File permissions in Linux

Project description

In this scenario, the research team tasked me to modify the permissions for files and directories within the `project` directory. The operating system is Linux, indicating that the tasks require a command-line interface (Linux Bash shell) approach via Linux Terminal.

Check file and directory details

To begin with, I wrote the command `ls` to display what directories are available. As the result goes, the `project` is the only directory listed. Then, the command `ls` with the `-la` displays file contents as well as the hidden files within the directory of the `project`. The result shows there is one hidden file within the `project` directory. The hidden file naming conventions start with a period (.), followed by its name. In this case, "`.project_x.txt`" is the hidden file. Other findings include four project files (ends with .txt) and one `drafts` directory.

```
researcher2@bd0202b25423:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 04:49 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 05:29 ..
-rw--w---- 1 researcher2 research_team   46 Dec 19 04:49 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec 19 04:49 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec 19 04:49 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec 19 04:49 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:49 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:49 project_t.txt
researcher2@bd0202b25423:~/projects$
```

Describe the permissions string

The 10-character string determines the authorization of accessing the file and their specific permissions. The characters and what they represent are as follows:
We'll take the first row from the picture above:

drwxr-xr-x

- **1st character**: This character is either a `d` or hyphen (`-`) and indicates the file type. Character `d` shows that it is a directory and `drafts` is the example. A hyphen (`-`) shows that it is a regular file.

- **2nd-4th characters**: These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for the **user**. When one of these characters is a hyphen (`-`) instead, it indicates that this permission is not granted to the **user**.
- **5th-7th characters:** These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for the **group**. When one of these characters is a hyphen (`-`) instead, it indicates that this permission is not granted for the **group**.
- **8th-10th characters:** These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for **others**. It includes all other users on the system that are not **users** and the **group**. When one of these characters is a hyphen (`-`) instead, that indicates that this permission is not granted for **others**.

Change file permissions

The command `chmod` allows us to change the file permissions. To do this, there are some important notes:

1. The command `chmod u+(r/w/x) project file name` allows us to add the file permissions for the **users**.
2. The command `chmod u-(r/w/x) project file name` allows us to remove the file permissions for the **users**.
3. The command `chmod g+(r/w/x) project file name` allows us to add the file permissions for the **groups**.
4. The command `chmod g-(r/w/x) project file name` allows us to remove the file permissions for the **group**.
5. The command `chmod o+(r/w/x) project file name` allows us to add the file permissions for **others**.
6. The command `chmod o-(r/w/x) project file name` allows us to remove the file permissions for **others**.

Changes that I made:

1. I wrote the command `chmod o-w project_k.txt` to remove write permissions from the file.
2. I wrote the command `chmod g-r project_m.txt` to remove read permissions from the file.

```
researcher2@bd0202b25423:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 04:49 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 05:29 ..
-rw--w---- 1 researcher2 research_team   46 Dec 19 04:49 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec 19 04:49 drafts
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:49 project_k.txt
-rw------- 1 researcher2 research_team   46 Dec 19 04:49 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:49 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:49 project_t.txt
researcher2@bd0202b25423:~/projects$
```

Change file permissions on a hidden file

The command `chmod` also allows us to change the file permissions for the hidden files. As for `".project_x.txt"`, I would like to remove the write permissions for the users and the group while maintaining read permissions for the group. The following code is able to make it happen in a single line of code:

`Chmod u-w,g-w,g+r .project_x.txt`

```
researcher2@93ec1502273e:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@93ec1502273e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 04:11 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 06:32 ..
-r--r----- 1 researcher2 research_team   46 Dec 19 04:11 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Dec 19 04:11 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec 19 04:11 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec 19 04:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:11 project_t.txt
researcher2@93ec1502273e:~/projects$
```

Change directory permissions

The command `chmod g-x drafts` will authorize only researcher2 to gain access to `drafts` directory.

```
researcher2@93ec1502273e:~/projects$ chmod g-x drafts
researcher2@93ec1502273e:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 04:11 .
drwxr-xr-x 3 researcher2 research_team 4096 Dec 19 06:32 ..
-r--r----- 1 researcher2 research_team   46 Dec 19 04:11 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Dec 19 04:11 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Dec 19 04:11 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Dec 19 04:11 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:11 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Dec 19 04:11 project_t.txt
researcher2@93ec1502273e:~/projects$
```

Summary

This scenario demonstrates my capability to match the level of authorization my organization set for files and directories in the `project` directory. The command `ls -la` displays all the files in the directory while `chmod` allows you to change permissions and directories.