Linux Basics - Permissions
Exercise

October 1, 2017

1 Introduction

Discuss and answer the following questions:

(a) How can you show the permissions of a file? Use the command on your home directory or any other directory of your choice.

(b) Who can change the permissions of a file/directory?

2 Changing permissions

2.1 Symbolic mode

Discuss and answer the following questions:

(a) Which command can you use to change permission of files?

(b) An easy way to remember how to use the *chmod* command is asking yourself ...

- for whom you want to change the permission?
  - u - user
  - g - group
  - o - other
  - a - all (*default*)
- are you granting or revoking the permission?
  - "+" - granting
  - "-" - revoking
  - "=" - equal to the following
- which permission you want to change?

- r - read
- w - write
- x - execute

Explain the following commands in a few words.

```
chmod u+r secret.txt
chmod og-rw dummy
chmod =x snake
chmod a+wx rw
```

(c) Download the file *testShellSkript.sh* which will print "I LOVE ASPH!" on your console. Afterwards try to execute it.

2.2 Octal mode

```
0    0    0    0
|    |    |    |
|    |    |    ------ r(4), w(2), x(1) for others (o)
|    |    ---------- r(4), w(2), x(1) for groups (g)
|    --------------- r(4), w(2), x(1) for a user (u)
-------------------- suid(4), sgid(2), sticky(1)
```

Discuss and answer the following questions:

(a) Given the octal number 605 as a *chmod* parameter. Who will gain which permission?

(b) Apply the permission of the last questions to the previous downloaded *testShellSkript.sh*.
Try to execute the file and explain what happens.

3 Changing permission of multiple files

3.1 chmod -R

(a) What does a execution permission for a directory mean?
What is the difference between the read and execution permission for them?

(b) Look at the man page of *chmod* and search for a option for *chmod* which recursivly applies *chmod*.

(c) Create a directory named “ownSecret”, change into that directory and create two files - one called “dummy” and the other one “dummy2”.
Aftwerwards change back to the parent directory. Now use the *chmod -R* command

to change the permissions to **700** of the directory and everything inside.
Use *ls* to check if everything has been applied in the right way.

(d) Now apply **400** in the same way. Try to explain what happens.

3.2 umask

(a) The default permissions for directories (depending on the distro) is **777** and for files **666**.
What do they mean?

(b) Use the man page to find out how to print the current *umask* in a symbolic form. Try to explain the ouput.

4 SETUID, SETGID, and Sticky Bit

4.1 SETUID & SETGID

(a) What is the SETUID/SETGID bit, what does it do in the context of files and how can you recognize it? Look together at the **/bin/passwd** file.

(b) One can set the SETUID/SETGID bit in symbolic mode by using *s* for a user/group when setting permissions with *chmod*.
Create a file, apply the permissions **400** to it and afterwards set the SETUID bit. Look at the result and try to identify the SETUID bit.
Now do the same again but this time apply **500**. What is the differenc?

4.2 Sticky Bit

(a) What is the Sticky Bit, what does it do in the context of directories and how can you regonize it? Look together at the **/tmp/** directory.

5 Independent Exercise

(a) Take the file structure from the last exercise (figure 1) and apply the permissions from figure 2 to them.

(b) Try to *cat grades.txt* as your standard user. Understand the error.

(c) Translate the symbolic notation into the octal notation.
You don't have to use 4 digits if you don't need the 4th one.

symbolic notation	octal notation
`rwxrwx--x`	
`--x-w-r-x`	
`---rwxrwx`	
`rwxrw--w-`	
`r-x-w-rw-`	
`-wx-wsrw-`	
`-w-r-xrwT`	
`-w-r-xrwx`	
`rwSr-srwx`	
`rwSr--rwt`	

(d) Translate the following octal numbers into the symbolic form:

octal notation	symbolic notation
026	
310	
614	
321	
502	
105	
647	
026	
1726	
4567	
7510	

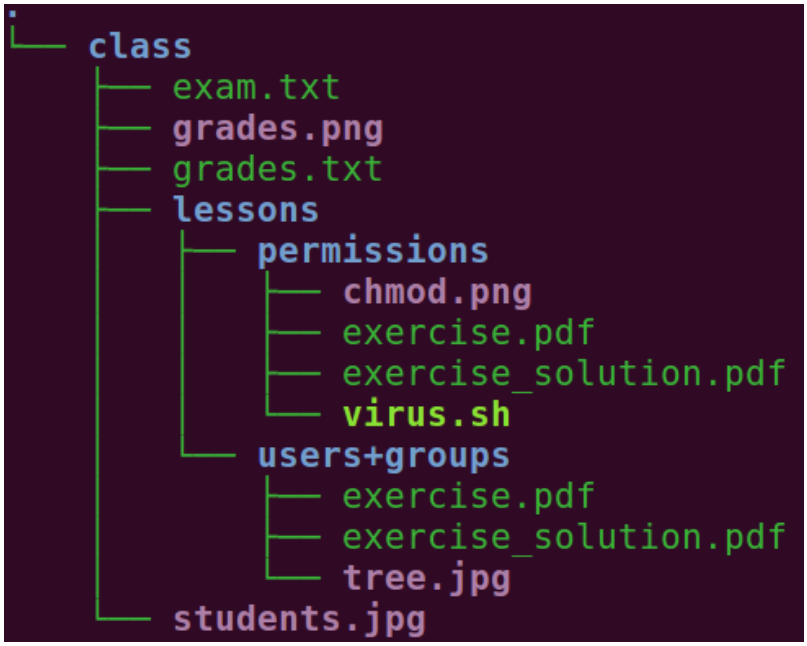

Figure 1: File tree

```
./class:
total 4
-rw-r----- 1 asph teachers    0 Aug 21 14:07 exam.txt
-r--r--r-- 1 asph teachers    0 Aug 21 14:08 grades.png
-r--r----- 1 asph teachers    0 Aug 21 14:07 grades.txt
drwxrwxr-x 4 asph teachers 4096 Aug 21 14:09 lessons
-rw-rw-r-- 1 asph teachers    0 Aug 21 14:08 students.jpg

./class/lessons:
total 8
drwxrwxr-x 2 asph teachers 4096 Aug 21 16:15 permissions
drwxrwxr-x 2 asph teachers 4096 Aug 21 14:10 users+groups

./class/lessons/permissions:
total 0
-rw-r--r-- 1 asph teachers 0 Aug 21 14:11 chmod.png
-rw-rw-r-- 1 asph teachers 0 Aug 21 14:07 exercise.pdf
-rw-r----- 1 asph teachers 0 Aug 21 14:07 exercise_solution.pdf
-rwxrwxr-x 1 asph teachers 0 Aug 21 16:15 virus.sh

./class/lessons/users+groups:
total 0
-rw-rw-r-- 1 asph teachers 0 Aug 21 14:09 exercise.pdf
-rw-r----- 1 asph teachers 0 Aug 21 14:09 exercise_solution.pdf
-rw-r--r-- 1 asph teachers 0 Aug 21 14:10 tree.jpg
```

Figure 2: Permission you shall apply