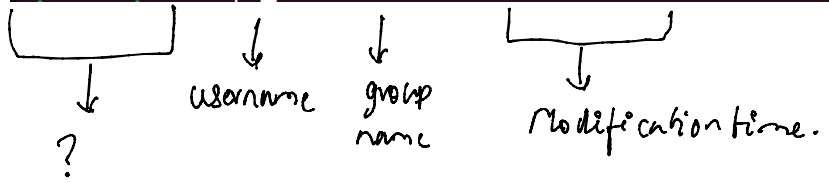
Permissions

19 June 2022 04:57 PM

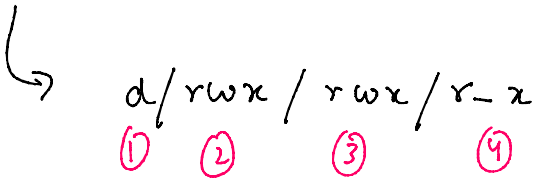
Permissions:

```
rizon@rizon:~$ ls -l
total 40
drwxrwxr-x 3 rizon rizon 4096 May 18 08:17 bootcamp
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Desktop
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Documents
drwxr-xr-x 3 rizon rizon 4096 May 17 08:25 Downloads
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Music
drwxr-xr-x 3 rizon rizon 4096 May 17 09:12 Pictures
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Public
drwx------ 7 rizon rizon 4096 May 17 08:28 snap
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Templates
drwxr-xr-x 2 rizon rizon 4096 May 16 23:44 Videos
```




```
drwxrwxr-x
```

* it generally has 10 bits, this are permission bits of that particular directory.
* Even the files have these permission bits.
* They have four parts



① → Type

↳ d → directory

– → files

l → Link

② → User permissions.

(2) → User permissions.

(3) → Group permission

(4) → Other permission

r → readable
w → writable
x → executable
_ → empty

→ Symbolic Representations.

For e.g. the file can only readable and writable NOT executable.

```
-rw-rw-r--
```

* Symbolic Representation of

User → u

Groups → g

Other → o

* Change / Modify Permission (chmod) :

```
rizon@rizon:~/Documents$ touch testing.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rw-rw-r-- 1 rizon rizon 0 Jun 19 17:11 testing.txt
rizon@rizon:~/Documents$
```

→ By default this file have permission for read and write.

To change it's permission we use chmod.

adding write permission

```
rizon@rizon:~/Documents$ chmod o+w testing.txt
rizon@rizon:~/Documents$ ls -l
```

+ → means add some

```
rizon@rizon:~/Documents$ chmod o+w testing.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rw-rw-rw- 1 rizon rizon 0 Jun 19 17:11 testing.txt
rizon@rizon:~/Documents$
```

+ → means add some permission

o → other

w → here giving write permission to other user.

Now it's -rw-rw-rw-1

before it was -rw-rw-r--

+ → Add permission

- → Remove permission

* Remove the permission:

```
rizon@rizon:~/Documents$ chmod o-w testing.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rw-rw-r-- 1 rizon rizon 0 Jun 19 17:11 testing.txt
```

* Multiple Permission for a file:

Removing all the permission here.

```
rizon@rizon:~/Documents$ chmod ugo-rwx testing.txt
rizon@rizon:~/Documents$ ls -l
total 0
---------- 1 rizon rizon 0 Jun 19 17:11 testing.txt
rizon@rizon:~/Documents$
```

Adding all the permission here.

```
rizon@rizon:~/Documents$ chmod ugo+rwx testing.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rwxrwxrwx 1 rizon rizon 0 Jun 19 17:11 testing.txt
rizon@rizon:~/Documents$
```

* Numerical Representation of Permission:

readable → r/4

writable ⟶ w / 2

Executable ⟶ x / 1

+ Grant all the permission

```
rizon@rizon:~/Documents$ touch texting.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rw-rw-r-- 1 rizon rizon 0 Jun 19 17:31 texting.txt
rizon@rizon:~/Documents$ chmod +777 texting.txt
rizon@rizon:~/Documents$ ls -l texting.txt
-rwxrwxrwx 1 rizon rizon 0 Jun 19 17:31 texting.txt
rizon@rizon:~/Documents$
```

chmod +777 file

↑ ↑ ↑

u g o

User ⟶ 7 (4 + 2 + 1) (4 → read, 2 → write, 1 → other)

group ⟶ 7 (+2+1)

other ⟶ 7 (4+2+1)

+ Remove all the permission

```
rizon@rizon:~/Documents$ chmod -777 texting.txt
rizon@rizon:~/Documents$ ls -l
total 0
---------- 1 rizon rizon 0 Jun 19 17:31 texting.txt
rizon@rizon:~/Documents$
```

chmod 755 (Calculating chmod value)

7 → (4+2+1) U

5 → (4+ 1) G

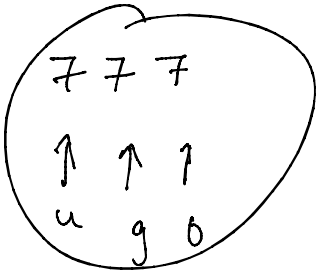
5 → (4+ 1) O

r w x r _ x r _ x

(the writing permission from group and other is removed)

```
rizon@rizon:~/Documents$ chmod 755 texting.txt
rizon@rizon:~/Documents$ ls -l
total 0
-rwxr-xr-x 1 rizon rizon 0 Jun 19 17:31 texting.txt
```

- 0 — No permission
- 1 — execute
- 2 — write
- 3 — write + execute
- 4 — read
- 5 — read + execute
- 6 — read + write
- 7 — read + write + execute




```
rizon@rizon:~/Documents$ ls -l /etc/shadow
-rw-r----- 1 root shadow 1429 May 16 23:29 /etc/shadow
```

↳ No permission

+ Here only root and group has the permission for read, I don't have the permission

```
rizon@rizon:~/Documents$ cat /etc/shadow
cat: /etc/shadow: Permission denied
```

+ Giving the read permission to the other.

sudo because it's belong to group.

```
rizon@rizon:~/Documents$ sudo chmod 644 /etc/shadow
[sudo] password for rizon:
rizon@rizon:~/Documents$ cat /etc/shadow
root:!:19128:0:99999:7:::
daemon:*:19101:0:99999:7:::
bin:*:19101:0:99999:7:::
```

going go back to normal permission.

```
rizon@rizon:~/Documents$ sudo chmod 640 /etc/shadow
rizon@rizon:~/Documents$ cat /etc/shadow
cat: /etc/shadow: Permission denied
rizon@rizon:~/Documents$ S
```

* Change Owner/Group (chown / chgrp):

```
rizon@rizon:~/Documents$ sudo chown user_name texting.txt
```

group

```
rizon@rizon:~/Documents$ sudo chown user_name:chgrp group_name texting.txt
```

* Default Permission (umask):

```
rizon@rizon:~/Documents$ touch testing.txt
rizon@rizon:~/Documents$ mkdir sample
rizon@rizon:~/Documents$ ls -l
total 4
drwxrwxr-x 2 rizon rizon 4096 Jun 19 19:22 sample
-rw-rw-r-- 1 rizon rizon    0 Jun 19 19:22 testing.txt
rizon@rizon:~/Documents$
```

Now if you want to change the default permission:

umask 022

the max permission any file / directory can have is 777

So the umask subtract

777

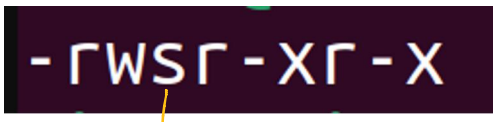
- 022

7 5 5 → default permission after running umask 022

* Set User ID (setuid):

You cannot always rely on system admin for the password always, So here we use setuid.

```
rizon@rizon:~/Documents$ ls -l /usr/bin/passwd
-rwsr-xr-x 1 root root 59976 Mar 14 14:29 /usr/bin/passwd
rizon@rizon:~/Documents$
```



↳ SUID, the s means that whoever is going to access this command is going to automatically have the permission of the owner and the execution permission.

Two's: s S

↳ owner permission.

↳ owner permission / execution

To add these permission:

sudo chmod u+s file

or

sudo chmod 4755 file

↳ SUID

```
rizon@rizon:~/Documents$ sudo chmod 4755 testing.txt
rizon@rizon:~/Documents$ ls -l
total 4
drwxrwxr-x 2 rizon rizon 4096 Jun 19 19:22 sample
-rwsr-xr-x 1 rizon rizon    0 Jun 19 19:22 testing.txt
rizon@rizon:~/Documents$
```

To remove these permission

sudo chmod u-s file

* Set Group ID Setgid :

* It's the same thing as UID, but it woork for group.

sudo chmod g+s file

or

sudo chmod 2755 file

```
rizon@rizon:~/Documents$ sudo chmod 2755 testing.txt
rizon@rizon:~/Documents$ ls -l
total 4
drwxrwxr-x 2 rizon rizon 4096 Jun 19 19:22 sample
-rwxr-sr-x 1 rizon rizon    0 Jun 19 19:22 testing.txt
```

* Sticky Bits : It will give all the permission (r/w/o), but only the owner can delete it.

```
rizon@rizon:~/Documents$ ls -l /tmp
total 60
```

```
rizon@rizon:~/Documents$ ls -ld /tmp
drwxrwxrwt 22 root root 4096 Jun 19 19:04 /tmp
rizon@rizon:~/Documents$
```

↳ t is the sticky bit

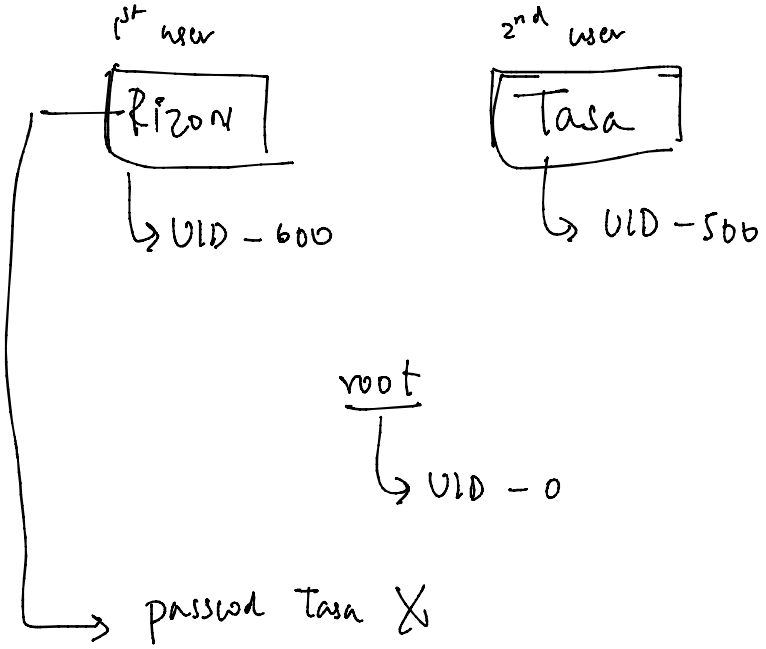
Sudo chmod +t directory

or

Sudo chmod 1755 file

↳ sticky bit permission.

Process Permissions:



// can you change the password of other user?

No, you can't change, the reason is whenever you try to execute any command it's a process and this process are associated with three User IDs.

Process

① Effective UID → 0 // root

② Real UID → 600 // Rizon

() Saved UID (Use switch b/w effective UID and real UID)