# Linux File Permissions

## Due date

End of Week 4 lab class (midnight)

## Evaluation

- 3% of final grade.

## Submission

Submit completed (and signed, either by hand or using an electronic code signature) lab into Bb before midnight on the night of your subsequent lab session (**pdf** or **word** .doc/.docx format only!). Make sure that your name and section number are visible on the last page.

## Materials

- Student laptop computer
- Ubuntu 14.04.3 installed in VMWare Workstation

## Procedure

***Exercise #1: Testing permissions***

While logged in as a regular user, use the following command to create a directory named **top** in user's home directory:

- **`mkdir -p /home/`*`user`*`/lab4/top`**

  Follow the instructions below to complete **Table #1**

a) Change the permission of the **`top`** directory using the **`chmod`** command. The exact command is given in the second column of the table.

b) Execute the commands listed in the first row (starting with the third column) for that permission level. For each command line document whether the command line executes successfully or not: Use **`PD`** for Permission Denied, **`OK`** for success, **`NF`** for "No such file or directory"

The commands are:

- `ls -l top`
- `mkdir top/sub`
- `rmdir top/sub`
- `cd top`
- `cd ..` **(execute this ONLY if your current directory is top!)**

c) Follow the above procedure for each row of the table (row 1 to 8).

**Note**: Before you run each **`chmod`** command in the table below, make sure your current directory is **~/lab4**.

```
LEGEND:     OK = success
            PD = permission denied
            NF = no such file r directory
```

**Table #1:** ***Testing directory permissions***

| Row # | Command line to modify permissions | `ls -l top` | `mkdir top/sub` | `rmdir top/sub` | `cd top` |
|---|---|---|---|---|---|
| **1** | `chmod u+r-w+x top` | OK | PD | NF | OK |
| **2** | `chmod u-r+wx top` | PD | OK | OK | OK |
| **3** | `chmod u+rw-x top` | OK | PD | PD | PD |
| **4** | `chmod u-rw+x top` | PD | PD | NF | OK |
| **5** | `chmod u-r+w-x top` | PD | PD | PD | PD |
| **6** | `chmod u+r-wx top` | OK | PD | PD | PD |
| **7** | `chmod u-rwx top` | PD | PD | PD | PD |
| **8** | `chmod u+rwx top` | OK | OK | OK | OK |

## Default permissions

***Exercise #2: Viewing a user's default permissions***

Login as a regular **user**.

1) Type **`umask`** and record the output of the command: `0002`

- Based on the **`umask`**, what are the default permissions for directories and files in octal mode, based on your **`umask`**:
  directory: `775` file: `664`

2) Verify it by creating a new file with the **`touch`** command.

   - Record the default permissions set on the file in symbolic mode:

     `-rw-rw-r--`

   - What is the default permissions set on the file in octal mode:

     `664`

3) Verify it by creating a new directory with the **`mkdir`** command.

   - Record the default permissions set on the directory in symbolic mode:

     `drwxrwxr-x`

   - What is the default permissions set on the directory in octal mode:

     `775`

***Exercise #3: Changing default permissions***

1) Set the `umask` to `044`, record the command you use umask 044

2) Type **`umask`** and record the output of the command: `0044`

   - Based on the umask, what are the default permissions for directories and files in octal mode, based on your `umask`:
     directory: `733` file: `622`

3) Verify it by creating a new file.

   - Record the default permissions set on the file in symbolic mode:

     `-rw--w--w-`

   - What is the default permissions set on the file in octal mode:

     `622`

4) Verify it by creating a new directory.

- Record the default permissions set on the directory in symbolic mode:

  drwx-wx-wx

- What is the default permissions set on the directory in octal mode:

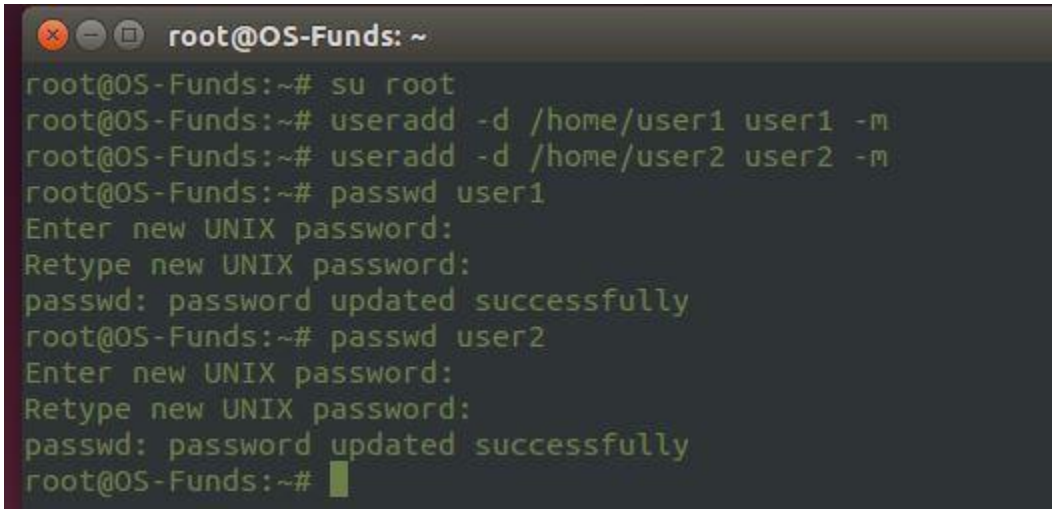
  733

## Ownership

***Exercise #4: Creating new users***

Create the two user accounts with the following commands:

1) **su – root**
2) **useradd -d /home/user1 user1 -m**
3) **useradd -d /home/user2 user2 -m**
4) **passwd user1**
   - type in a password when prompted. If you do not type the username after the passwd command, you are changing the root password!
5) **passwd user2**




***Exercise #5: Creating shared directory***

1) **mkdir /shared**

- Who is the owner of the **/shared** directory? _root_____

- What is the group name of the **/shared** directory? _root_____

2) Give full access permissions to **/shared** for everybody

- Record the command you use: chmod a+rwx shared

```
drwxr-xr-x  23 root root   780 Feb 17 15:30 run/
drwxr-xr-x   2 root root 12288 Jul 22  2015 sbin/
drwxrwxrwx   2 root root  4096 Feb 17 16:06 shared/
drwxr-xr-x   2 root root  4096 Dec 18  2014 srv/
dr-xr-xr-x  13 root root     0 Feb 17 15:24 sys/
drwxrwxrwt   4 root root  4096 Feb 17 16:09 tmp/
```

***Exercise #6: Making changes from user1***

1) **su – user1**

2) Has the prompt changed to *"$"*?___*yes*_____

3) **cd /shared**

4) **cat > plan**

*Hint: Input "this is a test" at the blinking cursor. Press* **ctrl+d** *when you are done.*

5) Who is the owner of that file? user1

6) What is the group name of that file? user1

7) **chmod o-rwx /shared/plan**

- Make sure that others have no access permissions. Verify with **ls -l** that you achieved the desired result.

```
drwxrwxrwx  2 root  root  4096 Feb 17 16:13 ./
drwxr-xr-x 24 root  root  4096 Feb 17 16:06 ../
-rw-rw----  1 user1 user1   14 Feb 17 16:13 plan
```

***Exercise #7: Making changes from user2***

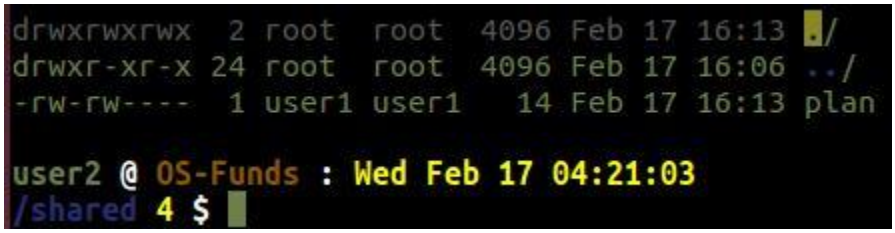
1) Login as **user2** and try to modify the file using the following commands:

```
su – user2

cat >> /shared/plan
```

2) Record the message: bash: /shared/plan: Permission denied

Why? Because even though we have changed to user2, the permissions set on 'plan' are still in effect by user1, who also is the owner.



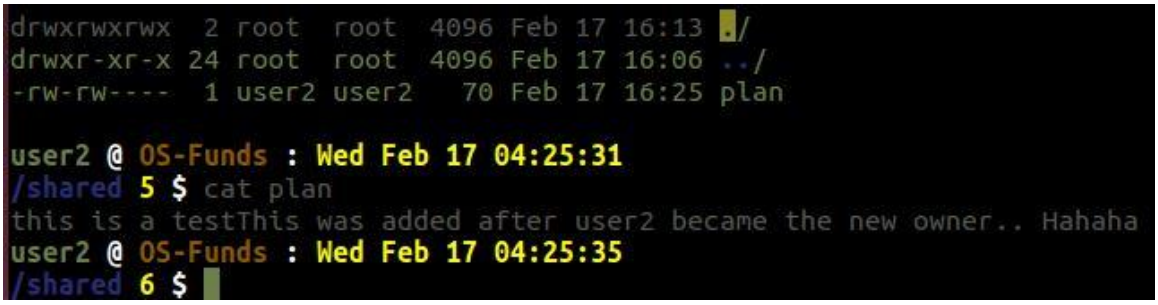

***Exercise #8: Changing file ownership***

1) Login as root and change the ownership of **plan** to **user2** using the following commands:

   **su - root**

   **chown user2.user2 /shared/plan**

2) Verify that **user2** is the owner of plan with command: ls -al
3) Login as **user2** and try to modify the **/shared/plan**. Can you do it? yes




4) Login as **user1** and try to modify the **/shared/plan**. Can you do it? no
5) While you are logged in as **user2,** try to delete the file. Can you do it (eventually)?

   yes!

   Command used: rm plan

***Exercise #9: Minimum Permissions***

Circle the minimum permissions required to successfully complete the actions listed below. (*hint: use lecture note #3 as reference*)

To copy a file the user requires:

- for the source directory: R W X
- for the target directory: R W X
- for the file: R W X

- To move a file the user requires
  - for the source directory: R W X
  - for the target directory: R W X
  - for the file: R W X

- To delete a file the user requires
  - for the directory: R W X
  - for the file: R W X

***You are now ready to have your work checked by the professor.***

**Instructor Initials (or signature code, obtained *during* the lab):_____**