

# 15 October, Wednesday

08:53 pm

Let's break down file permissions into simple, beginner-friendly notes.

## The Big Idea: What Are File Permissions?

Think of file permissions like a set of rules for a house:

- The File or Folder is the house.
- The Owner is the owner of the house.
- The Group is the owner's family who live there.
- Others is everyone else in the world.

Permissions are the rules that say who is allowed to do what inside that house.

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## The 3 Basic Actions (Permissions)

There are three main things you can be allowed to do to a file or folder:

1. Read (r)
  - For a File: You can look at the file's contents (e.g., open a text file to read it).
  - For a Folder: You can list the files inside it (e.g., use the ls command).
  - Symbol: The letter r
2. Write (w)
  - For a File: You can change or modify the file's contents (e.g., edit and save the file).
  - For a Folder: You can add or delete files inside that folder.
  - Symbol: The letter w
3. Execute (x)
  - For a File: You can run the file as a program (like an app or a script).
  - For a Folder: You can enter the folder (use the cd command to get into it).
  - Symbol: The letter x

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## The 3 Types of People (Who)

Permissions are given to three different groups of people:

1. Owner (u)
  - The user who created the file. Usually, you are the owner of your own files.
  - Symbol: u (for "user")
2. Group (g)
  - A collection of users. A file belongs to one group, and all members of that group get the same permissions.
  - Symbol: g
3. Others (o)
  - Literally every other user on the system who is not the owner and not in the group.
  - Symbol: o

(There's also a for "all", which means owner, group, and others combined.)

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## Putting It All Together: Reading Permission Symbols

When you list files in a terminal with `ls -l`, you see a weird code like this:

```
-rwxr--r--
```

Let's break it down. The first character (-) tells you if it's a file (-) or a directory (d). The next nine characters are the permissions, in three groups of three.

```
- r w x | r - - | r - - [ Owner ] [Group] [Others]
```

- Owner (rwx): The owner can Read, Write, and Execute this file.
- Group (r--): The group can only Read this file. They cannot write or execute it.
- Others (r--): Everyone else can only Read this file.

Another Example: A Folder `drwxr-x---`

- d : It's a directory (folder).
- rwx : The owner can enter, list, and add/delete files in it.
- r-x : The group can enter and list the files inside, but cannot add or delete files.
- --- : No one else is allowed to do anything with this folder.

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## The Simple Number System (Octal)

You might also see permissions as numbers, like 755 or 644. This is just a shortcut.

- Read (r) has a value of 4
- Write (w) has a value of 2
- Execute (x) has a value of 1

You add up the numbers for each group to get a single digit.

Example: `rwxr--r--`

1. Owner:  $rwx = 4+2+1 = 7$
2. Group:  $r-- = 4+0+0 = 4$
3. Others:  $r-- = 4+0+0 = 4$

So, `rwxr--r--` is the same as 744.

## Common Permission Numbers:

- 755: Common for programs and folders. `rwxr-xr-x` (Owner does everything, others can read/execute).
- 644: Common for regular files. `rw-r--r--` (Owner can read/write, everyone else can only read).
- 777: `rwxrwxrwx` (EVERYONE can do EVERYTHING). Use with caution! This is usually a bad idea for security.

## Summary

So think of permissions as:

Who can do what to this file or folder?

## Cheat Sheet

Table

Who?	Symbol	What can they do?	Symbol	Value
Owner	u	Read	r	4
Group	g	Write	w	2
Others	o	Execute	x	1