# File permissions in Linux

## Project description

Linux commands allow users to control the system from the command line interface instead of using a users mouse or trackpad. The commands are text instructions entered into the terminal to tell the system exactly what to do. Therefore the project will demonstrate how to manage file permissions and directory structures in a linux environment to maintain system security and organize files effectively,
Fundamental Linux commands to manipulate files, adjust permissions, and structure directories in a way that supports collaboration and secure access control.

## Check file and directory details

1. Navigate to the `projects` directory.
2. List the contents and permissions of the `projects` directory.
3. Check whether any hidden files exist in the `projects` directory. { .project_x.txt }

What is the name of the group that owns the files in the projects directory?

research_team

```
researcher2@f378f508d334:~$ pwd
/home/researcher2
researcher2@f378f508d334:~$ cd projects
researcher2@f378f508d334:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov 29 05:34 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 29 05:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 29 05:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 project_t.txt
researcher2@f378f508d334:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 29 05:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 29 05:55 ..
-rw--w---- 1 researcher2 research_team   46 Nov 29 05:34 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 29 05:34 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 29 05:34 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 29 05:34 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 project_t.txt
researcher2@f378f508d334:~/projects$
```

The command used to check permissions in the check file and directory details section of the file permissions in Linux is { ls -l } which displays permissions. { ls -la } displays permissions to files and directories + hidden files

In the `/home/researcher2/projects` directory, there are five files with the following names and permissions:

- `project_k.txt`
  - User = read, write,
  - Group = read, write
  - Other = read, write
- `project_m.txt`
  - User = read, write
  - Group = read
  - Other = none
- `project_r.txt`
  - User= read, write
  - Group = read, write
  - Other = read
- `project_t.txt`
  - User = read, write
  - Group = read, write
  - Other = read
- `.project_x.txt`
  - User = read, write
  - Group = write
  - Other = none

There is also one subdirectory inside the `projects` directory named `drafts`. The permissions on `drafts` are:

- User = read, write, execute
- Group = execute
- Other = none

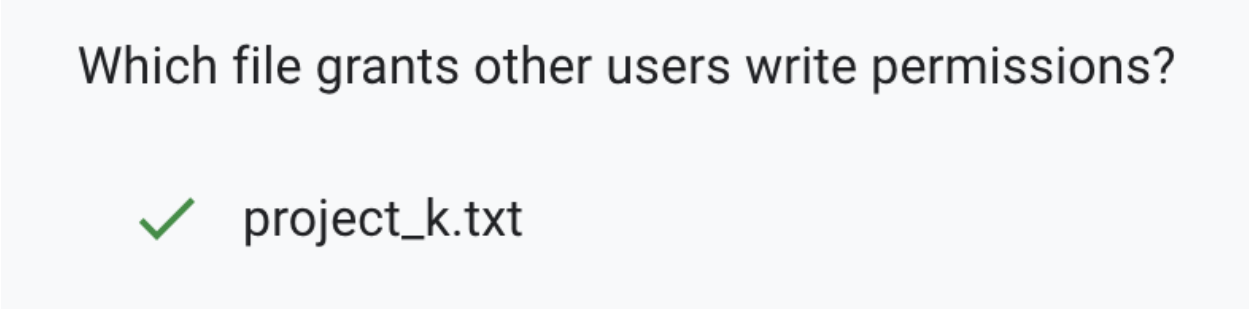
## Describe the permissions string

```
-rw-rw-rw- 1 researcher2 research_team   46 Nov 29 05:34 projec
t k.txt
```

There are 10 characters. The first character or - in this case is the directory, followed by the first 3 letters are dedicated to the user, followed by the next 3 for the group of users, and the last set of 3 to other, R-read, W-write, and X-execute. If there is nothing there - is used as a replacement. For example, in this situation the first set is users/groups/others all get to read and write.

Change file permissions- *None of the files should allow the other users to write to files.*

```
researcher2@f378f508d334:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Nov 29 05:34 .
drwxr-xr-x 3 researcher2 research_team 4096 Nov 29 05:55 ..
-rw--w---- 1 researcher2 research_team   46 Nov 29 05:34 .proje
ct_x.txt
drwx--x--- 2 researcher2 research_team 4096 Nov 29 05:34 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_t.txt
researcher2@f378f508d334:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Nov 29 05:34 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_k.txt
-rw-r----- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_t.txt
```



2. Change the permissions of the file identified in the previous step so that the owner type of other doesn't have write permissions.

```
chmod o-w project_k.txt
```

Used chmod to change the permission and then o stands for others - (removing) write-permissions from others.

```
-rw-r----- 1 researcher2 research_team   46 Nov 29 05:34 projec
t_m.txt
```

## Change file permissions on a hidden file

Command needed= ls -la

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

These permissions on the hidden file will allow both the user and group to read but not write to the file.
User -remove write
Group -remove write/ add read

## Change directory permissions

The files and directories in the projects directory belong to the researcher2 user. Only researcher2 should be allowed to access the drafts directory and its contents. Use a Linux command to modify the permissions accordingly. Describe the command you used and its output in the Change directory permissions section of the File permissions in Linux template. In the Manage authorization lab, take a screenshot of the Linux command you used. Or, type this command directly into the template

First, you want to check the permissions so we use the command ls -l. Here we see that the group also has execute permissions and therefore we remove them by using the following command line.

```
chmod g-x drafts
```

## Summary

I engaged with various directories, moved files, created new files, removed files, and managed permissions while using and engaging with Linux commands. This real-life cyber security task ensured secure access and proper organization within the system. Very similar to system administration work and demonstrates the ability to secure and manage file systems effectively in a professional environment.