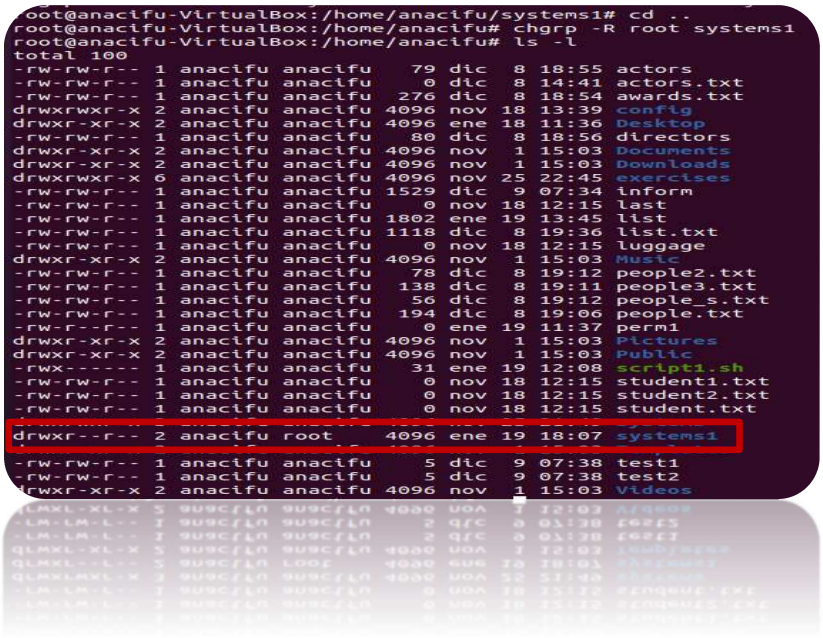
24. Do exercise 13 again, but this time granting permissions to the folder “systems” including files and subfolders.

 # chmod -R 744 systems1 -> **-R** (recursive): change files and directories recursively.
 # chmod -R u=rwx,go=r systems1
The **-R** tells the file system to recursively download the file/directory tree and copy any and all content that may be a "child" from that file to a new location. This is because a directory is just a file containing a list of connected files.



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

 # chgrp -R root systems1-> The **chgrp** command in Linux is used to change the group ownership of a file or directory. All files in Linux belong to an owner and a group


root@anacifu-VirtualBox:/home/anacifu/systems1# cd ..
root@anacifu-VirtualBox:/home/anacifu# chgrp -R root systems1
root@anacifu-VirtualBox:/home/anacifu# ls -l
total 100
-rw-rw-r-- 1 anacifu anacifu 79 dic 8 18:55 actors
-rw-rw-r-- 1 anacifu anacifu 0 dic 8 14:41 actors.txt
-rw-rw-r-- 1 anacifu anacifu 276 dic 8 18:54 awards.txt
drwxrwxr-x 2 anacifu anacifu 4096 nov 18 13:39 config
drwxr-xr-x 2 anacifu anacifu 4096 ene 18 11:36 Desktop
-rw-rw-r-- 1 anacifu anacifu 80 dic 8 18:56 directors
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Documents
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Downloads
drwxrwxr-x 6 anacifu anacifu 4096 nov 25 22:45 exercises
-rw-rw-r-- 1 anacifu anacifu 1529 dic 9 07:34 inform
-rw-rw-r-- 1 anacifu anacifu 0 nov 18 12:15 last
-rw-rw-r-- 1 anacifu anacifu 1802 ene 19 13:45 list
-rw-rw-r-- 1 anacifu anacifu 1118 dic 8 19:36 list.txt
-rw-rw-r-- 1 anacifu anacifu 0 nov 18 12:15 luggage
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Music
-rw-rw-r-- 1 anacifu anacifu 78 dic 8 19:12 people2.txt
-rw-rw-r-- 1 anacifu anacifu 138 dic 8 19:11 people3.txt
-rw-rw-r-- 1 anacifu anacifu 56 dic 8 19:12 people_s.txt
-rw-rw-r-- 1 anacifu anacifu 194 dic 8 19:06 people.txt
-rw-r--r-- 1 anacifu anacifu 0 ene 19 11:37 perm1
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Pictures
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Public
-rwx------ 1 anacifu anacifu 31 ene 19 12:08 script1.sh
-rw-rw-r-- 1 anacifu anacifu 0 nov 18 12:15 student1.txt
-rw-rw-r-- 1 anacifu anacifu 0 nov 18 12:15 student2.txt
-rw-rw-r-- 1 anacifu anacifu 0 nov 18 12:15 student.txt
drwxr--r-- 2 anacifu root 4096 ene 19 18:07 systems1
-rw-rw-r-- 1 anacifu anacifu 5 dic 9 07:38 test1
-rw-rw-r-- 1 anacifu anacifu 5 dic 9 07:38 test2
drwxr-xr-x 2 anacifu anacifu 4096 nov 1 15:03 Videos