File permissions in Linux

Project description

This project is to display the functions that we can use in Linux's command line console; Bash to check, and manipulate file and directory permissions.

Check file and directory details

```
researcher2@cfafc39a9b43:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 20:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 21:20 ..
-rw--w---- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 23 20:27 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 23 20:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

Here I use the ls -la command to display all the files and directories with their permissions including hidden files in the project directory. The ls command is to list all the files and directories in the project directory, hyphen(-) is used to define options for the ls command, l is to display the permissions setting for each file and directories, and a is to display all the hidden files in that directory.

Describe the permissions string

```
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

This is an example of a permissions string that is displayed at the console. Here we can see that the permissions string is "drwxr-xr-x". There are 10 characters in total. The first character tells you what the type of file is, if it's a directory then it will be "d" if it's a normal file it will be "-". The next 3 characters tell us about the permissions for the user, in this case "r" for read and "w" for write. The next three which are the 5th, 6th, and 7th characters tell you what permissions have been given to the group type. Here it is read and write, they don't have execute access as shown by the hyphen(-). And the last three characters, the 8th, 9th, and 10th are for the other type of users. Hre they only have read access.

Change file permissions

Here is one example of a file that needs their file permissions to be change because the other user have the write access

```
-rw-rw-rw- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
```

And here is the linux commands that I used to modified it

```
researcher2@cfafc39a9b43:~/projects$ chmod o-w project_k.txt
researcher2@cfafc39a9b43:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 20:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 21:20 ..
-rw--w---- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 23 20:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 23 20:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

I use chmod as the command to change the permissions, the arguments that it accepts are o-w which means “o” for “Other” user type, “-” to remove a permissions, and “w” for “write” permission, and the last argument is the target file which is project_k.txt

Change file permissions on a hidden file

```
-rw--w---- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
```

Here, .project_x.txt is a hidden file. We can tell from the “.” in the beginning of the file name. We can also tell that for both the User and Group type of user they still have the write access. But all three of the user types should still be able to read the file.
So what we need to do is to remove the write access for User and Group like this

```
researcher2@cfafc39a9b43:~/projects$ chmod u-w,g-w .project_x.txt
```

Here I removed the write access for User and Group

```
researcher2@cfafc39a9b43:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 20:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 21:20 ..
-r-------- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 23 20:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 23 20:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

And the next step is to add the read access to Group and Other like this

```
researcher2@cfafc39a9b43:~/projects$ chmod g+r,o+r .project_x.txt
```

```
researcher2@cfafc39a9b43:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 20:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 21:20 ..
-r--r--r-- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jun 23 20:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 23 20:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

Change directory permissions

And the last part is we need to change the directory permissions for the drafts directories. Here we can see that the research_team which is the Group type still has access to execute access so we need to remove it like this

```
researcher2@cfafc39a9b43:~/projects$ chmod g-x drafts/
researcher2@cfafc39a9b43:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 20:27 .
drwxr-xr-x 3 researcher2 research_team 4096 Jun 23 21:20 ..
-r--r--r-- 1 researcher2 research_team   46 Jun 23 20:27 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Jun 23 20:27 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jun 23 20:27 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jun 23 20:27 project_t.txt
```

Summary

In conclusion this project showcases the definition of a permissions string, it shows how to change the permissions for normal file, hidden files, as well as directories. Screenshots and detailed explanation has been include in this project to describe the steps required to complete these tasks as well as the results to confirm that the tasks has been completed