Using UNIX/Linux system

Krzysztof Kluza

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Working with files

Use: `export LANG=en_US.UTF-8` to change the language of the manual.

1 File system permissions

1. Check the command **chmod**. What is the "-R"' option of this?

   ```
   r=4, w=2, x=1
   su=4, sg=2, t=1
   chmod NNNN filename
   ```

   `r` – one can read a file `cat filename`
   `w` – one can write to file `echo ''abc'' >> filename`
   `x` – one can execute a file `./filename`

2. Please test the changes of permissions (access rights) for you on files created in the previously created structure *unix/lab2*. Check the permissions using:

   - `ls -l`
   - `stat`

   (Note: *The impact of changing access rights on the ability to access other user's files will be tested in further laboratories when access is granted without extended access rights.*)

3. What is the difference between numerical and symbolic permissions?

4. Transform the following numerical permissions into symbolic ones:

   - `123`
   - `1234`
   - `4321`
   - `7654`
   - `4567`

5. Transform the following symbolic permissions into numerical ones:
   - `r---w---x`
   - `rw-r-xr-x`
   - `rwxrwxrwt`
   - `rwsr-xr-x`
   - `rwSrw-rwT`
6. What are the conditions for user A to create directories in the directory that belongs to user B, and what is sufficient to save files in the directory?
7. Please check the permisions of the files `/tmp` and `/usr/bin/passwd`:

   ```
   ls -ld /tmp
   ls -l  /usr/bin/passwd
   ```

   and explain their permission rights.
8. How SUID/sTicky bits work on files/directories?
9. How `umask` is changing default permissions?

2 Links

1. Using `ln -s`, please create a symbolic link from the directory above (parent) to the previously created file.
2. How does such a link work when reading, writing, or executing it? What happens if one deletes a link or the original file?

3 Homework

As the homework watch the following movies on Youtube:

[**HW**] Watch *Free software, free society: Richard Stallman at TEDxGeneva*
`https://youtu.be/Ag1AKIl_2GM`
[**HW**] Review the information about file permissions
`https://wiki.archlinux.org/title/File_permissions_and_attributes`

If some commands from the lab instruction are not clear, please check them with examples for instance in Wikipedia. If there are further questions, send them by MS Teams and we will try to review them during the lab classes.