# 16. Permissions Basics

## 01. What actually matters in this section?

- `important`: reading permission attributes, understanding read, write and execute permissions, file owners & file group owners

## 02. Multi-User Systems & Permissions Intro

- Unix and Unix like systems can run multiple users at the same time. Due to this reason, it is important to know about permissions
- files and folders of one user don't have the same permission to all by default.

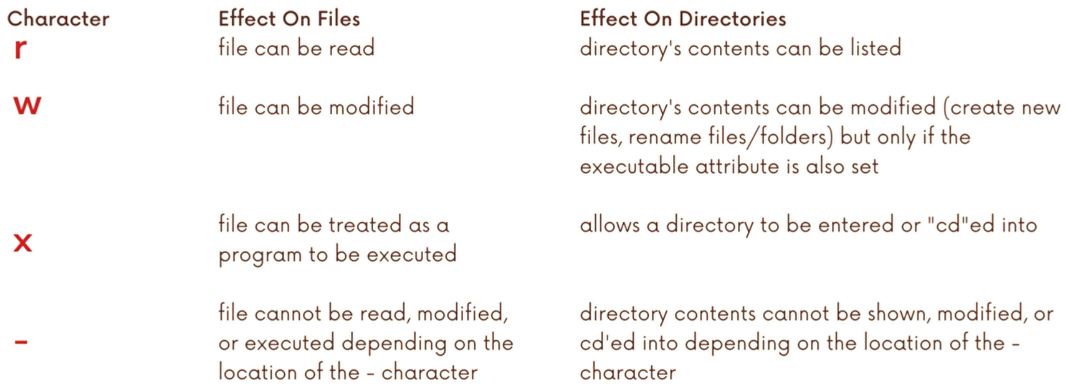
  For example you can read a file inside the directory of another user but can't make changes to it

## 03. File owners & group owners

- A single user may be the owner of files and directories, meaning that they have control over their access. Additionally, users can belong to groups that are given access to particular files and folders by their owners

- Let’s start by talking about the ownership of Linux files.

1. `User` : the owner of the file (person who created the file).
2. `Group` : the group can contain multiple users. Therefore, all users in that group will have the same permissions. It makes things easier than assigning permission for every user you want.
3. `Other` : any person has access to that file, that person has neither created the file nor are they in any group which has access to that file.



| Character | Effect On Files | Effect On Directories |
|---|---|---|
| r | file can be read | directory's contents can be listed |
| w | file can be modified | directory's contents can be modified (create new files, rename files/folders) but only if the executable attribute is also set |
| x | file can be treated as a program to be executed | allows a directory to be entered or "cd"ed into |
| - | file cannot be read, modified, or executed depending on the location of the - character | directory contents cannot be shown, modified, or cd'ed into depending on the location of the - character |

## 04. The File type Attribution

- when we do `ls -l` , Then we will see the file’s permissions, like the following:

```
drwxr-xr-x  3 pank pank 4096 Jan 16 09:10 Desktop
```

let’s break down this,

1. `drwxr-xr-x` is exactly 10 characters in size.
    - `1st char` : gives information regarding the type of listed item.  There are more as well like symlinks

    - `2nd - 4th char`: shows information regarding user permissions for the listed item
    - `5th - 7th char`: shows information regarding group permissions for the listed item
    - `8th - 10th char`: shows information regarding others permissions for the listed item
2. `pank` shown first is the name of the owner of the file
3. `pank` shown the second time is the name of the group owner

## 05. Understanding Permissions

- the permissions are mainly of 3 types. Often shown as `rwx` or simply `-` if not given respective permission. They stand for read, write, and execute permission.
- each file permission is divided into 3 types of accessing persons.
    1. owner of file or directory
    2. group of fie or directory
    3. others than the owner or group related to the file. or simply public

## 06. Read Permissions

- It is shown as `r` in the permission table.
- It represents permission to read the file/directory.
- If any file/directory is permitted to read then it shows `r` to the group and if not then it simply shows `-` instead.
- example: `-rwxr-x--x`: means that the file is readable for the owner, for the group but not for the outside world or any other users other

than that.

## 07. Write Permissions

- It is shown as `w` in the permission table
- It represents permission to write the file/directory
- If any file/directory is permitted to read then it shows `w` to the group and if not then it simply shows `-` instead.
- example: `-rwxrwx--x` means that the file is writable for the owner and group but not for the outside world or any other users other than that.

## 08. Execute Permissions

- It is shown as `x` in the permission table
- we can run the file as a script if execute permission is given
- It represents permission to execute the file/directory
- If any file/directory is permitted to read then it shows `x` to the group and if not then it simply shows `-` instead.
- example: `-rwxrwxr--` means that the file is executable for the owner and group but not for the outside world or any other users other than that.