ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 4: LESSON 2

FILE PERMISSIONS

LESSON 2 TOPICS

File Permissions

- Purpose
- **Directory** vs. **Regular File** Permissions
- Changing File Permissions (**chmod**)
- Setting File Permissions for Newly Created Directories and Regular Files (**umask**)
- Demonstration

Perform Week 4 Tutorial

- Investigation 2
- Review Questions (Questions 6 – 12)

FILE PERMISSIONS

```
drwxr-xr-x 2 murray.saul users 6 Jan 19 14:06 mydir
-rw-r--r-- 1 murray.saul users 0 Jan 19 14:05 myregfile
```

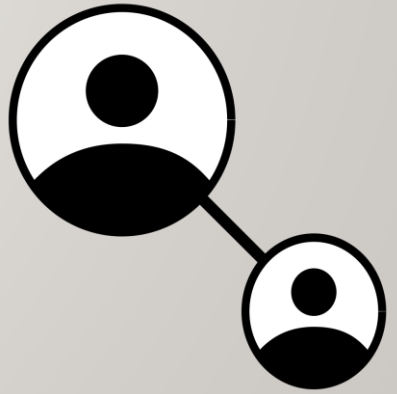
File Permissions

Since Unix / Linux operating systems allow for **multiple user accounts**, it is essential to have a system to **share** or **limit** access to directories and files contained in those file systems.

When **directories** and **regular files** are created, they are assigned to an **owner** (typically the username of the creator).

To *allow* or *limit* **access** to those files and directories, those files and directories are assigned to an initial **group** referred to as a "**primary group**".

Users that own those *directories* and *regular files* are referred to as **users**, users that belong within that **same primary group** are referred to as **same group members**, and those users are do NOT belong to a particular group are referred to as **other group members**.



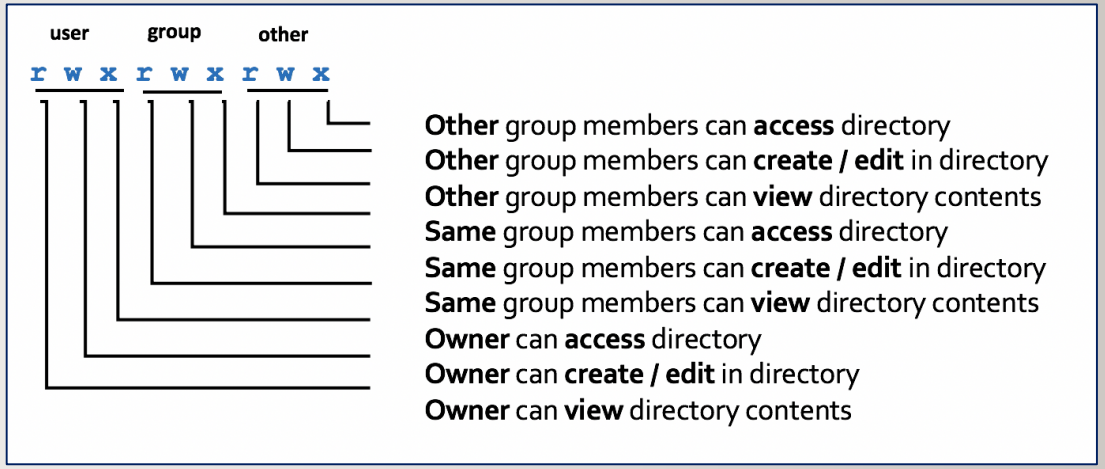
FILE PERMISSIONS

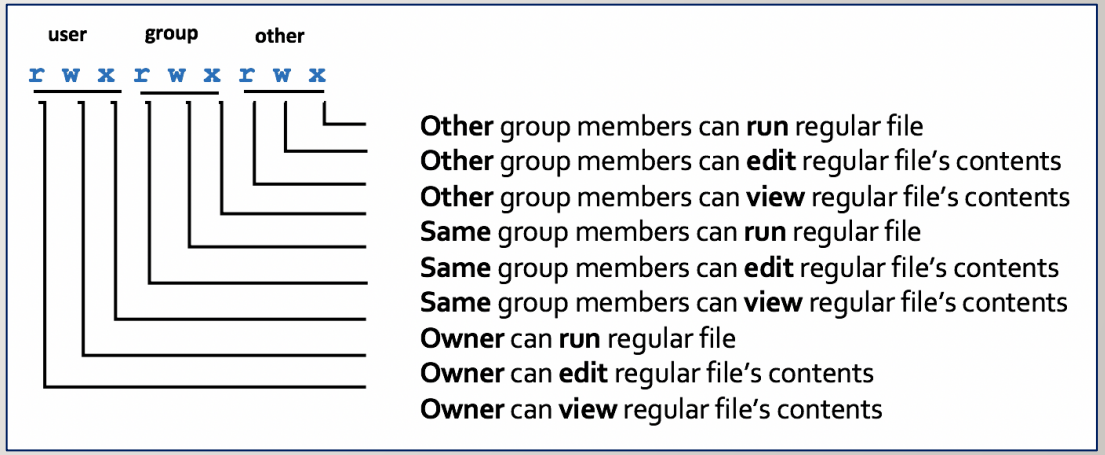
File permissions consist of **two-layers**:

- ***First***, the permissions relating to a **directory.**
- ***Second***, the permissions relating to the **regular files** contained within a directory.

NOTE: *Permissions for* ***directories*** *have a different meaning than permissions for* ***regular files****.*

NOTE: A symbol *dash* **"-"** indicates that the permission is **NOT** granted.





FILE PERMISSIONS

Changing File Permissions with `chmod` command - *Symbolic Method:*

The **chmod** command can use **symbols** to **add**, **remove**, and **set** **`rwx`** permissions for **user**, **same group members**, **other group members** or **ALL** categories:

NOTE: You can use the **-R** option to set permissions for directory, subdirectory and directory contents **recursively**.

Command	Description
`chmod ugo+x script.bash`	Add execute permissions to the file **script.bash** so it can be run.
`chmod u=rwx,go=x ~`	Set "**pass-thru**" permissions of your **home** directory for same group members and other group members to navigate to other subdirectories (that may have access / view permissions).
`chmod go-w ~/shared`	Remove write permissions for same group members and other group members for the directory **~/shared**
`chmod a=rx myfile.txt`	Set read and execute permissions for the directory **myfile.txt**

FILE PERMISSIONS

Instructor Demonstration

Your instructor will now demonstrate how to **add**, **remove** and **set** permissions with the **chmod** command the *Symbolic* method

FILE PERMISSIONS

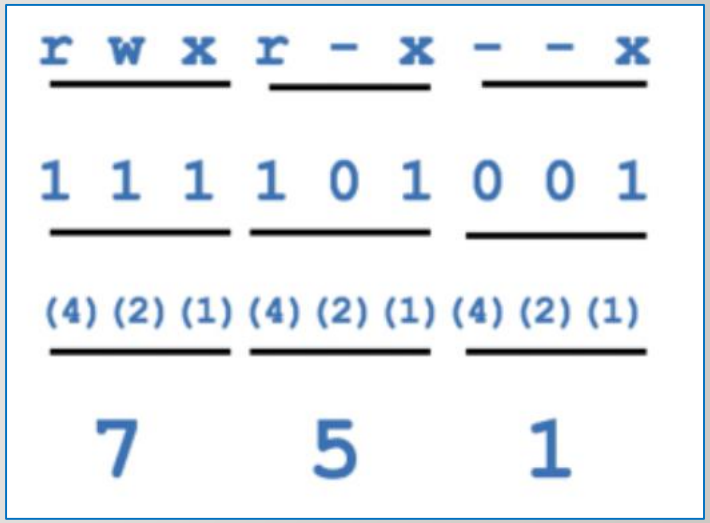
Changing File Permissions with `chmod` command -
Absolute (Octal) Method:

You can also use **octal numbers** to **set** permissions.

This method is a shortcut and may require less typing than using the *symbolic* method.

- **First**, write **permissions** for user, group and others that you want to set**. If permission is granted, write 1 and if not granted, write 0**.
- **Second**, perform a **binary to octal conversion**, for each group of three (user, group, other) and then issue the **chmod** command using the absolute (octal) method.

You can only use this method to **set** file permissions (as opposed to *adding* or *removing* permissions).



FILE PERMISSIONS

Changing File Permissions with `chmod` command: *Absolute (Octal) Method*

Below is a table that displays common **chmod** commands (using the Absolute / Octal method) for common purposes.

Command	Description
`chmod 500 script.bash`	Set read and execute permissions for only the **user** for the file **script.bash** so it can be run.
`chmod 711 ~`	Set "**pass-thru**" permissions of your **home** directory.
`chmod 750 ~/shared`	Set full permissions for user, read and access permissions for some group members and no permissions for other group members for the directory **~/shared**
`chmod 555 myfile.txt`	Set read and execute permissions for the directory **myfile.txt**

FILE PERMISSIONS

Instructor Demonstration

Your instructor will now demonstrate how to **set** permissions with the **chmod** command using the *Absolute / Octal* method.

FILE PERMISSIONS

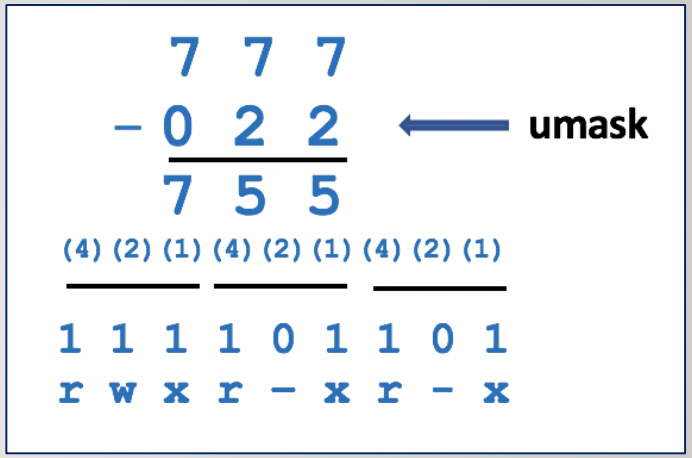
Setting Permissions for Newly-Created Directories and Regular Files (umask):

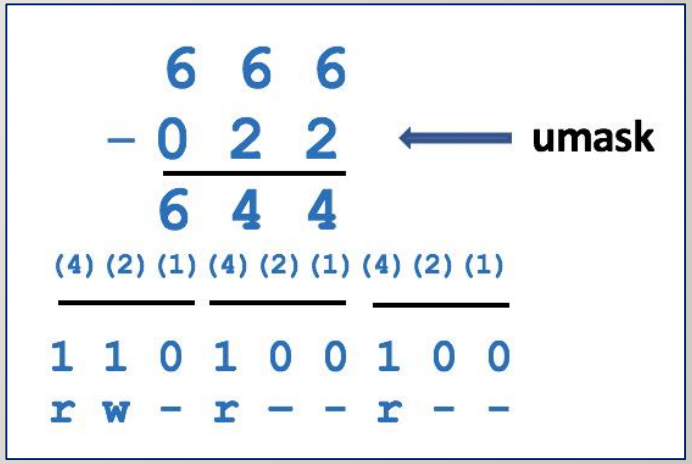
The `umask` command is used to set the permissions of **newly-created directories and regular files**. Issuing the `umask` command without arguments will display the current umask value.

The diagram on the above right shows how to calculate permissions for newly-created **directories** using the **umask** command.

The diagram on the below right shows how to calculate permissions for newly-created **regular files** using the **umask** command.

Setting the **umask** value works only in the current shell session unless the umask command is contained in a start-up file (e.g. **.profile**, **.bash_profile**, or **.bashrc**). Start-up files are discussed at the end of this course.





FILE PERMISSIONS

Instructor Demonstration

Your instructor will now demonstrate how to **set / confirm** permissions of newly-created directories and regular files using the **umask** command.

HOMEWORK

Getting Practice

Perform the online tutorial **Tutorial2: Unix / Linux File Management (Due: Friday Week 5 @ midnight for a 2% grade)**:

- INVESTIGATION 2: FILE PERMISSIONS
- LINUX PRACTICE QUESTIONS (Questions 6 – 12)