jamk.fi

Linux perusteet [TTC1040]

harjoitus 7

Maarit Salo

7.10.2021

1. **Create a new file *first.txt* and a new directory *second* to your user's home directory. What are the permissions for newly created file and directory?**

```
user@P0033-Ubuntu:~$ touch first.txt
user@P0033-Ubuntu:~$ mkdir second
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
drwxrwxr-x  2 user user     4096 Oct  7 15:58 second
```

Näköjään second-kansioon user-käyttäjällä ja user-ryhmällä on täydet oikeudet, ja muut saavat luku- ja kansioonpääsyoikeudet. first.txt-tiedostoon käyttäjällä user ja ryhmällä user on kirjoitus- ja lukuoikeudet, muilla vain lukuoikeudet.

2. **Change file (first.txt) permissions using numerical format in the following way: owner → all permissions, group → read and write permissions and other → no permissions. Return original permissions for the file using symbolic format.**

```
user@P0033-Ubuntu:~$ chmod 760 first.txt
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rwxrw----  1 user user        0 Oct  7 15:58 first.txt
```

Ja sitten symbolisesti takaisin tilaan rw/rw/r

```
user@P0033-Ubuntu:~$ chmod u-x,o+r first.txt
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
```

3. **Change root or other user for the owner for the directory (second).**

```
user@P0033-Ubuntu:~$ sudo chown root:root second
[sudo] password for user:
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
drwxrwxr-x  2 root root     4096 Oct  7 15:58 second
```

4. **Change directory permissions in a way that only owner has permissions for the directory.**

```
user@P0033-Ubuntu:~$ sudo chmod 700 second
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
drwx------  2 root root     4096 Oct  7 15:58 second
```

5. **Create a new file and set root or other user as a file owner.**

```
user@P0033-Ubuntu:~$ touch new_filepermission.txt
user@P0033-Ubuntu:~$ sudo chown root:root new_filepermission.txt
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
-rw-rw-r--  1 root root        0 Oct  7 16:16 new_filepermission.txt
```

tai sitten vain root omistajaksi, ei root-ryhmä

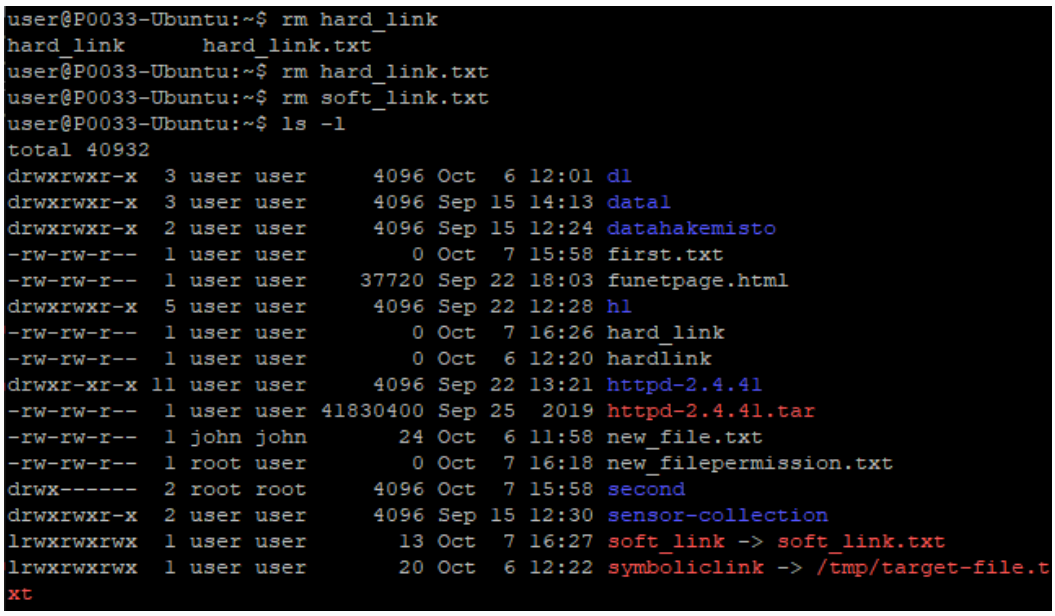
```
user@P0033-Ubuntu:~$ touch new_filepermission.txt
user@P0033-Ubuntu:~$ sudo chown root new_filepermission.txt
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
-rw-rw-r--  1 root user        0 Oct  7 16:18 new_filepermission.txt
```

6. **Create two files: hard_link.txt and soft_link.txt. Create hard and soft link for these files according to file names. Check the results with ls -l command. What does the output of the command tell about the links and how do links differ? Remove the files you created and recheck the results with ls -l command. What differences do you notice?**

```
user@P0033-Ubuntu:~$ touch hard_link.txt
user@P0033-Ubuntu:~$ touch soft_link.txt
user@P0033-Ubuntu:~$ ln hard_link.txt hard_link
user@P0033-Ubuntu:~$ ln -s soft_link.txt soft_link
user@P0033-Ubuntu:~$ ls -l
total 40932
drwxrwxr-x  3 user user     4096 Oct  6 12:01 dl
drwxrwxr-x  3 user user     4096 Sep 15 14:13 data1
drwxrwxr-x  2 user user     4096 Sep 15 12:24 datahakemisto
-rw-rw-r--  1 user user        0 Oct  7 15:58 first.txt
-rw-rw-r--  1 user user    37720 Sep 22 18:03 funetpage.html
drwxrwxr-x  5 user user     4096 Sep 22 12:28 hl
-rw-rw-r--  2 user user        0 Oct  7 16:26 hard_link
-rw-rw-r--  2 user user        0 Oct  7 16:26 hard_link.txt
-rw-rw-r--  1 user user        0 Oct  6 12:20 hardlink
drwxr-xr-x 11 user user     4096 Sep 22 13:21 httpd-2.4.41
-rw-rw-r--  1 user user 41830400 Sep 25  2019 httpd-2.4.41.tar
-rw-rw-r--  1 john john       24 Oct  6 11:58 new_file.txt
-rw-rw-r--  1 root user        0 Oct  7 16:18 new_filepermission.txt
drwx------  2 root root     4096 Oct  7 15:58 second
drwxrwxr-x  2 user user     4096 Sep 15 12:30 sensor-collection
lrwxrwxrwx  1 user user       13 Oct  7 16:27 soft_link -> soft_link.txt
-rw-rw-r--  1 user user        0 Oct  7 16:26 soft_link.txt
```

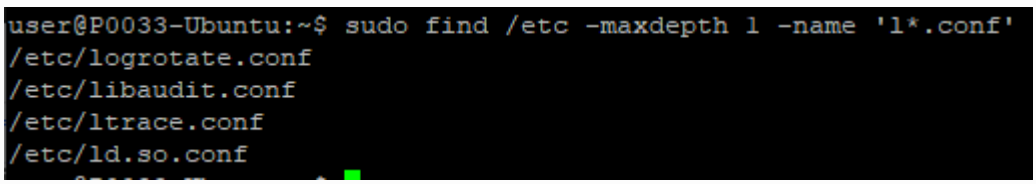
soft_link muuttuu vaaleansiniseksi ja näyttää mihin tiedostoon se viittaa, hard_link taas ei eroa väritykseltään tekstitiedostosta eikä näytä mihin tiedostoon se viittaa. Soft_link on myös kooltaan 13 kun taas hard_link on kooltaan 0. Hard_link ei myöskään häiriintynyt siitä, että olin jo luennoilla luonut samannimisen hard_linkin. Soft_linkkiin on myös

käyttäjällä ja itseasiassa kaikilla enemmän oikeuksia: Soft_linkiin on kaikilla täydet oikeudet, kun taas hard_linkiin vain käyttäjällä ja tämän ryhmällä luku- ja kirjoitusoikeudet, muut voivat vain lukea sen. Soft_link myös ilmoittaa olevansa linkki sanomalla l oikeusrimpsun alussa (samaan tapaan kuin kansiot ilmoittavat olevansa kansioita sanomalla d, esim drwxrwxr-x).



Kun tiedostot joihin linkataan poistettiin, soft_link muuttui väriltään punaiseksi merkitsemään rikkinäistä linkkiä. Lokakuun 7. päivä luotu hard_link taas ei muuttunut mitenkään.

7. **Use find command to list /etc directory contents including only files with .conf extension and starting with letter l (small l, not capital I). Do not include files from subdirectories!**



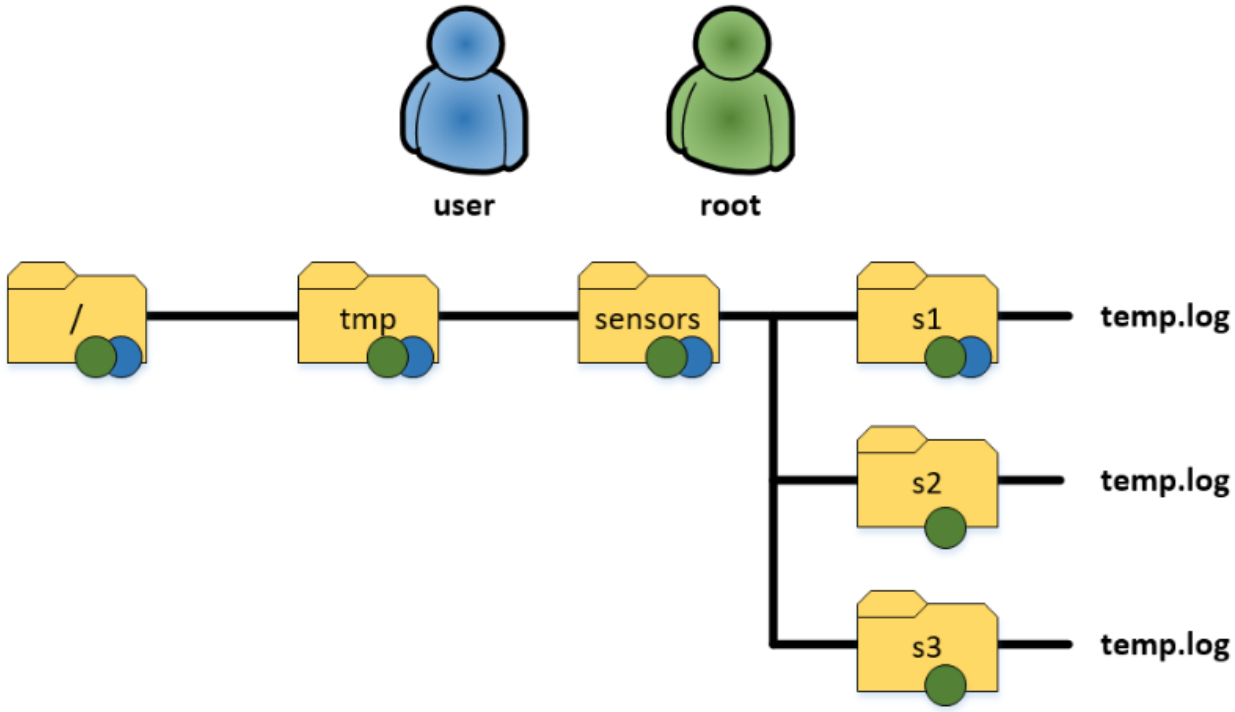
8. **Below is a presentation of a directory structure where temperature data from sensors s1, s2 and s3 has been saved for log files under sensor specific directories. Create this directory structure with files. Important: Check the location of this directory structure within the Linux filesystem!**

```
user@P0033-Ubuntu:/tmp$ ls -l
total 20
drwx------ 3 root root 4096 Sep 15 13:10 systemd-private-2732240bdb5f47
drwx------ 3 root root 4096 Sep 15 13:10 systemd-private-2732240bdb5f47
drwx------ 3 root root 4096 Sep 15 13:09 systemd-private-2732240bdb5f47
drwx------ 3 root root 4096 Sep 15 19:02 systemd-private-2732240bdb5f47
drwx------ 2 root root 4096 Sep 15 13:09 vmware-root_658-2697598381
user@P0033-Ubuntu:/tmp$ sudo mkdir -p sensors/s1 sensors/s2 sensors/s3
user@P0033-Ubuntu:/tmp$ tree sensors
sensors
├── s1
├── s2
└── s3

3 directories, 0 files
```

```
user@P0033-Ubuntu:/tmp/sensors$ sudo touch s1/temp.log
user@P0033-Ubuntu:/tmp/sensors$ sudo touch s2/temp.log
user@P0033-Ubuntu:/tmp/sensors$ sudo touch s3/temp.log
user@P0033-Ubuntu:/tmp/sensors$ cd ..
user@P0033-Ubuntu:/tmp$ tree sensors
sensors
├── s1
│   └── temp.log
├── s2
│   └── temp.log
└── s3
    └── temp.log

3 directories, 3 files
```

Siellä ovat.

9. **Users user (regular user) and root have been marked for the directory presentation below. Create the following permissions: user can only access the first sensor's temp.log file and root has access to the whole directory structure. User should have adequate permissions for reading and editing the temp.log file.**




```
user@P0033-Ubuntu:/tmp$ tree -p sensors
sensors
├── [drwxr-xr-x]  s1
│   └── [-rw-r--r--]  temp.log
├── [drwxr-xr-x]  s2
│   └── [-rw-r--r--]  temp.log
└── [drwxr-xr-x]  s3
    └── [-rw-r--r--]  temp.log

3 directories, 3 files
```

alkutilanne oikeuksien suhteen

```
user@P0033-Ubuntu:/tmp$ sudo chmod -R o-r sensors/s2
user@P0033-Ubuntu:/tmp$ sudo chmod -R o-r sensors/s3
user@P0033-Ubuntu:/tmp$ tree -p sensors
sensors
├── [drwxr-xr-x]  s1
│   └── [-rw-r--rw-]  temp.log
├── [drwxr-x--x]  s2 [error opening dir]
└── [drwxr-x--x]  s3 [error opening dir]

3 directories, 1 file
user@P0033-Ubuntu:/tmp$ sudo tree -p sensors
sensors
├── [drwxr-xr-x]  s1
│   └── [-rw-r--rw-]  temp.log
├── [drwxr-x--x]  s2
│   └── [-rw-r-----]  temp.log
└── [drwxr-x--x]  s3
    └── [-rw-r-----]  temp.log

3 directories, 3 files
```

Pääsyoikeudet on edelleen muilla, joten poistetaan nekin

```
user@P0033-Ubuntu:/tmp$ sudo chmod -R o-x sensors/s2
user@P0033-Ubuntu:/tmp$ sudo chmod -R o-x sensors/s3
user@P0033-Ubuntu:/tmp$ sudo tree -p sensors
sensors
├── [drwxr-xr-x]  s1
│   └── [-rw-r--rw-]  temp.log
├── [drwxr-x---]  s2
│   └── [-rw-r-----]  temp.log
└── [drwxr-x---]  s3
    └── [-rw-r-----]  temp.log

3 directories, 3 files
```

No niin, eli kuten tehtävässä haluttiin, muilla käyttäjillä ei ole mitään pääsyä s2 ja s3, ja s1 sisälle pääsee tavallinen käyttäjä tasan lukemaan ja kirjoittamaan temp.logiin, muttei esimerkiksi tallentamaan sitä eri nimelle.

```
user@P0033-Ubuntu:/tmp/sensors/s1$ ls -l
total 0
-rw-r--rw- 1 root root 0 Oct  7 16:54 temp.log
user@P0033-Ubuntu:/tmp/sensors/s1$ cd ..
user@P0033-Ubuntu:/tmp/sensors$ ls -l
total 12
drwxr-xr-x 2 root root 4096 Oct  7 16:54 s1
drwxr-x--- 2 root root 4096 Oct  7 16:54 s2
drwxr-x--- 2 root root 4096 Oct  7 16:54 s3
user@P0033-Ubuntu:/tmp/sensors$ cd ..
user@P0033-Ubuntu:/tmp$ cd ..
user@P0033-Ubuntu:/$ cd tmp
user@P0033-Ubuntu:/tmp$ ls -l
total 24
drwxr-xr-x 5 root root 4096 Oct  7 16:52 sensors
drwx------ 3 root root 4096 Sep 15 13:10 systemd-p
drwx------ 3 root root 4096 Sep 15 13:10 systemd-p
drwx------ 3 root root 4096 Sep 15 13:09 systemd-p
drwx------ 3 root root 4096 Sep 15 19:02 systemd-p
drwx------ 2 root root 4096 Sep 15 13:09 vmware-r
```

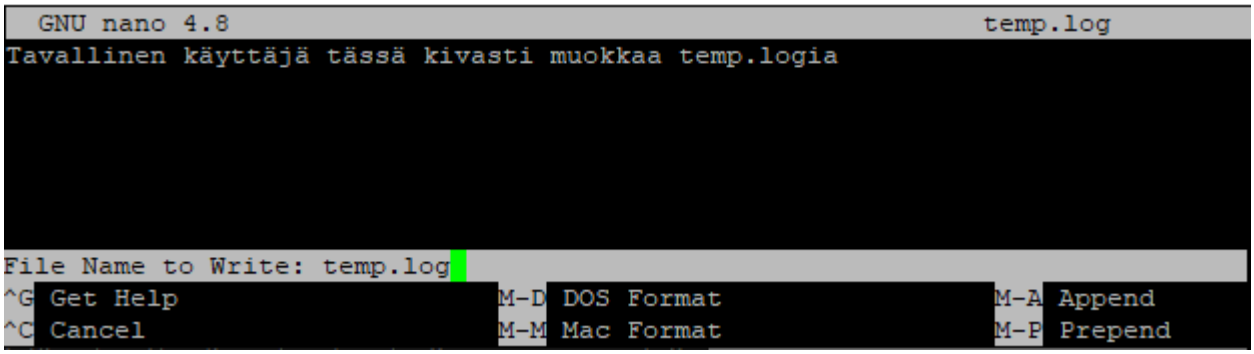
Ja kuten tästä nähdään, root-omistaa kaiken, niin sensorsin kuin myös sen aliset s1-s3-kansiot ja niiden sisältämät temp.logit.

```
user@P0033-Ubuntu:/tmp/sensors$ ls -l s1/
total 0
-rw-r--rw- 1 root root 0 Oct  7 16:54 temp.log
user@P0033-Ubuntu:/tmp/sensors$ ls -l s2/
ls: cannot open directory 's2/': Permission denied
user@P0033-Ubuntu:/tmp/sensors$ sudo ls -l s2/
total 0
-rw-r----- 1 root root 0 Oct  7 16:54 temp.log
user@P0033-Ubuntu:/tmp/sensors$ sudo ls -l s3/
total 0
-rw-r----- 1 root root 0 Oct  7 16:54 temp.log
```

Tässä vielä temp.logien omistajat, ja nehän ovat myös root.

Sitten vielä tarkistetaan että tavallinen käyttäjä voi muokata ja lukea s1/temp.logia.

```
user@P0033-Ubuntu:/tmp/sensors$ cd s1
user@P0033-Ubuntu:/tmp/sensors/s1$ ls -l
total 0
-rw-r--rw- 1 root root 0 Oct  7 16:54 temp.log
user@P0033-Ubuntu:/tmp/sensors/s1$ nano temp.log
user@P0033-Ubuntu:/tmp/sensors/s1$ cat temp.log
Tavallinen käyttäjä tässä kivasti muokkaa temp.logia
```



Sehän toimii.