

Linux & Bash Essentials

1. To discover files with active sticky bits with following version of the find command.

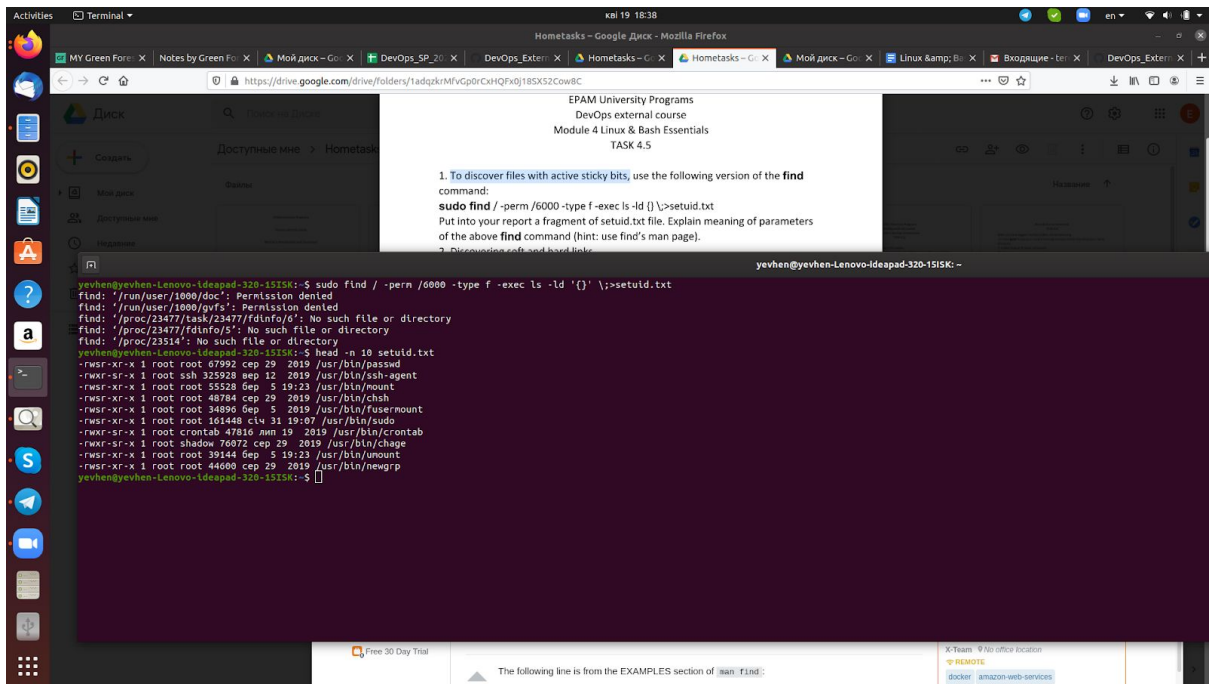
```
sudo find / -perm /6000 -type f -exec ls -ld '{}' \;>setuid.txt
```

find / it is a directory to find files

-perm /6000 bits with access right

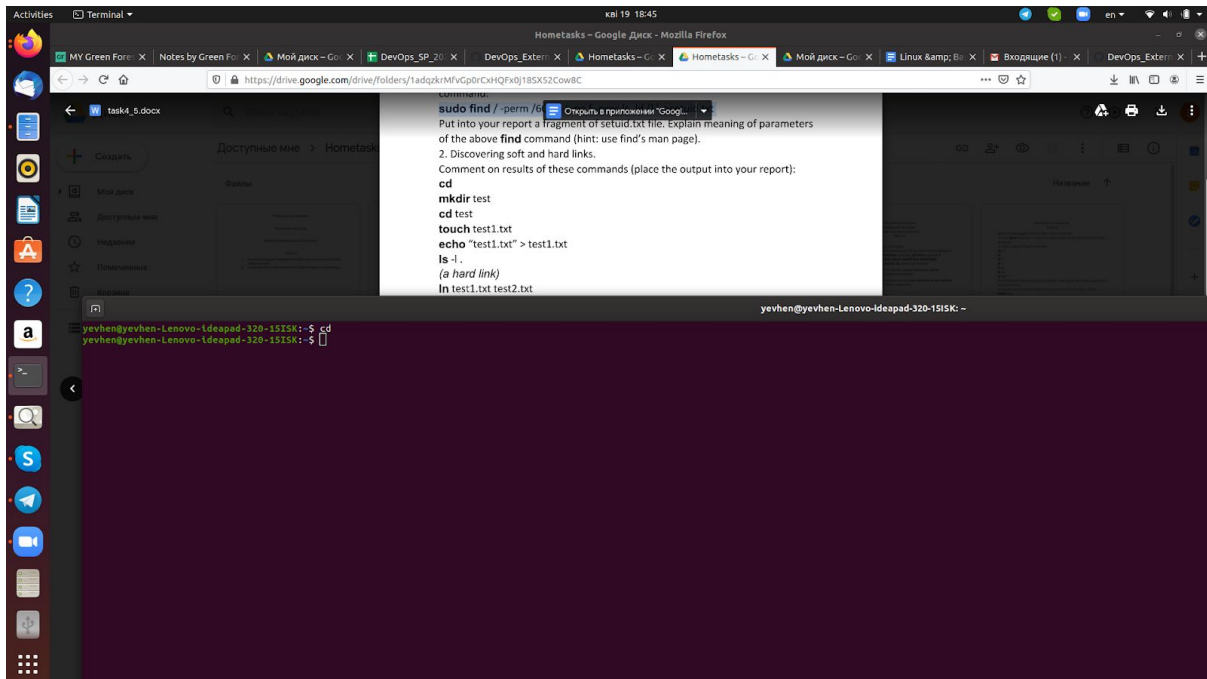
-type f it's a type of search to use

-exec command show the output

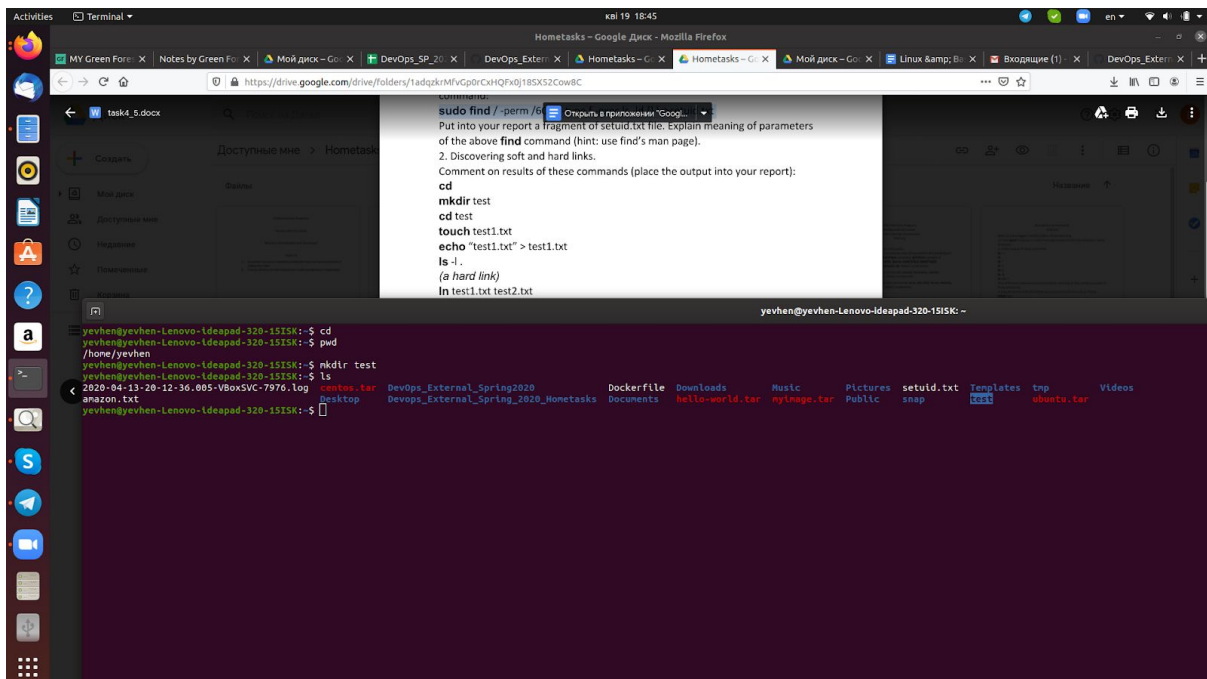


2. Discovering soft and hard links.

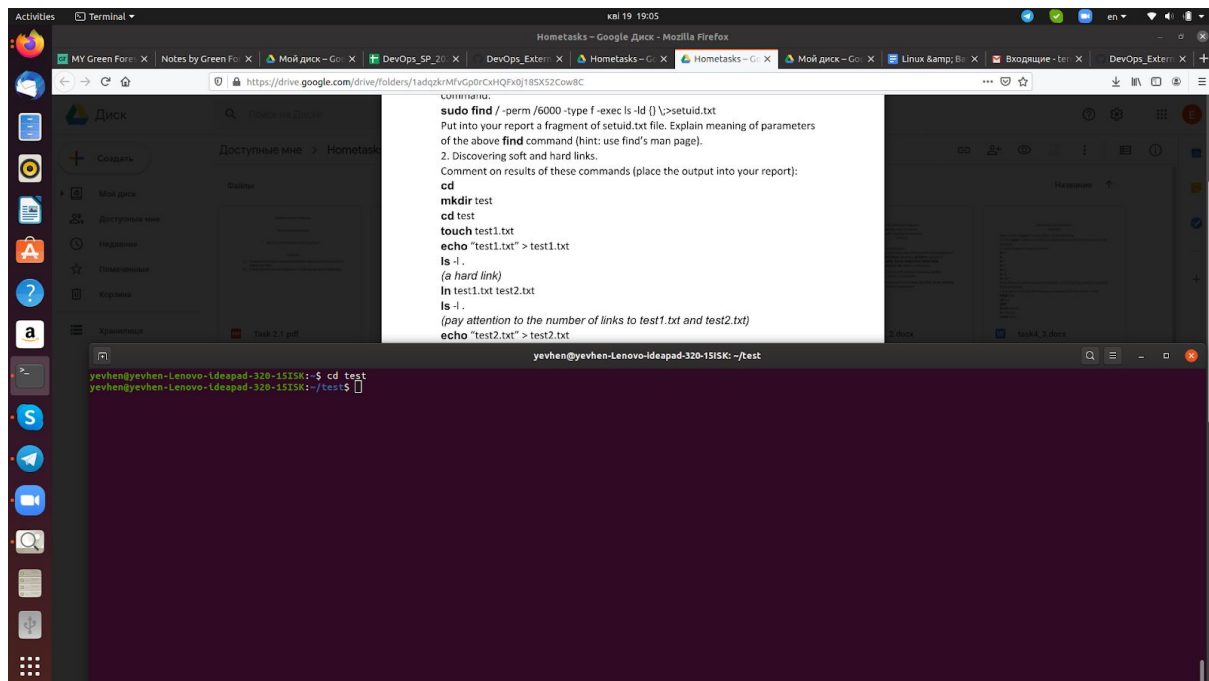
`cd` change directory to home



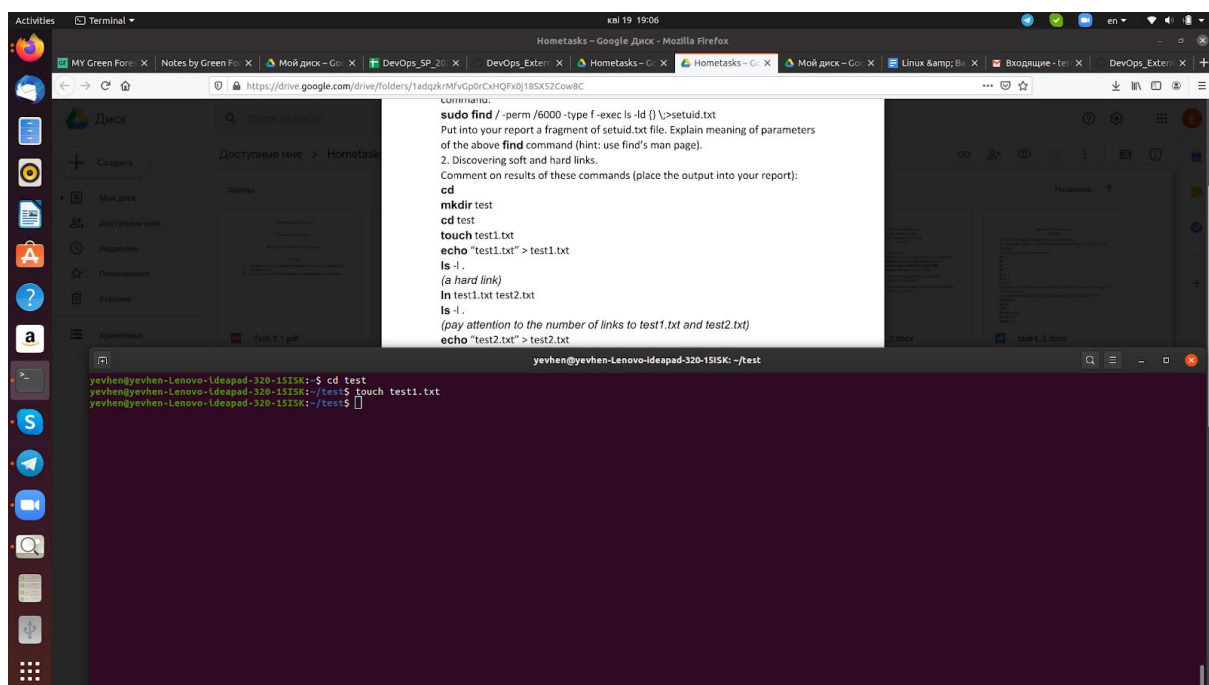
`mkdir test` create directory



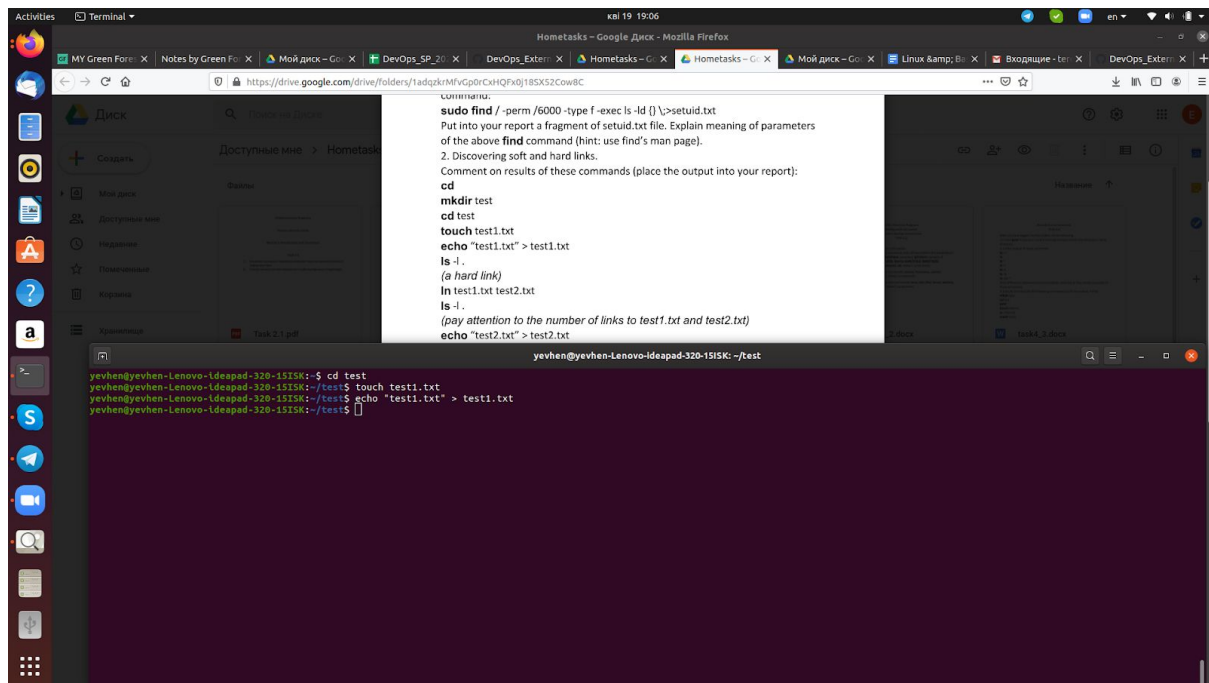
cd test change to that directory



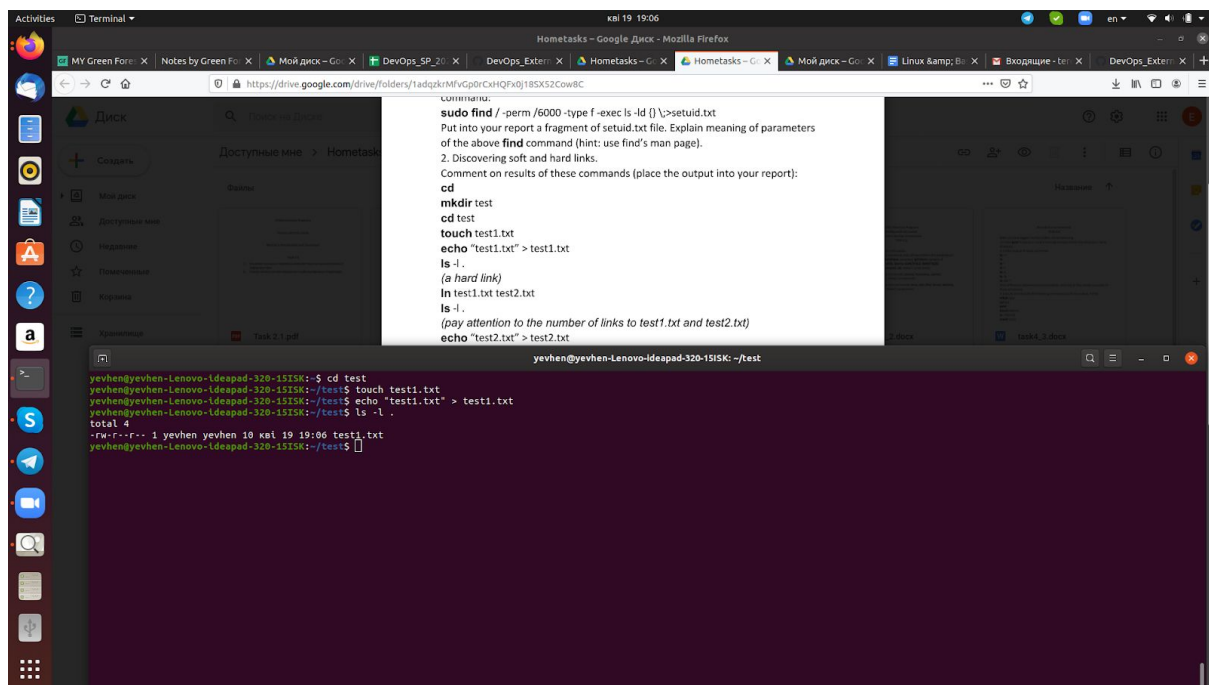
touch test1.txt create file test1.txt



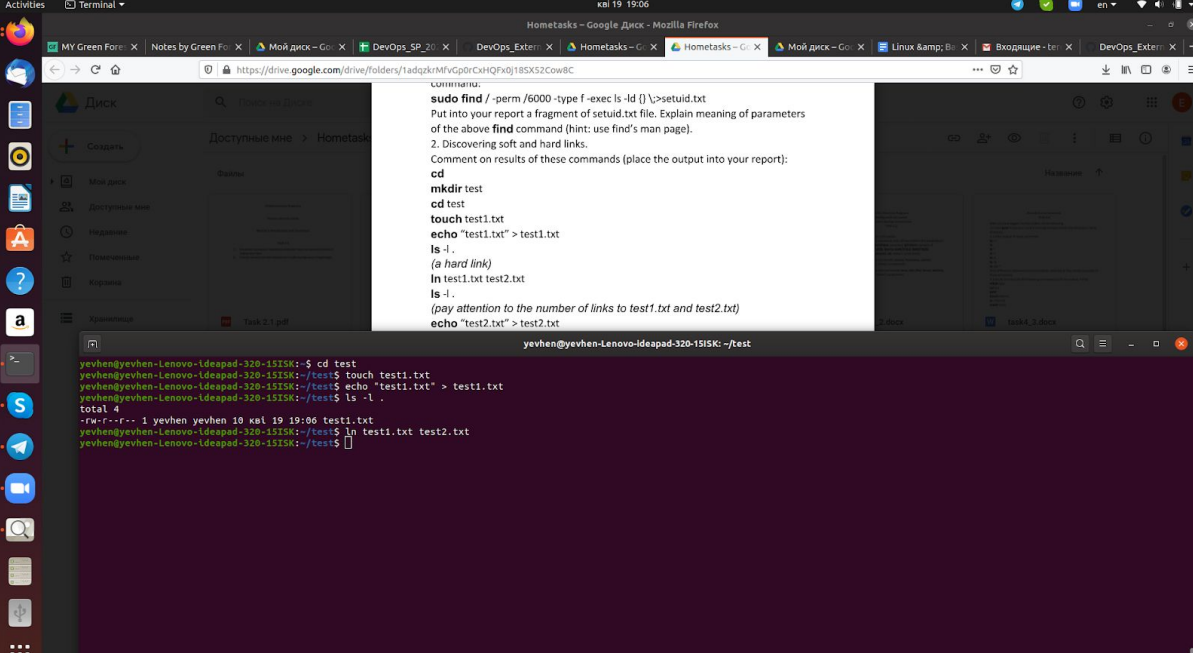
echo "test1.txt" > test1.txt write some message to file



ls -l . show output content of directory



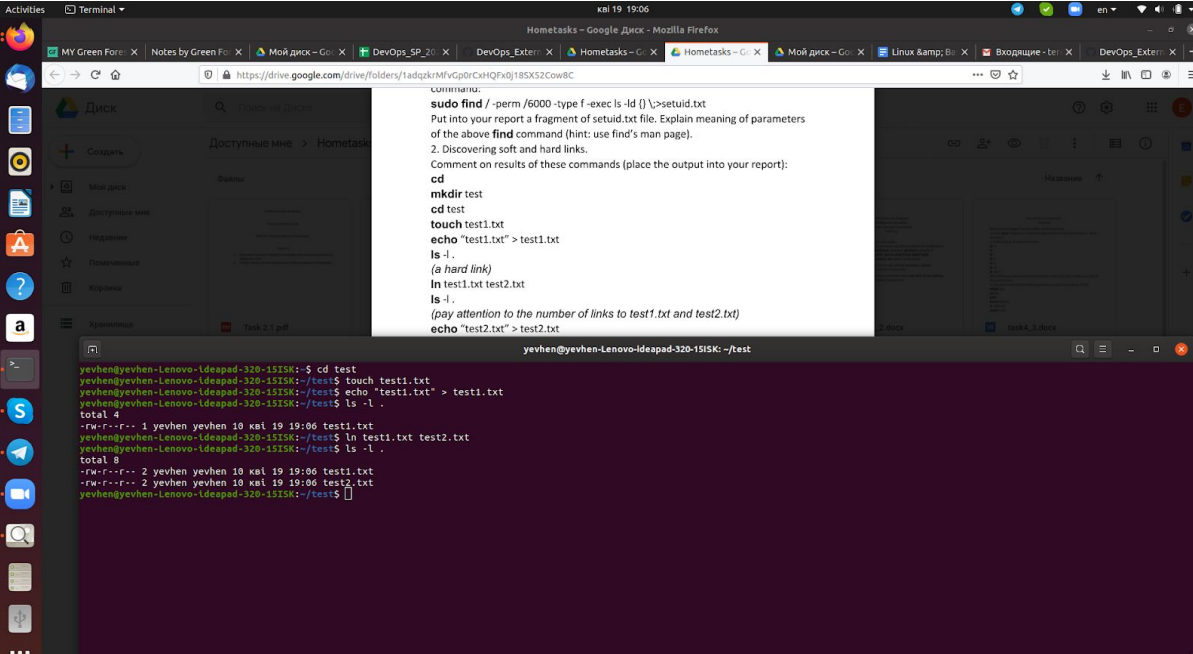
In test1.txt test2.txt create a hard link



```
Commentary:
sudo find / -perm /6000 -type f -exec ls -ld {} \;>setuid.txt
Put into your report a fragment of setuid.txt file. Explain meaning of parameters
of the above find command (hint: use find's man page).
2. Discovering soft and hard links.
Comment on results of these commands (place the output into your report):
cd
mkdir test
cd test
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ cd test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ touch test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ echo "test1.txt" > test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 4
-rw-r--r-- 1 yevhen yevhen 10 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

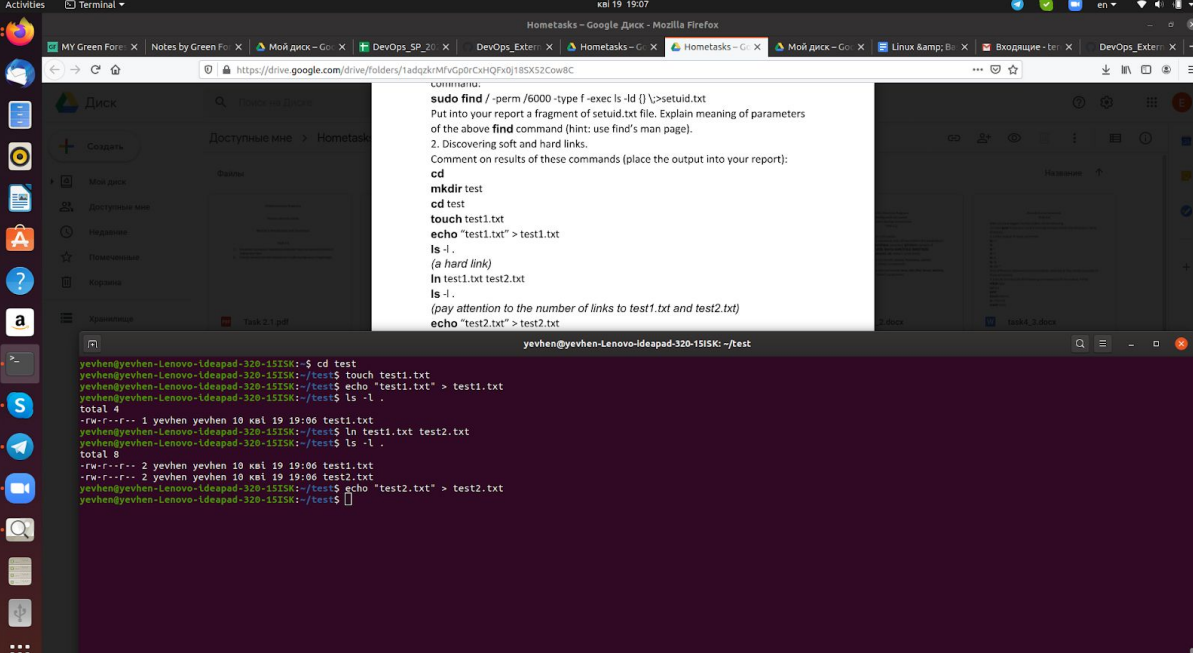
ls -l . show output content of directory



```
Commentary:
sudo find / -perm /6000 -type f -exec ls -ld {} \;>setuid.txt
Put into your report a fragment of setuid.txt file. Explain meaning of parameters
of the above find command (hint: use find's man page).
2. Discovering soft and hard links.
Comment on results of these commands (place the output into your report):
cd
mkdir test
cd test
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ cd test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ touch test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ echo "test1.txt" > test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 4
-rw-r--r-- 1 yevhen yevhen 10 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 8
-rw-r--r-- 2 yevhen yevhen 10 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

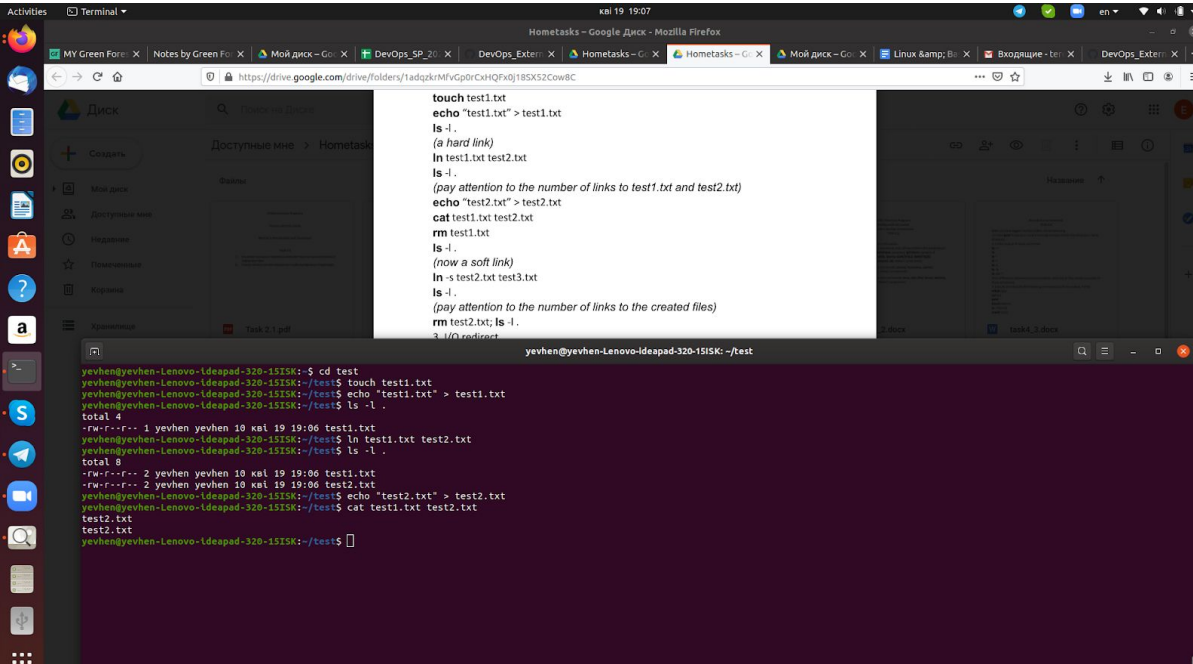
echo "test2.txt" > test2.txt input that 'string' into file



The screenshot shows a terminal window with the following commands and output:

```
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~$ cd test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ touch test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ echo "test1.txt" > test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 8
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ echo "test2.txt" > test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$
```

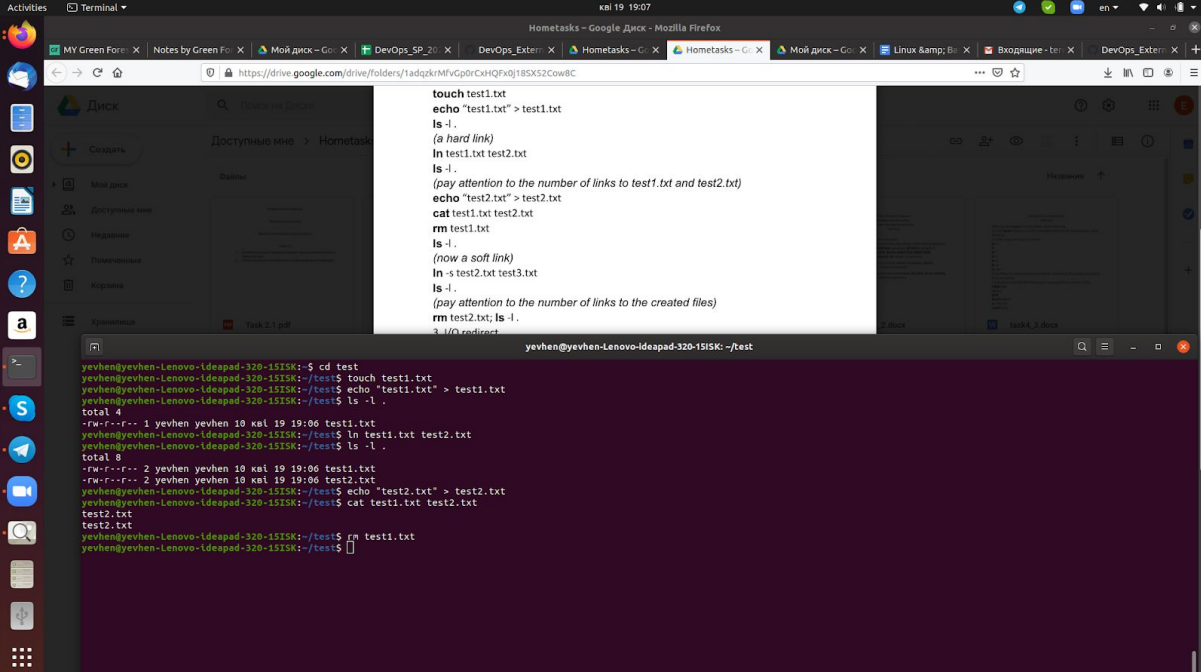
cat test1.txt test2.txt show content of files



The screenshot shows a terminal window with the following commands and output:

```
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~$ cd test
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ touch test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ echo "test1.txt" > test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 8
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ echo "test2.txt" > test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ cat test1.txt test2.txt
test1.txt
test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ rm test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ln -s test2.txt test3.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ ls -l .
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test2.txt
lrwxrwxrwx 1 yevhen yevhen 10 kал 19 19:06 test3.txt -> test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$ rm test2.txt; ls -l .
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test3.txt -> test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:/test$
```


rm test1.txt delete file

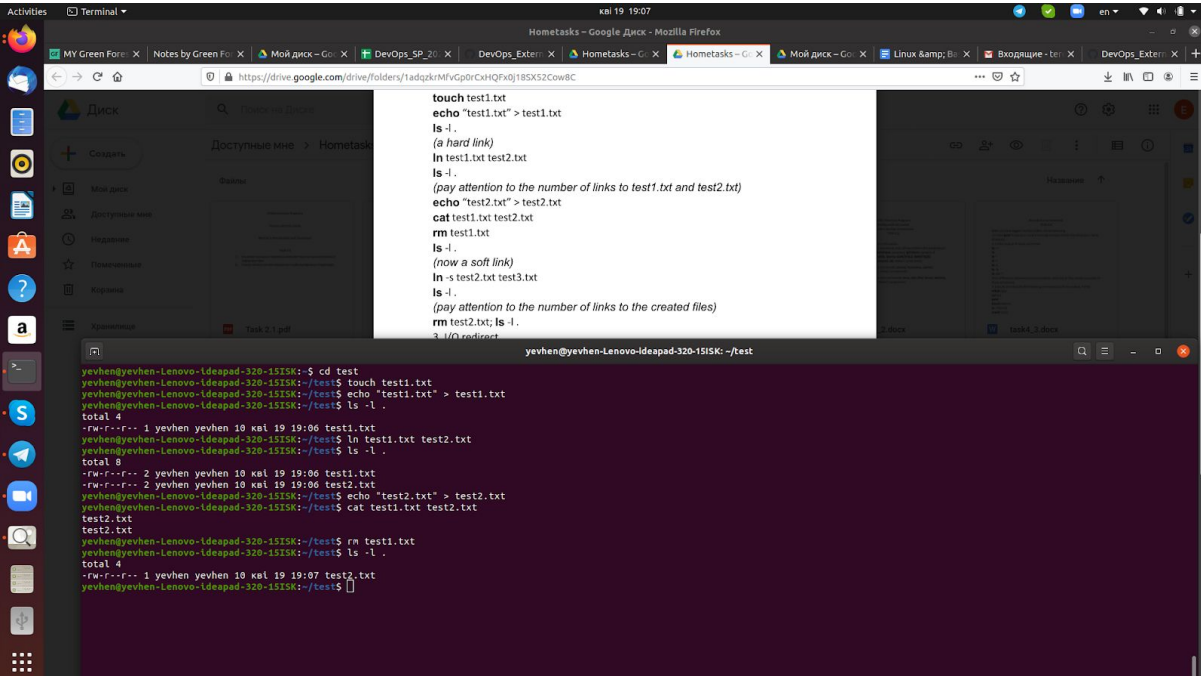


The screenshot shows a Linux desktop environment with a terminal window and a web browser. The terminal window displays the following commands and output:

```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention to the number of links to the created files)
rm test2.txt; ls -l
3.1/0 reading...
```

The web browser shows a Google Drive interface with a file named "Task 2.1.pdf".

ls -l show content of directory

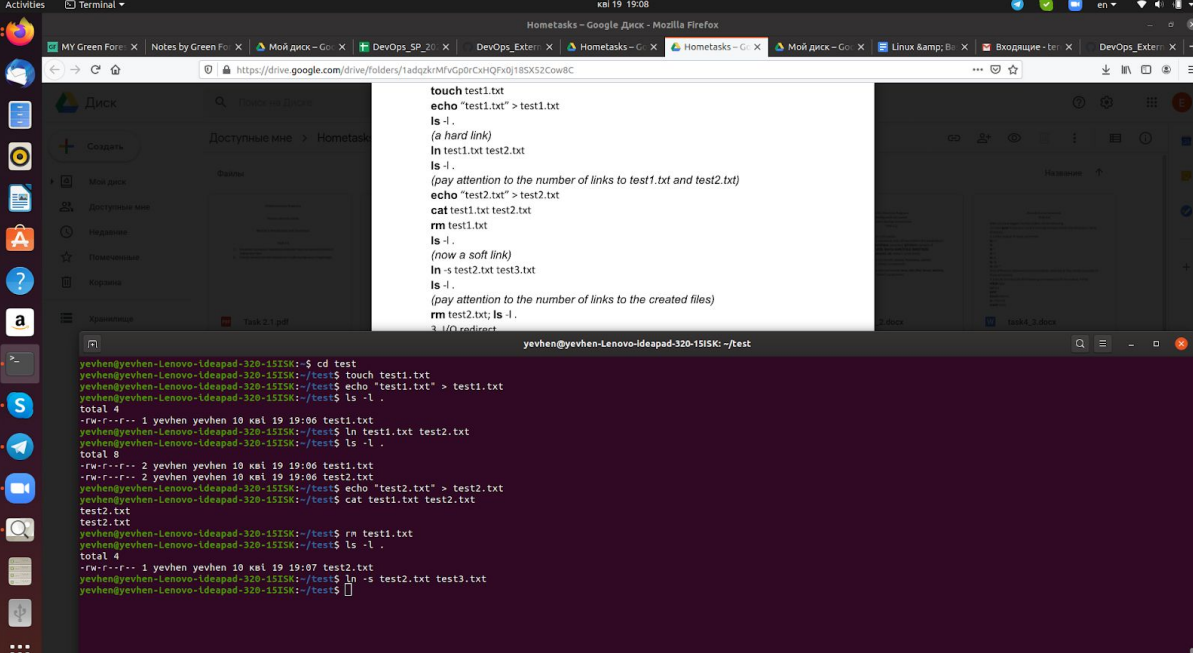


The screenshot shows a Linux desktop environment with a terminal window and a web browser. The terminal window displays the following commands and output:

```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention to the number of links to the created files)
rm test2.txt; ls -l
3.1/0 reading...
```

The web browser shows a Google Drive interface with a file named "Task 2.1.pdf".

In -s test2.txt test3.txt create a soft link

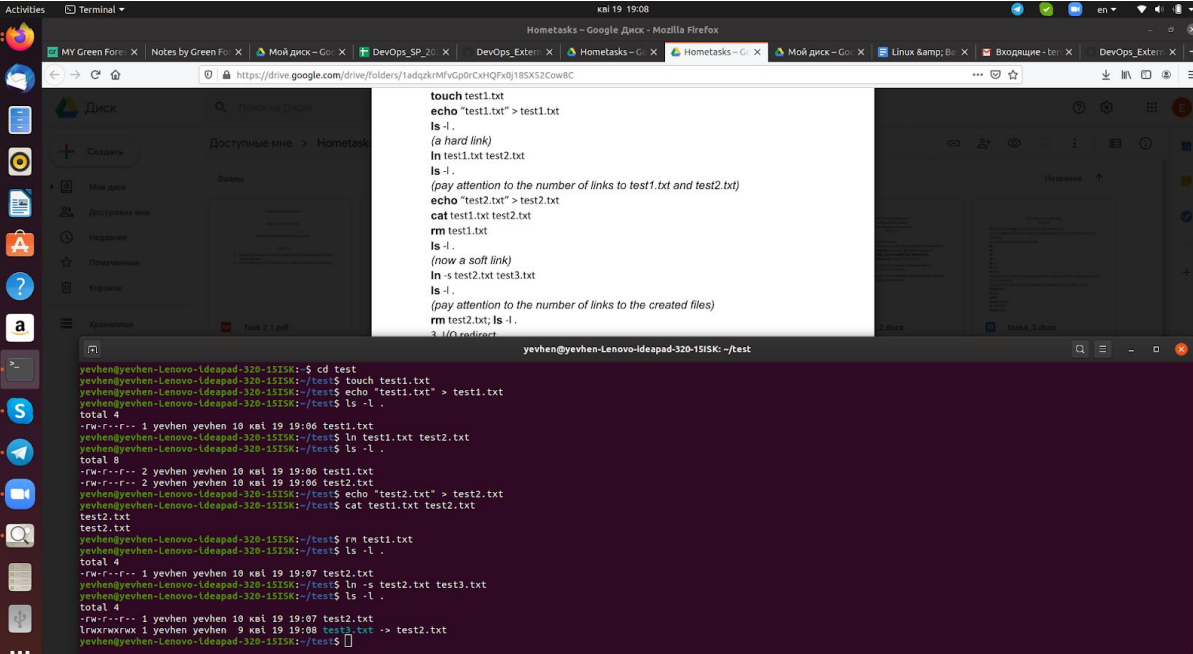


The screenshot shows a terminal window with the following commands and output:

```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention to the number of links to the created files)
rm test2.txt; ls -l
3.1/0 reading...
```

The terminal output shows the directory listing after each command, indicating the creation of hard and soft links and the removal of files.

ls -l . show content of directory

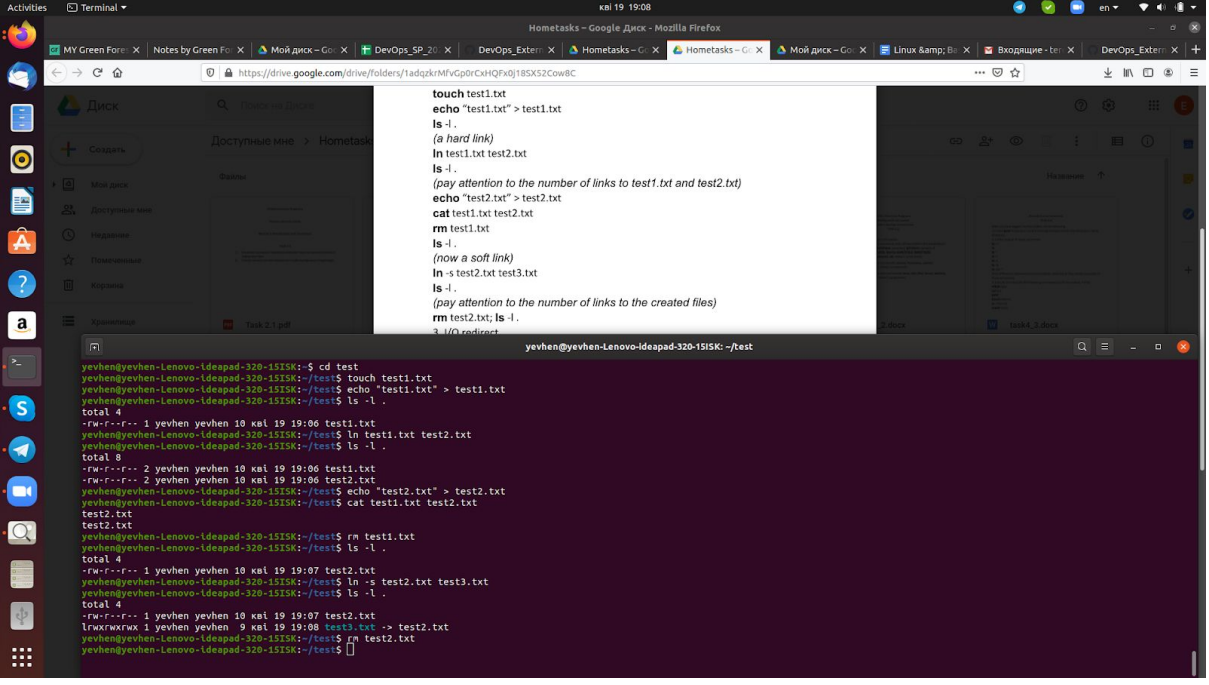


The screenshot shows a terminal window with the following commands and output:

```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention to the number of links to the created files)
rm test2.txt; ls -l
3.1/0 reading...
```

The terminal output shows the directory listing after each command, indicating the creation of hard and soft links and the removal of files.

rm test2.txt delete file

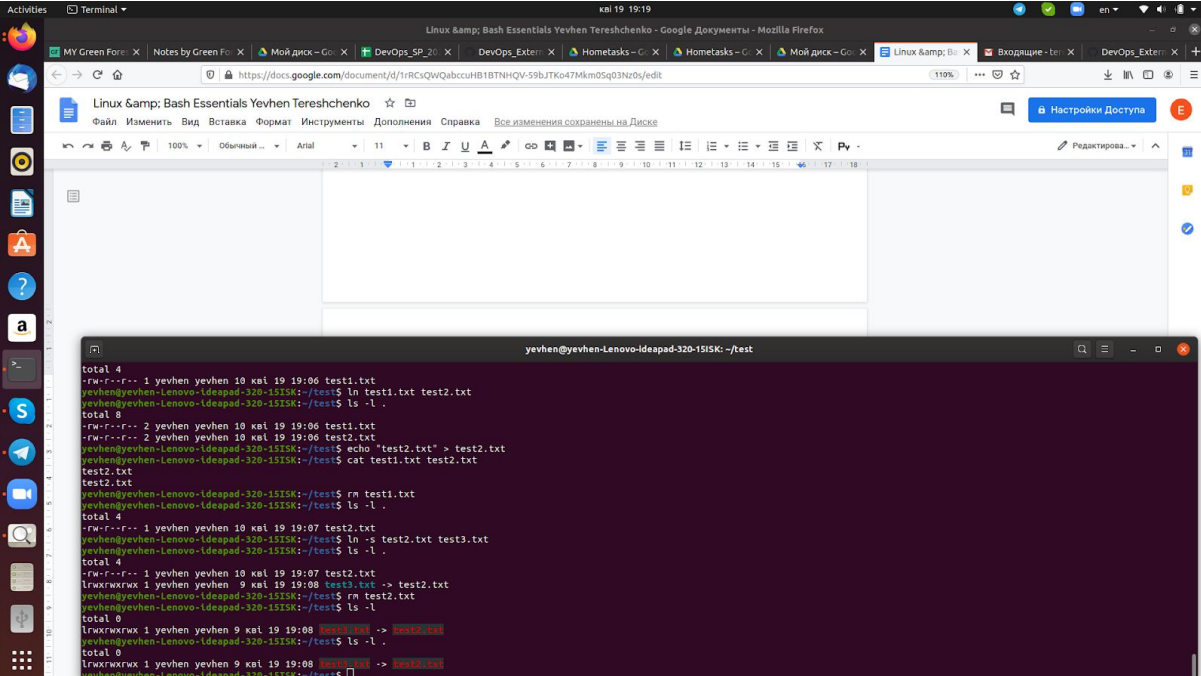


The screenshot shows a Linux desktop environment. In the background, a web browser displays a Google Drive folder named 'Hometaask'. In the foreground, a terminal window shows the following commands and their output:

```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt test2.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention to the number of links to the created files)
rm test2.txt; ls -l
3.1/0.xendia
```

The terminal output shows the file permissions and the number of links for each file. For example, after creating test1.txt and test2.txt as hard links, both show '2 links'. After removing test1.txt, test2.txt still shows '2 links' because it is a hard link. After creating test3.txt as a soft link to test2.txt, it shows '1 link'. Finally, after removing test2.txt, test3.txt shows '0 links' because it is a broken soft link.

ls -l show content of directory



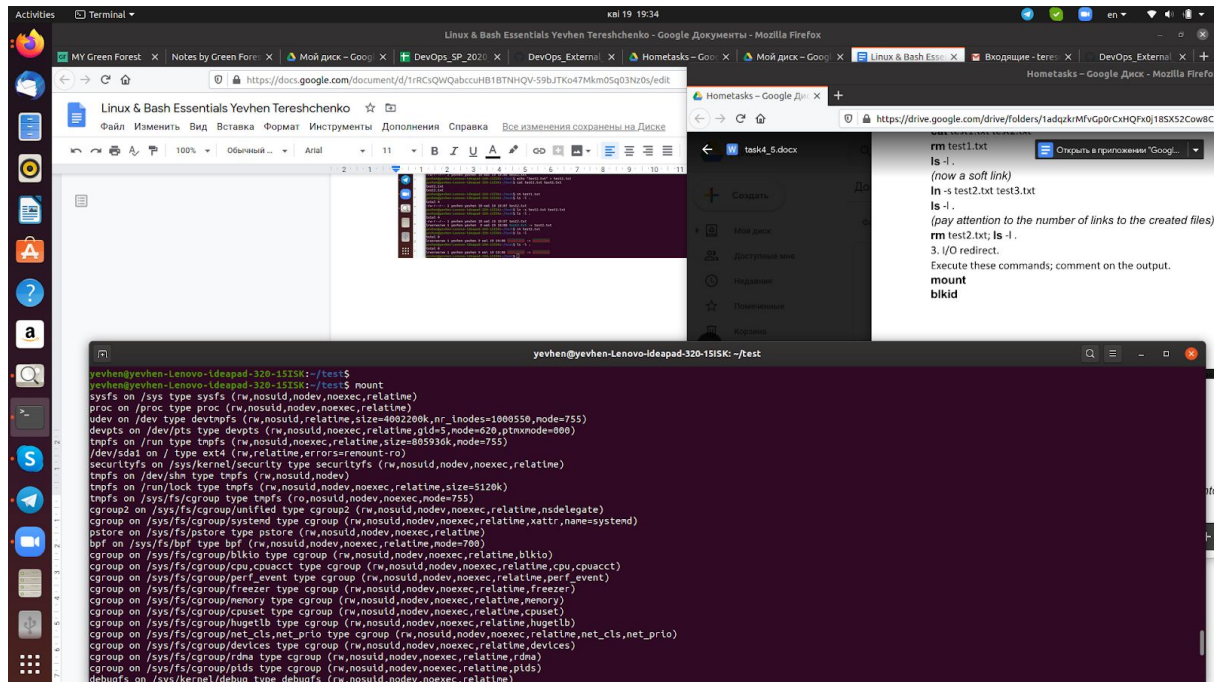
The screenshot shows a Linux desktop environment. In the background, a web browser displays a Google Docs document. In the foreground, a terminal window shows the following commands and their output:

```
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 8
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ echo "test2.txt" > test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ cat test1.txt test2.txt
test1.txt
test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ rm test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:07 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln -s test2.txt test3.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:07 test2.txt
lrwxrwxrwx 1 yevhen yevhen 9 kал 19 19:08 test3.txt -> test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ rm test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 0
lrwxrwxrwx 1 yevhen yevhen 9 kал 19 19:08 test3.txt -> test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 0
lrwxrwxrwx 1 yevhen yevhen 9 kал 19 19:08 test3.txt -> test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

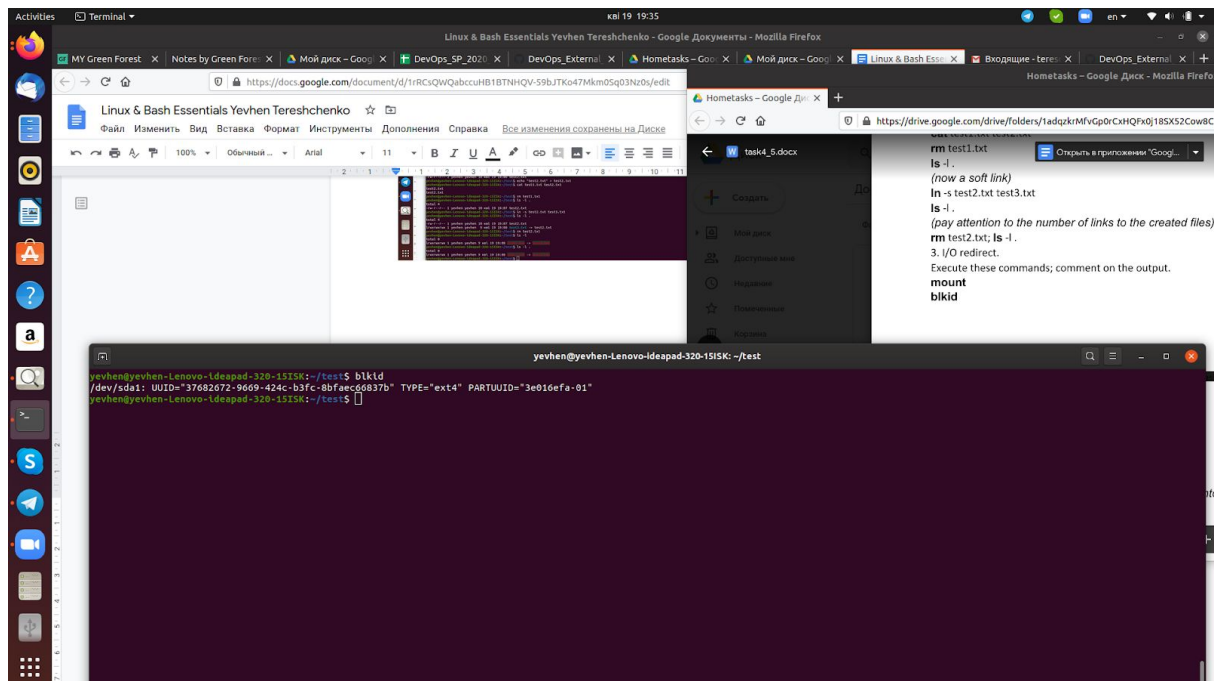
The terminal output shows the file permissions and the number of links for each file. For example, after creating test1.txt and test2.txt as hard links, both show '2 links'. After removing test1.txt, test2.txt still shows '2 links' because it is a hard link. After creating test3.txt as a soft link to test2.txt, it shows '1 link'. Finally, after removing test2.txt, test3.txt shows '0 links' because it is a broken soft link.

3 I/O redirect

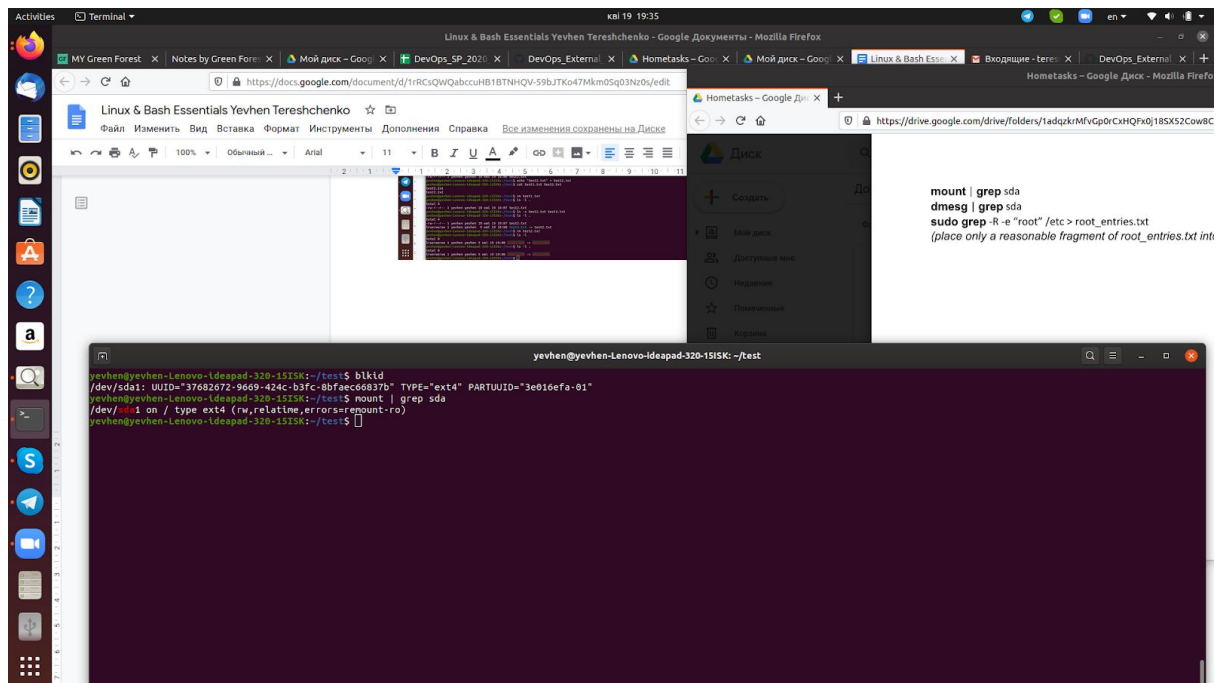
mount show mount a filesystem



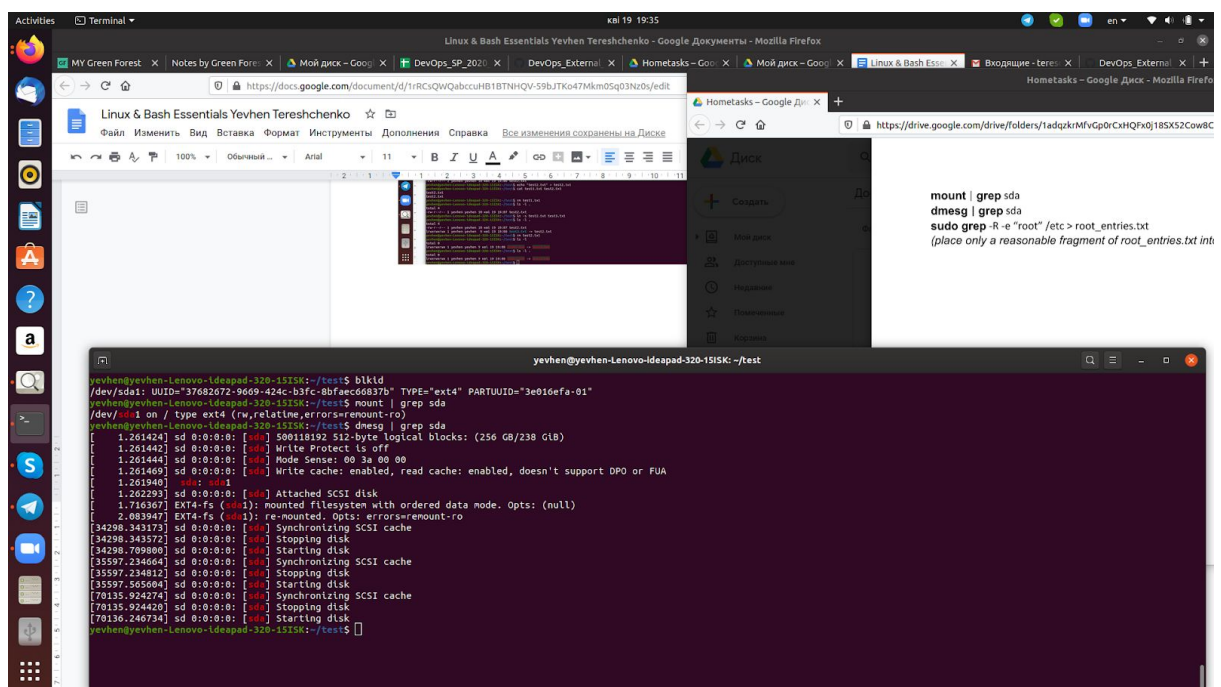
blkid locate/print block device attributes



mount | grep sda



dmesg | grep sda



`sudo grep -R -e "root" /etc > root_entries.txt`
recursively and use patterns.

Read all files under each directory,

