File permissions in Linux

Project description

As an analyst we need to update the file permissions for files and directories within the `projects` director. Checking and updating these permissions will help keep their system secure.

Check file and directory details

```
researcher2@812dadada795:~$ cd projects
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
researcher2@812dadada795:~/projects$ []
```

`ls` command with the `-la` option to display a detailed listing of the file contents that also returned hidden files there is one directory named `drafts`, one hidden file named `.project_x.txt`, and five other project files. The 10-character string in the first column represents the permissions set on each file or directory.

Describe the permissions string

The 10-character string can be deconstructed to determine who is authorized to access the file and their specific permissions. The characters and what they represent are as follows:
- **1st character**: This character is either a `d` or hyphen (–) and indicates the file type. If it's a `d`, it's a directory. If it's a hyphen (–), it's a regular file.
- **2nd-4th characters**: These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for the user. Following + or - indicates adding or removing permission
- **5th-7th characters:** These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for the group. Following + or - indicates adding or removing permission

- **8th-10th characters:** These characters indicate the read (`r`), write (`w`), and execute (`x`) permissions for other. Following + or - indicates adding or removing permission

Change file permissions

```
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
researcher2@812dadada795:~/projects$ chmod g-x drafts
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
```

I have removed the 'execute' permission from the group owner for drafts project. Chmod used to change the permission of file / directory

Change file permissions on a hidden file

```
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
researcher2@812dadada795:~/projects$ chmod u-r .project_x.txt
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
--w--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
```

ls -la displays the permission of the file / directory including Hidden files. Here .project_x.txt is a hidden file(starts with ' . '). I have removed the read access from the user on the hidden file .project_x.txt.

Change directory permissions

The researcher2 user should be allowed to access the drafts directory and its contents.

```
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
researcher2@812dadada795:~/projects$ chmod g-x drafts
researcher2@812dadada795:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:39 .
drwxr-xr-x 3 researcher2 research_team 4096 Aug  9 22:57 ..
-rw--w---- 1 researcher2 research_team   46 Aug  9 22:39 .project_x.txt
drwx------ 2 researcher2 research_team 4096 Aug  9 22:39 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Aug  9 22:39 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Aug  9 22:39 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Aug  9 22:39 project_t.txt
```

Summary

`ls -la` to check the permissions for the directory. This informed my decisions in the following steps. I then used the `chmod` command multiple times to change the permissions on files and directories.