1.

```
user@AA3209-Ubuntu:~$ touch first.txt
user@AA3209-Ubuntu:~$ mkdir second
user@AA3209-Ubuntu:~$ ls
apache  first.txt  funet  h1  kansiol  second  tmp
user@AA3209-Ubuntu:~$
```

```
user@AA3209-Ubuntu:~$ ls -1
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 h1
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
drwxrwxr-x 2 user user 4096 Mar  7 19:22 second
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

2.

```
user@AA3209-Ubuntu:~$ chmod 760 first.txt
user@AA3209-Ubuntu:~$ ls -1
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rwxrw---- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 h1
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
drwxrwxr-x 2 user user 4096 Mar  7 19:22 second
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

```
user@AA3209-Ubuntu:~$ chmod u-x,o+r first.txt
user@AA3209-Ubuntu:~$ ls -1
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 h1
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
drwxrwxr-x 2 user user 4096 Mar  7 19:22 second
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

3.

```
user@AA3209-Ubuntu:~$ sudo chown root second
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
drwxrwxr-x 2 root user 4096 Mar  7 19:22 second
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

4.

```
user@AA3209-Ubuntu:~$ sudo chmod 700 second
[sudo] password for user:
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
drwx------ 2 root user 4096 Mar  7 19:22 second
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

5.

```
user@AA3209-Ubuntu:~$ touch third.txt
user@AA3209-Ubuntu:~$ sudo chown root third.txt
[sudo] password for user:
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
-rw-rw-r-- 1 user user    0 Mar  7 20:14 kovalinkki.
lrwxrwxrwx 1 user user   13 Mar  7 20:21 pehmeelinkk
drwx------ 2 root user 4096 Mar  7 19:22 second
-rw-rw-r-- 1 root user    0 Mar  7 21:29 third.txt
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
```

6.

```
user@AA3209-Ubuntu:~$ touch hard_link.txt
user@AA3209-Ubuntu:~$ touch soft_link.txt
```

```
user@AA3209-Ubuntu:~$ ln -s soft_link.txt pehmeelinkki.txt
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
-rw-rw-r-- 1 user user    0 Mar  7 20:14 hard_link.txt
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
lrwxrwxrwx 1 user user   13 Mar  7 20:21 pehmeelinkki.txt -> soft_link.txt
drwx------ 2 root user 4096 Mar  7 19:22 second
-rw-rw-r-- 1 user user    0 Mar  7 20:14 soft_link.txt
-rw-rw-r-- 1 root user    0 Mar  7 20:13 third.txt
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
```

In soft link it shows that "pehmeelinkki" file doesn't necessarily have to exist like in this case it doesn't.

```
user@AA3209-Ubuntu:~$ ln hard_link.txt kovalinkki.txt
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
-rw-rw-r-- 2 user user    0 Mar  7 20:14 hard_link.txt
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
-rw-rw-r-- 2 user user    0 Mar  7 20:14 kovalinkki.txt
lrwxrwxrwx 1 user user   13 Mar  7 20:21 pehmeelinkki.txt -> soft_link.txt
drwx------ 2 root user 4096 Mar  7 19:22 second
-rw-rw-r-- 1 user user    0 Mar  7 20:14 soft_link.txt
-rw-rw-r-- 1 root user    0 Mar  7 20:13 third.txt
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
```

In hard link it created a new file "kovalinkki" because the file has to exist in hard link situations.

```
user@AA3209-Ubuntu:~$ rm soft_link.txt
user@AA3209-Ubuntu:~$ rm hard_link.txt
user@AA3209-Ubuntu:~$ ls -l
total 24
drwxrwxr-x 3 user user 4096 Feb 22 01:22 apache
-rw-rw-r-- 1 user user    0 Mar  7 19:21 first.txt
drwxrwxr-x 2 user user 4096 Feb 22 01:54 funet
drwxrwxr-x 5 user user 4096 Feb 21 23:56 hl
drwxrwxr-x 3 user user 4096 Feb 14 13:58 kansiol
-rw-rw-r-- 1 user user    0 Mar  7 20:14 kovalinkki.txt
lrwxrwxrwx 1 user user   13 Mar  7 20:21 pehmeelinkki.txt -> soft_link.txt
drwx------ 2 root user 4096 Mar  7 19:22 second
-rw-rw-r-- 1 root user    0 Mar  7 20:13 third.txt
drwxrwxr-x 2 user user 4096 Feb 14 14:48 tmp
user@AA3209-Ubuntu:~$
```

After removing the soft_link.txt and hard_link.txt files the soft link file turned red to show that the file it is linked to no more exists. The hard link file stayed since it is a "normal file".

7.

```
user@AA3209-Ubuntu:/etc$ find -maxdepth 1  -type f -name "l*.conf"
./logrotate.conf
./libaudit.conf
./ltrace.conf
./ld.so.conf
user@AA3209-Ubuntu:/etc$
```

8.

```
user@AA3209-Ubuntu:/tmp$ mkdir sensors
user@AA3209-Ubuntu:/tmp$ cd sensors
```

```
user@AA3209-Ubuntu:/tmp/sensors$ mkdir s1 s2 s3
user@AA3209-Ubuntu:/tmp/sensors$ ls
s1  s2  s3
user@AA3209-Ubuntu:/tmp/sensors$ cd s1
user@AA3209-Ubuntu:/tmp/sensors/s1$ touch temp.log
user@AA3209-Ubuntu:/tmp/sensors/s1$ cd /sensord/s2
-bash: cd: /sensord/s2: No such file or directory
user@AA3209-Ubuntu:/tmp/sensors/s1$ cd /sensors/s2
-bash: cd: /sensors/s2: No such file or directory
user@AA3209-Ubuntu:/tmp/sensors/s1$ cd /tmp/sensors/s2
user@AA3209-Ubuntu:/tmp/sensors/s2$ touch temp.log
user@AA3209-Ubuntu:/tmp/sensors/s2$ cd /tmp/sensors/s3
user@AA3209-Ubuntu:/tmp/sensors/s3$ touch temp.log
user@AA3209-Ubuntu:/tmp/sensors/s3$ ls
temp.log
user@AA3209-Ubuntu:/tmp/sensors/s3$ 
```

9.

```
user@AA3209-Ubuntu:/tmp$ sudo chown root sensors
user@AA3209-Ubuntu:/tmp$ ls -l
total 32
drwxrwxr-x 2 user user 4096 Feb 14 14:44 hl
drwxrwxr-x 5 root user 4096 Mar  7 20:50 sensors
```

```
user@AA3209-Ubuntu:/tmp$ cd /tmp/sensors
user@AA3209-Ubuntu:/tmp/sensors$ sudo chown root s1
user@AA3209-Ubuntu:/tmp/sensors$ sudo chown root s2
user@AA3209-Ubuntu:/tmp/sensors$ sudo chown root s3
```

```
user@AA3209-Ubuntu:/tmp/sensors$ cd /tmp/sensors
user@AA3209-Ubuntu:/tmp/sensors$ ls -l
total 12
drwxrwx--- 2 root user 4096 Mar  7 20:51 s1
drwx------ 2 root user 4096 Mar  7 20:52 s2
drwx------ 2 root user 4096 Mar  7 20:52 s3
user@AA3209-Ubuntu:/tmp/sensors$ 
```

```
user@AA3209-Ubuntu:/tmp/sensors/s1$ sudo chown root temp.log
user@AA3209-Ubuntu:/tmp/sensors/s1$ ls -l
total 0
-rw-rw-r-- 1 root user 0 Mar  7 20:51 temp.log
user@AA3209-Ubuntu:/tmp/sensors/s1$
```

Changed owner of tem.log in s2 and s3 to root too.

```
user@AA3209-Ubuntu:/tmp/sensors/s1$ sudo chmod 760 temp.log
user@AA3209-Ubuntu:/tmp/sensors/s1$ ls -l
total 0
-rwxrw---- 1 root user 0 Mar  7 20:51 temp.log
user@AA3209-Ubuntu:/tmp/sensors/s1$
```

```
root@AA3209-Ubuntu:/tmp/sensors/s2# chmod 700 temp.log
root@AA3209-Ubuntu:/tmp/sensors/s2# ls -l
total 0
-rwx------ 1 root user 0 Mar  7 20:52 temp.log
root@AA3209-Ubuntu:/tmp/sensors/s2#
```

Used chmod 700 temp.log command also in s3 directory to change
permissions. I also had to change user to root since directories s2 and s3 only
had permissions for root user.