# File permissions of /researcher2/projects in Linux

```
researcher2@3cd684ede00b:~$ pwd
/home/researcher2
researcher2@3cd684ede00b:~$ ls
projects
researcher2@3cd684ede00b:~$ cd projects
researcher2@3cd684ede00b:~/projects$ ls -l
total 20
drwx--x--- 2 researcher2 research_team 4096 Jul  1 19:42 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul  1 19:42 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul  1 19:42 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  1 19:42 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  1 19:42 project_t.txt
researcher2@3cd684ede00b:~/projects$ ls -la
total 32
drwxr-xr-x 3 researcher2 research_team 4096 Jul  1 19:42 .
drwxr-xr-x 3 researcher2 research_team 4096 Jul  1 21:12 ..
-rw--w---- 1 researcher2 research_team   46 Jul  1 19:42 .project_x.txt
drwx--x--- 2 researcher2 research_team 4096 Jul  1 19:42 drafts
-rw-rw-rw- 1 researcher2 research_team   46 Jul  1 19:42 project_k.txt
-rw-r----- 1 researcher2 research_team   46 Jul  1 19:42 project_m.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  1 19:42 project_r.txt
-rw-rw-r-- 1 researcher2 research_team   46 Jul  1 19:42 project_t.txt
researcher2@3cd684ede00b:~/projects$ chmod o-w project_k.txt
researcher2@3cd684ede00b:~/projects$ chmod g-r project_m.txt
researcher2@3cd684ede00b:~/projects$ chmod u-w,g-w,g+r .projects_x.txt
chmod: cannot access '.projects_x.txt': No such file or directory
researcher2@3cd684ede00b:~/projects$ chmod u-w,g-w,g+r .project_x.txt
researcher2@3cd684ede00b:~/projects$ chmod g-x drafts
researcher2@3cd684ede00b:~/projects$ []
```

## Project description

Through the option modified `ls` command, I determined directory and file permissions within the `/projects` directory. Adjusting so that the least amount of permissions necessary for each access level of files and/or directories are enabled.

## Check file and directory details

Initially, I used the `pwd` command (line 1) to orient myself of where I was within the directory. Afterwich, I used the `ls` command (line 3) to see the contents of the `/researcher2` directory I was within. Using the `cd projects` command (line 5) I navigated to the `/projects` directory and utilized the `ls -la` command (line 13) to see all files/directories, hidden files/directories, and permissions for each,

## Describe the permissions string

The permission string is broken down into the format of `drwxrwxrwx`. D represents this being either a directory (d) or file (-). The first instance of `rwx` is privileges of the User (aka File/Directory Owner) to read, write, and execute this specific file/directory. In this example the owner has Administrative privileges, being able to do all. If the User **didn't** have the permissions, it would appear as `d---`. The second and third instances of `rwx` are the permissions of the Group and Other access levels respectively.

## Change file permissions

`project_k.txt` posed a security threat as a globally writable file. Using the `chmod o-w project_k.txt` (line 23) the Other Group access level lost the ability to write the `project_k.txt file`. On the other hand, `project_m.txt` was a file dictated that only the Owner should be able to read or write. Using the `chmod g-r project_m.txt` I removed the read permission of the Group Access level.

## Change file permissions on a hidden file

Since I utilized the `ls -la` command (line 13) earlier, all hidden files and directories were already listed. The only hidden file shown was `.project_x.txt` (line 17), which was an archived project. The permissions for such a file should be the User and Group access levels having reading permissions only. This was not the case, so to remedy it I utilized the `chmod u-w,g-w,g+r .project_x.txt` command (line 27). To remove writing permissions from the User, to remove writing permissions from the Group, and to bestow reading permissions to the Group. Resulting in a permission line of `-r--r-----`.

## Change directory permissions

The `drafts` directory is intended for only the User to have privileges to. The Group access level however, had execution privileges. To rectify this, I utilized the `chmod g-x drafts` command (line 28) to remove execution privileges from that access level.

## Summary

Successfully adjusted permissions of files and directories within the `/researcher2`; reducing time to adjust manually through a GUI by 50% minimum.