

Linux perusteet [TTC1040]

harjoitus 6



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1. Create regular users sulo and riku using useradd command (use options for creating home directory and sets bash as a default shell). Set passwords for both users. Then create users joonas and jani using adduser command.

```
user@P0033-Ubuntu:~$ sudo useradd -m sulo -s /bin/bash
user@P0033-Ubuntu:~$ sudo useradd -m riku -s /bin/bash
user@P0033-Ubuntu:~$ sudo passwd sulo
New password:
Retype new password:
passwd: password updated successfully
user@P0033-Ubuntu:~$ sudo passwd riku
New password:
Retype new password:
passwd: password updated successfully
user@P0033-Ubuntu:~$ ls -la /home
total 28
drwxr-xr-x  7 root   root   4096 Sep 29 12:20 .
drwxr-xr-x 19 root   root   4096 Sep 15 13:10 ..
drwxr-xr-x  2 chris  staff  4096 Sep 29 11:58 chris
drwxr-xr-x  2 riku   riku   4096 Sep 29 12:20 riku
drwxr-xr-x  2 sulo   sulo   4096 Sep 29 12:20 sulo
drwxr-xr-x  3 ubuntu ubuntu 4096 Sep  1 11:35 ubuntu
drwxr-xr-x 11 user   user   4096 Sep 22 18:03 user
```

```
user@P0033-Ubuntu:~$ sudo adduser joonas
Adding user `joonas' ...
Adding new group `joonas' (1006) ...
Adding new user `joonas' (1005) with group `joonas' ...
Creating home directory `/home/joonas' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for joonas
Enter the new value, or press ENTER for the default
    Full Name []: Joonas
    Room Number []: 50
    Work Phone []: 000
    Home Phone []: 000
    Other []:
Is the information correct? [Y/n] Y
```

```
user@P0033-Ubuntu:~$ sudo adduser jani
Adding user `jani' ...
Adding new group `jani' (1007) ...
Adding new user `jani' (1006) with group `jani' ...
Creating home directory `/home/jani' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for jani
Enter the new value, or press ENTER for the default
    Full Name []: Jani
    Room Number []: 51
    Work Phone []: 000
    Home Phone []: 000
    Other []:
Is the information correct? [Y/n] Y
```

```

user@P0033-Ubuntu:~$ ls -la /home
total 36
drwxr-xr-x  9 root   root   4096 Sep 29 12:23 .
drwxr-xr-x 19 root   root   4096 Sep 15 13:10 ..
drwxr-xr-x  2 chris  staff  4096 Sep 29 11:58 chris
drwxr-xr-x  2 jani   jani   4096 Sep 29 12:23 jani
drwxr-xr-x  2 joonas joonas 4096 Sep 29 12:23 joonas
drwxr-xr-x  2 riku   riku   4096 Sep 29 12:20 riku
drwxr-xr-x  2 sulo   sulo   4096 Sep 29 12:20 sulo
drwxr-xr-x  3 ubuntu ubuntu 4096 Sep  1 11:35 ubuntu
drwxr-xr-x 11 user   user   4096 Sep 22 18:03 user

```

2. Create group called testers and add this group as a primary group for all users created in previous task. Verify this by creating a file with user jani and check the owner group. In addition, test commands id and groups for any of previously created users and for your own user. In what groups does your user belong to? Find out what is the purpose of these groups.

```

user@P0033-Ubuntu:~$ sudo groupadd testers
user@P0033-Ubuntu:~$ sudo usermod -g testers sulo
user@P0033-Ubuntu:~$ sudo usermod -g testers riku
user@P0033-Ubuntu:~$ sudo usermod -g testers joonas
user@P0033-Ubuntu:~$ sudo usermod -g testers jani
user@P0033-Ubuntu:~$ su - jani
Password:
jani@P0033-Ubuntu:~$ touch janintiedosto.txt
jani@P0033-Ubuntu:~$ ls -la
total 20
drwxr-xr-x 2 jani testers 4096 Sep 29 12:37 .
drwxr-xr-x 9 root   root   4096 Sep 29 12:23 ..
-rw-r--r-- 1 jani testers  220 Sep 29 12:23 .bash_logout
-rw-r--r-- 1 jani testers 3771 Sep 29 12:23 .bashrc
-rw-r--r-- 1 jani testers  807 Sep 29 12:23 .profile
-rw-r--r-- 1 jani testers    0 Sep 29 12:37 janintiedosto.txt

```

```

user@P0033-Ubuntu:~$ id user
uid=1000(user) gid=1000(user) groups=1000(user),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lxd)
user@P0033-Ubuntu:~$ id joonas
uid=1005(joonas) gid=1008(testers) groups=1008(testers)
user@P0033-Ubuntu:~$ id jani
uid=1006(jani) gid=1008(testers) groups=1008(testers)
user@P0033-Ubuntu:~$ id sulo
uid=1003(sulo) gid=1008(testers) groups=1008(testers)
user@P0033-Ubuntu:~$ id riku
uid=1004(riku) gid=1008(testers) groups=1008(testers)

```

```

user@P0033-Ubuntu:~$ groups sulo riku joonas jani user
sulo : testers
riku : testers
joonas : testers
jani : testers
user : user adm cdrom sudo dip plugdev lxd

```

User kuuluu ryhmiin user, adm, cdrom, sudo, dip, plugdev ja lxd

- User oletettavasti luotiin samalla kun user-käyttäjänimi. Jos käyttäjänimeä luotaessa sille ei anneta ryhmää, sille luodaan käyttäjänimeä vastaava ryhmä
- Adm-ryhmällä on monitorointioikeudet ja pääsy moniin logitiedostoihin /var/logissa
- Cdrom-ryhmällä on paikalliset oikeudet käyttää cd-asemaa ja muita optisia asemia
- Sudo-ryhmällä on admin-oikeudet ja voivat ajaa kaikki järjestelmän komennot
- Dip (dial-up IP)-ryhmällä on oikeudet käyttää työkaluja kuten ppp, wvdial jne muodostaakseen yhteyden. He eivät voi konfiguroida modeemia, mutta voivat ajaa ohjelmia jotka käyttävät modeemia.
- Plugdev-ryhmä saa kytkeä laitteita järjestelmään (mount, umount). Tosin vain ehdoin nodev ja nosuid turvallisuussyistä.
- LXD on API joka hoitaa LXC-containereita Linux-järjestelmissä, ja joka voi suorittaa tehtäviä kaikille lxd-ryhmän jäsenille. Root-käyttäjä ja lxd-ryhmän jäsenet voivat olla yhteydessä paikalliseen daemoniin.

Lähde: oppimateriaali, <https://wiki.debian.org/SystemGroups> ,
<https://shenaniganslabs.io/2019/05/21/LXD-LPE.html> ,
<https://linuxcontainers.org/lxd/getting-started-cli/>

3. Create group called coders and set it as the primary group for user joonas, but let joonas still be a member of testers group.

```
user@P0033-Ubuntu:~$ sudo groupadd coders
[sudo] password for user:
user@P0033-Ubuntu:~$ sudo usermod -g coders -G testers joonas
user@P0033-Ubuntu:~$ groups joonas
joonas : coders testers
```

4. Remove the user riku (remove also user's home directory) and remove also user jani without removing user's home directory. In addition, remove the group called coders.

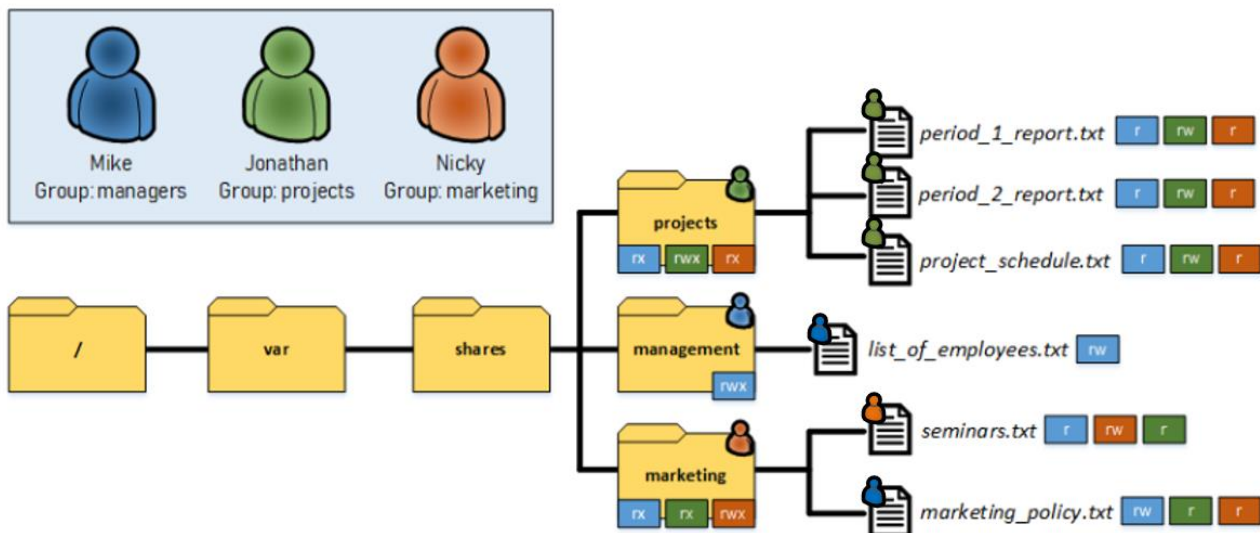
```
user@P0033-Ubuntu:~$ sudo userdel -r riku
userdel: group riku not removed because it is not the primary group of user riku.
userdel: riku mail spool (/var/mail/riku) not found
user@P0033-Ubuntu:~$ groups riku
groups: 'riku': no such user
user@P0033-Ubuntu:~$ sudo userdel jani
userdel: group jani not removed because it is not the primary group of user jani.
user@P0033-Ubuntu:~$ groups joonas
joonas : coders testers
user@P0033-Ubuntu:~$ sudo usermod -g testers joonas
user@P0033-Ubuntu:~$ sudo groupdel coders
```

5. Lock the password for user sulo. Verify the changes. After this, set the password as expired and login with user sulo (remember to remove the password lock before login). What happens?

```
user@P0033-Ubuntu:~$ sudo passwd -l sulo
passwd: password expiry information changed.
user@P0033-Ubuntu:~$ sudo passwd -S sulo
sulo L 09/29/2021 0 99999 7 -1
user@P0033-Ubuntu:~$ sudo passwd -e sulo
passwd: password expiry information changed.
user@P0033-Ubuntu:~$ sudo passwd -u sulo
passwd: password expiry information changed.
user@P0033-Ubuntu:~$ su - sulo
Password:
You are required to change your password immediately (administrator enforced)
Changing password for sulo.
Current password:
su: Authentication token manipulation error
user@P0033-Ubuntu:~$ sudo passwd sulo
New password:
Retype new password:
passwd: password updated successfully
user@P0033-Ubuntu:~$ su - sulo
Password:
sulo@P0033-Ubuntu:~$ exit
logout
user@P0033-Ubuntu:~$
```

Kuten odotettua, se pyytää vaihtamaan salasanan, mutta Authentication token manipulation error oli yllätys. Sen ohi pääsi ihan vaan vaihtamalla salasanan sulolle.

6. Below is the presentation of a directory structure from fictional company including users from different groups. Create the presented directory structure, users and groups for the filesystem of your Ubuntu. Set file permissions for files and directories as described in the figure (Tip: use material from the next course title: *File permissions*). Verify that permissions work as intended and take screenshot from several different situations with different users. **Important:** Owner and group permissions can be set to be equal and other users should have permissions if needed (check the image for other permissions)!



```
user@P0033-Ubuntu:/var$ sudo mkdir -p shares/projects shares/management shares/marketing
user@P0033-Ubuntu:/var$ cd shares
user@P0033-Ubuntu:/var/shares$ ls
management  marketing  projects
user@P0033-Ubuntu:/var/shares$ cd management/
user@P0033-Ubuntu:/var/shares/management$ touch list_of_employees.txt
touch: cannot touch 'list_of_employees.txt': Permission denied
user@P0033-Ubuntu:/var/shares/management$ sudo touch list_of_employees.txt
user@P0033-Ubuntu:/var/shares/management$ cd ../marketing
user@P0033-Ubuntu:/var/shares/marketing$ sudo touch seminars.txt marketing_policy.txt
user@P0033-Ubuntu:/var/shares/marketing$ cd ../projects
user@P0033-Ubuntu:/var/shares/projects$ sudo touch period_1_report.txt period_2_report.txt p
roject_schedule.txt
user@P0033-Ubuntu:/var/shares/projects$ ls
period_1_report.txt  period_2_report.txt  project_schedule.txt
user@P0033-Ubuntu:/var/shares/projects$ cd ../marketing
user@P0033-Ubuntu:/var/shares/marketing$ ls
marketing_policy.txt  seminars.txt
user@P0033-Ubuntu:/var/shares/marketing$ cd management/
-bash: cd: management/: No such file or directory
user@P0033-Ubuntu:/var/shares/marketing$ cd management
-bash: cd: management: No such file or directory
user@P0033-Ubuntu:/var/shares/marketing$ cd ../management/
user@P0033-Ubuntu:/var/shares/management$ ls
list_of_employees.txt
```

Hakemistorakenne + tiedostot paikoilleen

```

user@P0033-Ubuntu:/home$ sudo groupadd managers
user@P0033-Ubuntu:/home$ sudo groupadd projects
user@P0033-Ubuntu:/home$ sudo groupadd marketing
user@P0033-Ubuntu:/home$ sudo useradd -m -g marketing -s /bin/bash nicky
user@P0033-Ubuntu:/home$ sudo useradd -m -g projects -s /bin/bash jonathan
user@P0033-Ubuntu:/home$ sudo useradd -m -g managers -s /bin/bash mike
user@P0033-Ubuntu:/home$ groups nicky jonathan mike
nicky : marketing
jonathan : projects
mike : managers
user@P0033-Ubuntu:/home$ ls
chris jani jonathan joonas mike nicky sulo ubuntu user

```

Ryhmät ja käyttäjät paikoilleen

```

user@P0033-Ubuntu:/var/shares$ sudo chown -R mike:managers management
[sudo] password for user:
user@P0033-Ubuntu:/var/shares$ tree -p management
management
├── [-rw-r--r--] list_of_employees.txt

0 directories, 1 file
mike@P0033-Ubuntu:/var/shares/management$ chmod 660 list_of_employees.txt
mike@P0033-Ubuntu:/var/shares/management$ ls -l
total 0
-rw-rw---- 1 mike managers 0 Sep 30 18:26 list_of_employees.txt
mike@P0033-Ubuntu:/var/shares/management$ cd ..
mike@P0033-Ubuntu:/var/shares$ cd ..
mike@P0033-Ubuntu:/var$ tree -p shares
shares
├── [drwxr-xr-x] management
│   ├── [-rw-rw----] list_of_employees.txt
├── [drwxr-xr-x] marketing
│   ├── [-rw-r--r--] marketing_policy.txt
│   └── [-rw-r--r--] seminars.txt
└── [drwxr-xr-x] projects
    ├── [-rw-r--r--] period_1_report.txt
    ├── [-rw-r--r--] period_2_report.txt
    └── [-rw-r--r--] project_schedule.txt

3 directories, 6 files

```

```

mike@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x 5 root root 4096 Sep 30 18:25 .
drwxr-xr-x 13 root root 4096 Sep 30 18:25 ..
drwxr-xr-x 2 mike managers 4096 Sep 30 18:26 management
drwxr-xr-x 2 root root 4096 Sep 30 18:27 marketing
drwxr-xr-x 2 root root 4096 Sep 30 18:29 projects
mike@P0033-Ubuntu:/var/shares$ chmod g+w,o-rx management
mike@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x 5 root root 4096 Sep 30 18:25 .
drwxr-xr-x 13 root root 4096 Sep 30 18:25 ..
drwxrwx--- 2 mike managers 4096 Sep 30 18:26 management
drwxr-xr-x 2 root root 4096 Sep 30 18:27 marketing
drwxr-xr-x 2 root root 4096 Sep 30 18:29 projects

```

Nyt mikellä ja managereilla on rwx oikeudet management-kansioon ja rw-oikeudet list_of_employees.txt-tiedostoon.


```

user@P0033-Ubuntu:/var/shares$ sudo chown -R jonathan:projects projects
[sudo] password for user:
user@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x  5 root      root      4096 Sep 30 18:25 .
drwxr-xr-x 13 root      root      4096 Sep 30 18:25 ..
drwxrwx---  2 mike      managers 4096 Sep 30 18:26 management
drwxr-xr-x  2 root      root      4096 Sep 30 18:27 marketing
drwxr-xr-x  2 jonathan projects 4096 Sep 30 18:29 projects
user@P0033-Ubuntu:/var/shares$ sudo chmod 775 projects
user@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x  5 root      root      4096 Sep 30 18:25 .
drwxr-xr-x 13 root      root      4096 Sep 30 18:25 ..
drwxrwx---  2 mike      managers 4096 Sep 30 18:26 management
drwxr-xr-x  2 root      root      4096 Sep 30 18:27 marketing
drwxrwxr-x  2 jonathan projects 4096 Sep 30 18:29 projects

```

Nyt jonathan ja projectilaiset omistavat projekti-kansion ja muille on rx-oikeudet

```

user@P0033-Ubuntu:/var/shares/projects$ ls -la
total 8
drwxrwxr-x 2 jonathan projects 4096 Sep 30 18:29 .
drwxr-xr-x 5 root      root      4096 Sep 30 18:25 ..
-rw-r--r-- 1 jonathan projects    0 Sep 30 18:29 period_1_report.txt
-rw-r--r-- 1 jonathan projects    0 Sep 30 18:29 period_2_report.txt
-rw-r--r-- 1 jonathan projects    0 Sep 30 18:29 project_schedule.txt
user@P0033-Ubuntu:/var/shares/projects$ sudo chmod g+w *.txt
user@P0033-Ubuntu:/var/shares/projects$ ls -la
total 8
drwxrwxr-x 2 jonathan projects 4096 Sep 30 18:29 .
drwxr-xr-x 5 root      root      4096 Sep 30 18:25 ..
-rw-rw-r-- 1 jonathan projects    0 Sep 30 18:29 period_1_report.txt
-rw-rw-r-- 1 jonathan projects    0 Sep 30 18:29 period_2_report.txt
-rw-rw-r-- 1 jonathan projects    0 Sep 30 18:29 project_schedule.txt

```

Ja nyt Jonathan ja projectilaiset saivat rw-oikeudet txt-tiedostoihin, ja r oikeudet muille (typerehdin välissä ja annoin x-oikeudet kaikille, mutta se olikin projekti-kansioon, ei tähän)

```

user@P0033-Ubuntu:/var/shares$ sudo chown -R nicky:marketing marketing
user@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x  5 root      root      4096 Sep 30 18:25 .
drwxr-xr-x 13 root      root      4096 Sep 30 18:25 ..
drwxrwx---  2 mike      managers 4096 Sep 30 18:26 management
drwxr-xr-x  2 nicky     marketing 4096 Sep 30 18:27 marketing
drwxrwxr-x  2 jonathan projects 4096 Sep 30 18:29 projects
user@P0033-Ubuntu:/var/shares$ sudo chmod g+w marketing
user@P0033-Ubuntu:/var/shares$ ls -la
total 20
drwxr-xr-x  5 root      root      4096 Sep 30 18:25 .
drwxr-xr-x 13 root      root      4096 Sep 30 18:25 ..
drwxrwx---  2 mike      managers 4096 Sep 30 18:26 management
drwxrwxr-x  2 nicky     marketing 4096 Sep 30 18:27 marketing
drwxrwxr-x  2 jonathan projects 4096 Sep 30 18:29 projects

```

sitten nicky ja marketing omistamaan marketing-kansio, ja lisätään marketing-groupille write-oikeudet, muille rx-oikeudet.


```

user@P0033-Ubuntu:/var/shares$ sudo tree -p
[sudo] password for user:
.
├── [drwxrwx---] management
│   └── [-rw-rw----] list_of_employees.txt
├── [drwxrwxr-x] marketing
│   ├── [-rw-r--r--] marketing_policy.txt
│   └── [-rw-r--r--] seminars.txt
└── [drwxrwxr-x] projects
    ├── [-rw-rw-r--] period_1_report.txt
    ├── [-rw-rw-r--] period_2_report.txt
    └── [-rw-rw-r--] project_schedule.txt

3 directories, 6 files

```

Tilanne tällä hetkellä (sudo tarvitaan management-kansion avaamiseen)

Huomaamme että kansiot ovat kunnossa.

```

user@P0033-Ubuntu:/var/shares$ cd marketing
user@P0033-Ubuntu:/var/shares/marketing$ ls -la
total 8
drwxrwxr-x 2 nicky marketing 4096 Sep 30 18:27 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-r--r-- 1 nicky marketing 0 Sep 30 18:27 marketing_policy.txt
-rw-r--r-- 1 nicky marketing 0 Sep 30 18:27 seminars.txt

```

Marketing-kansion sisällä kuitenkin pitää vielä jakaa oikeuksia uusiksi opettajan päivityksen mukaisesti. Eli nicky ja marketoijat omistaa ihan oikein seminars.txt-tiedoston ja muilla on r-oikeudet, mutta miken ja managereiden pitäisi omistaa marketing_policy.txt ja muilla r-oikeudet. Tehdään siis se.

```

user@P0033-Ubuntu:/var/shares/marketing$ sudo chown mike:managers marketing_policy.txt
user@P0033-Ubuntu:/var/shares/marketing$ ls -la
total 8
drwxrwxr-x 2 nicky marketing 4096 Sep 30 18:27 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-r--r-- 1 mike managers 0 Sep 30 18:27 marketing_policy.txt
-rw-r--r-- 1 nicky marketing 0 Sep 30 18:27 seminars.txt

```

No niin. nyt Mike ja managerit omistavat marketing_policy.txtin. Mutta huomataan, että managerit groupilta puuttuu vielä kirjoitusoikeudet (w) marketing_policy.txtiin, ja ihan samalla tavalla marketing-groupilta puuttuu kirjoitusoikeudet seminars.txtiin. Muutetaanpa se.

```

user@P0033-Ubuntu:/var/shares/marketing$ sudo chmod g+w *.txt
user@P0033-Ubuntu:/var/shares/marketing$ ls -la
total 8
drwxrwxr-x 2 nicky marketing 4096 Sep 30 18:27 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-rw-r-- 1 mike managers 0 Sep 30 18:27 marketing_policy.txt
-rw-rw-r-- 1 nicky marketing 0 Sep 30 18:27 seminars.txt

```

Senhän sai muutettua kivasti samalla kertaa.

```

user@P0033-Ubuntu:/var$ sudo tree -p shares
shares
├── [drwxrwx---] management
│   └── [-rw-rw----] list_of_employees.txt
├── [drwxrwxr-x] marketing
│   ├── [-rw-rw-r--] marketing_policy.txt
│   └── [-rw-rw-r--] seminars.txt
└── [drwxrwxr-x] projects
    ├── [-rw-rw-r--] period_1_report.txt
    ├── [-rw-rw-r--] period_2_report.txt
    └── [-rw-rw-r--] project_schedule.txt

3 directories, 6 files
user@P0033-Ubuntu:/var/shares$ ls -la projects
total 8
drwxrwxr-x 2 jonathan projects 4096 Sep 30 18:29 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-rw-r-- 1 jonathan projects 0 Sep 30 18:29 period_1_report.txt
-rw-rw-r-- 1 jonathan projects 0 Sep 30 18:29 period_2_report.txt
-rw-rw-r-- 1 jonathan projects 0 Sep 30 18:29 project_schedule.txt
user@P0033-Ubuntu:/var/shares$ ls -la management
ls: cannot open directory 'management': Permission denied
user@P0033-Ubuntu:/var/shares$ sudo ls -la management
total 8
drwxrwx--- 2 mike managers 4096 Sep 30 18:26 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-rw---- 1 mike managers 0 Sep 30 18:26 list_of_employees.txt
user@P0033-Ubuntu:/var/shares$ ls -la marketing
total 8
drwxrwxr-x 2 nicky marketing 4096 Sep 30 18:27 .
drwxr-xr-x 5 root root 4096 Sep 30 18:25 ..
-rw-rw-r-- 1 mike managers 0 Sep 30 18:27 marketing_policy.txt
-rw-rw-r-- 1 nicky marketing 0 Sep 30 18:27 seminars.txt

```

Sitten esimerkkejä:

```

user@P0033-Ubuntu:/var/shares$ su - nicky
Password:
nicky@P0033-Ubuntu:~$ cd /var/shares/management
-bash: cd: /var/shares/management: Permission denied

```

Nicky marketingista ei pääse management-kansioon edes sisälle.

```

GNU nano 4.8 period_2_report.txt
[ File 'period_2_report.txt' is unwritable ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line

```

Nicky marketingista ei myöskään pääse kirjoittamaan tiedostoihin, koska hänellä on vain lukuoikeudet projekti-kansioon.

```

nicky@P0033-Ubuntu:/var/shares/projects$ cat period_1_report.txt

```

lukeminen onnistuu. Tuossa tiedostossa ei vain ole mitään.

```
nicky@P0033-Ubuntu:/var/shares/projects$ cd ../marketing
nicky@P0033-Ubuntu:/var/shares/marketing$ nano seminars.txt
nicky@P0033-Ubuntu:/var/shares/marketing$ nano seminars.txt
nicky@P0033-Ubuntu:/var/shares/marketing$ cat seminars.txt
Nicky oli täällä 6.10.2021
```

```
GNU nano 4.8 seminars.txt
Nicky oli täällä 6.10.2021

[ Read 1 line ]
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Paste Text ^T To Spell  ^_ Go To Line
```

Nickyn omistamassa marketing-kansiossa hänellä on kirjoitus- ja lukuoikeudet, joten hän voi kirjoittaa seminars.txt-tiedostoon sekä lukea sen vaikkapa catilla.

```
mike@P0033-Ubuntu:/var/shares$ nano management/list_of_employees.txt

Use "fg" to return to nano.

[l]+ Stopped nano management/list_of_employees.txt
mike@P0033-Ubuntu:/var/shares$ fg
nano management/list_of_employees.txt
mike@P0033-Ubuntu:/var/shares$ cat management/list_of_employees.txt
Mike kirjoitti tänne asioita 6.10.2021
```

mike manageri pääsee kirjoittamaan oman kansionsa list_of_employees.txtiin.

```
GNU nano 4.8 management/list_of_employees.txt Modified
Mike kirjoitti tänne asioita 6.10.2021

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Paste Text ^T To Spell  ^_ Go To Line
```

Cat onnistuu myös.

```
[ Directory 'marketing' is not writable ]
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File ^\ Replace  ^U Paste Text ^T To Spell ^_ Go To Line

mike@P0033-Ubuntu:/var/shares$ nano marketing/marketing_policy.txt
mike@P0033-Ubuntu:/var/shares$ cd marketing
mike@P0033-Ubuntu:/var/shares/marketing$ ls -l
total 4
-rw-rw-r-- 1 mike  managers   0 Sep 30 18:27 marketing_policy.txt
-rw-rw-r-- 1 nicky marketing 30 Oct  6 15:19 seminars.txt
```

Kun yritämme avata nanolla Miken omistaman marketing_policy.txin, havaitsemme että kun yritämme kirjoittaa marketing_policy.txtiin lisää tekstiä, Mikea varoitetaan siitä että hänellä on oikeudet vain tähän tiedostoon. Hän ei esimerkiksi voi tallentaa marketing_policy.txtiä uudella nimellä.

```
mike@P0033-Ubuntu:/var/shares/marketing$ nano marketing_policy.txt
mike@P0033-Ubuntu:/var/shares/marketing$ cat marketing_policy.txt
Mike oli täällä 6.10.2021
```

Mike voi lukea ja kirjoittaa.

```
mike@P0033-Ubuntu: /var/shares/marketing
GNU nano 4.8 seminars.txt
Nicky oli täällä 6.10.2021

[ File 'seminars.txt' is unwritable ]
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File ^\ Replace  ^U Paste Text ^T To Spell ^_ Go To Line
```

Seminars.txt-tiedostoon Mike ei voi kirjoittaa

```
mike@P0033-Ubuntu:/var/shares/marketing$ cat seminars.txt
Nicky oli täällä 6.10.2021
```

Mutta voi lukea sen.

Vaihdetaan Jonathaniin.

```
user@P0033-Ubuntu:/var/shares/marketing$ su - jonathan
Password:
su: Authentication failure
user@P0033-Ubuntu:/var/shares/marketing$ sudo passwd jonathan
[sudo] password for user:
New password:
Retype new password:
passwd: password updated successfully
user@P0033-Ubuntu:/var/shares/marketing$ su - jonathan
Password:
jonathan@P0033-Ubuntu:~$ cd /var/shares/management
```

Muutamalla käyttäjällä salasana junnasi, joten ne piti vaihtaa uusiksi.

```
jonathan@P0033-Ubuntu:~$ cd /var/shares/management
-bash: cd: /var/shares/management: Permission denied
```

Kuten Nicky, Jonathan ei myöskään pääse edes management-kansioon sisälle.

```
jonathan@P0033-Ubuntu:/var/shares/marketing$ cat marketing_policy.txt
Mike oli täällä 6.10.2021
jonathan@P0033-Ubuntu:/var/shares/marketing$ cat seminars.txt
Nicky oli täällä 6.10.2021
```

Marketing-kansiossa Jonathan voi lukea tiedostoja,

```
GNU nano 4.8 seminars.txt
Nicky oli täällä 6.10.2021

[ File 'seminars.txt' is unwritable ]

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File ^\ Replace  ^U Paste Text ^T To Spell  ^_ Go To Line
```

muttei kirjoittaa.

Jonathanin omassa projekti-kansiossa hän voi kirjoittaa ja lukea kamaa.

```
jonathan@P0033-Ubuntu:/var/shares/projects$ cat project_schedule.txt
jonathan@P0033-Ubuntu:/var/shares/projects$ nano project_schedule.txt
jonathan@P0033-Ubuntu:/var/shares/projects$ cat project_schedule.txt
Jonathan muutti tätä 7.10.2021
```

```
GNU nano 4.8 project_schedule.txt Modified
Jonathan muutti tätä 7.10.2021

File Name to Write: project_schedule.txt

^G Get Help  ^M-D DOS Format  ^M-A Append  ^M-B Backup File
^C Cancel    ^M-M Mac Format  ^M-P Prepend  ^T To Files
```

Se unohtui sanoa, että Mikellä, Jonathanilla ja Nickyllä on x- eli execute-oikeudet toistensa kansioihin (paitsi Miken management-kansioon vain Mikellä ja managereilla on x-oikeudet). Tässä x-oikeus viittaa kykyyn siirtyä kansioon, tai ajaa vaikka skripti. Mike ja Nicky pääsevät siirtymään Jonathanin projekti-kansioon & Jonathan ja Mike Nickyn marketing-kansioon.