Linux permissions

- Permission groups
    - ♦ **super**u**ser** (su), sys admins
    - ♦ **owner**, the user who made the file/directory, ex. `someone`
    - ♦ **group**, a subset of users with a distinct name, ex. `student`
    - ♦ **others**, everyone else, public, guest, untrusted unsers
- Types of permissions
    - ♦ **w**: Write, can modify
    - ♦ **r**: Read, can read
    - ♦ **x**: eXecute, run a program, or list a directory
    - ♦ **-**: none

It is specified who can do what, ex:

- owner can write, read and execute
- its group can read and execute, but not modify
- others cannot do anything

The superusers (su) can do anything at any time, only a superuser can make an other user super.

These can be expressed with a set of three alpha-numeric charactes:

- **u**: user, owner
- **g**: group
- **o**: others
- **a**: all of the above
- read: **r** or **4**
- write: **w** or **2**
- execute: **x** or **1**
- none: **-** or **0**

The **a** is not the same as **o**, because it is possible that a group does not have a permission, but someone outside of the groups has.

The permissions can be represented with a 10 character string:

1	2	3	4	5	6	7	8	9	10
type									
read	write	execute	read	write	execute	read	write	execute	

```
$ ls -l ~
drwxr-xr-x 8 borbely student 4096 Aug 30 23:24 Desktop
drwxr-xr-x 2 borbely student 4096 Mar 27  2012 Downloads
drwxr-xr-x 2 borbely student 4096 Oct 20  2009 Drives
drwx------ 2 borbely student 4096 Apr 20 10:42 mail
drwxr-xr-x 7 borbely student 4096 Sep  6 13:01 public_html
$ _
```

The `public_html` folder is owned by `borbely`, its group is `student`, permissions: `drwxr-xr-x`

- type: it is a **d**irectory

- my permissions **rwx** means that owner can do anything
- other students' permissions: **r-x**, they can read but not write
- others: **r-x**, they can still read but not write

Numerically, you can encode this in 3 digits. The three numbers are (from left to right): owner, group and others. The munbers 4: read, 2: write, 1: execute. They can be added. Example: `/home/student/borbely/public_html` has permission: `755` meaning

- owner (`borbely`) `7`=4+2+1: read, write, execute
- group (`student`) `5`=4+1: read and execute
- other `5`=4+1: read and execute

chmod

You can change the permissions with `chmod` Examples:

- `chmod 700 ~/info_hazi`: nobody can see anything, except me (of course superusers still can see it).
- `chmod 750 ~/important_work`: In this folder one can share data with group members, but not others. Also group can only see it, not modify.
- `chmod 754 -R ~/public_html`: The **-R** applies the permissions recursively in the subfolders of the folder, and every file in it.

More info

- `man chmod`
- manual

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