

Linux & Bash Essentials

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

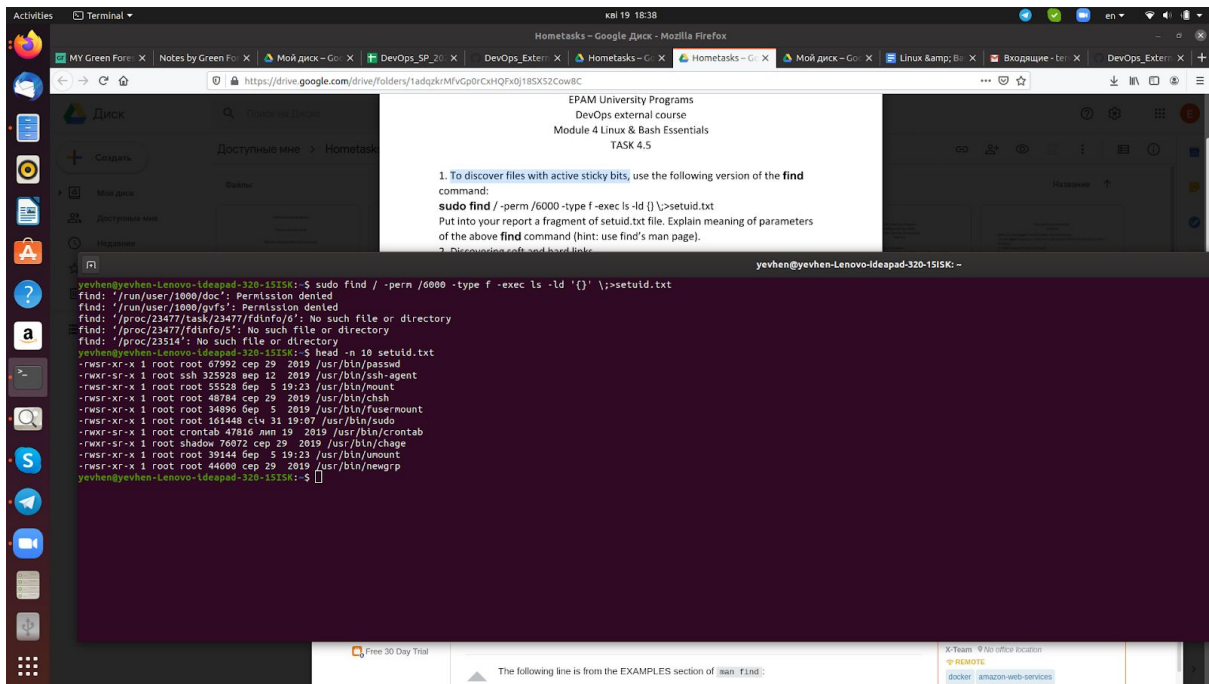
```
sudo find / -perm /6000 -type f -exec ls -ld '{}' \;>setuid.txt
```

find / it is a directory to find files

-perm /6000 bits with access right

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

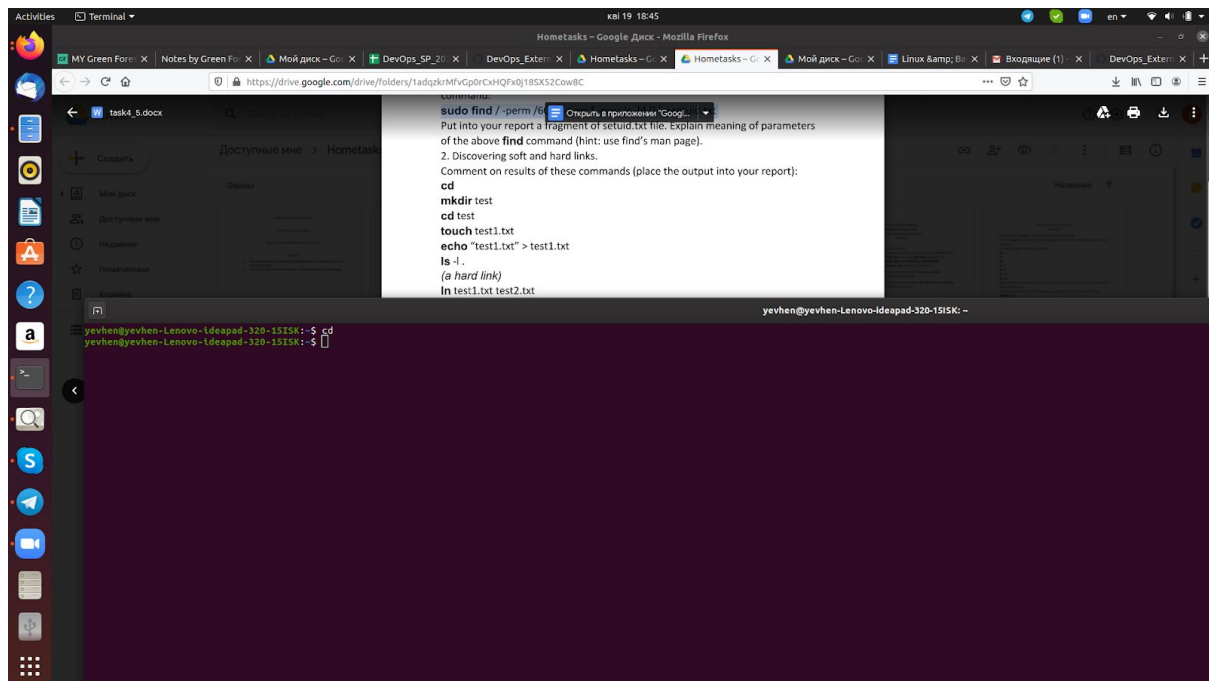
-exec command show the output



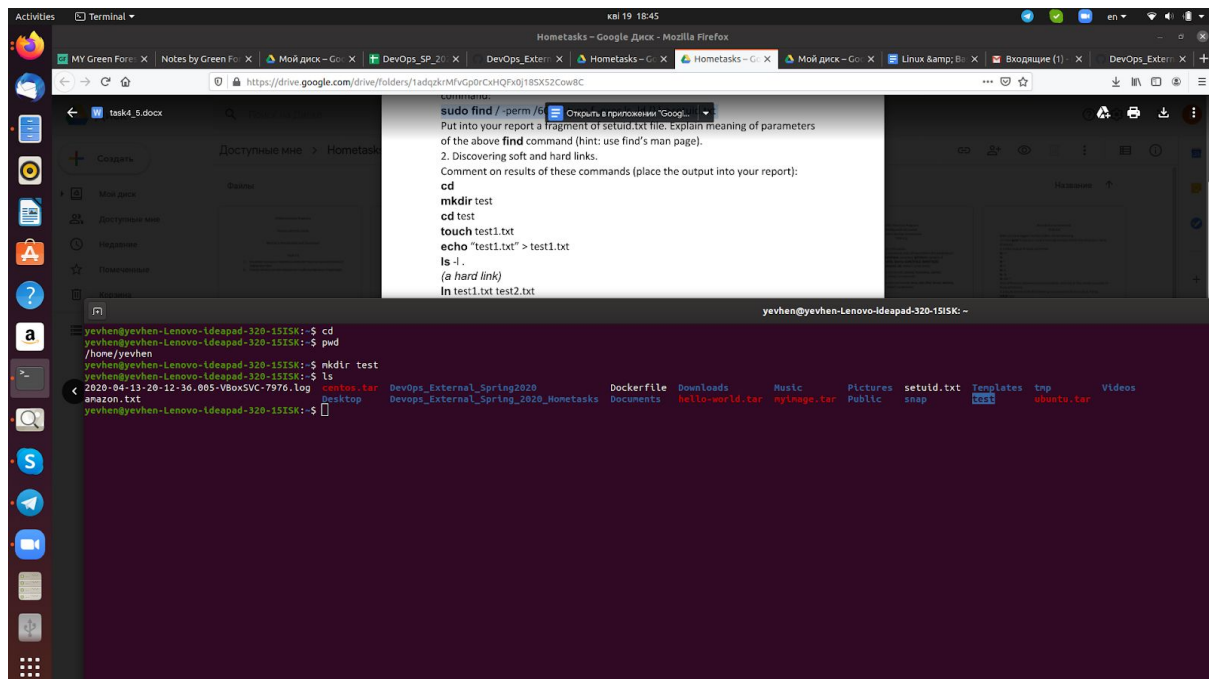
```
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~$ sudo find / -perm /6000 -type f -exec ls -ld '{}' \;>setuid.txt
find: '/run/user/1000/doc': Permission denied
find: '/run/user/1000/gvfs': Permission denied
find: '/proc/23477/task/23477/fdinfo/6': No such file or directory
find: '/proc/23477/fdinfo/5': No such file or directory
find: '/proc/23514': No such file or directory
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~$ head -n 10 setuid.txt
-rwxr-xr-x 1 root root 67992 cep 29 2019 /usr/bin/passwd
-rwxr-xr-x 1 root root 325928 bep 12 2019 /usr/bin/ssh-agent
-rwxr-xr-x 1 root root 55528 bep 5 19:23 /usr/bin/mount
-rwxr-xr-x 1 root root 48784 cep 29 2019 /usr/bin/chsh
-rwxr-xr-x 1 root root 34896 bep 5 2019 /usr/bin/fusemount
-rwxr-xr-x 1 root root 161448 cli 31 19:07 /usr/bin/sudo
-rwxr-xr-x 1 root root 47816 amn 19 2019 /usr/bin/crontab
-rwxr-xr-x 1 root root 76972 cep 29 2019 /usr/bin/chage
-rwxr-xr-x 1 root root 39144 bep 5 19:23 /usr/bin/umount
-rwxr-xr-x 1 root root 44680 cep 29 2019 /usr/bin/newgrp
yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~$
```

2. Discovering soft and hard links.

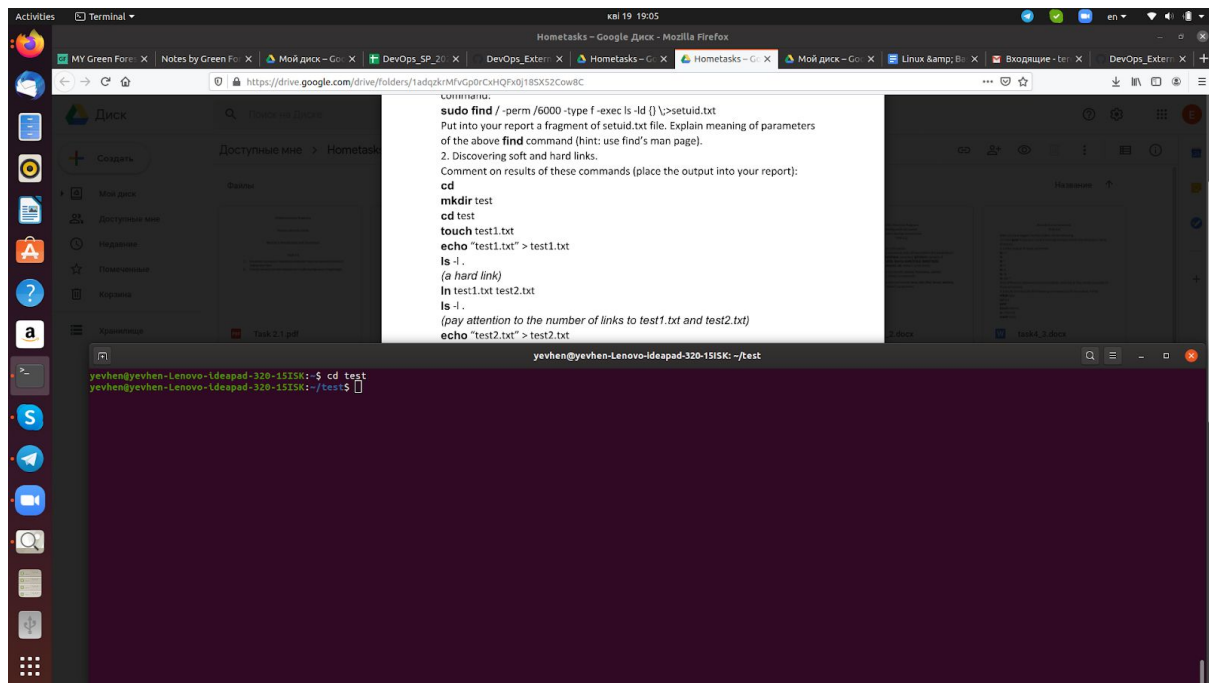
cd



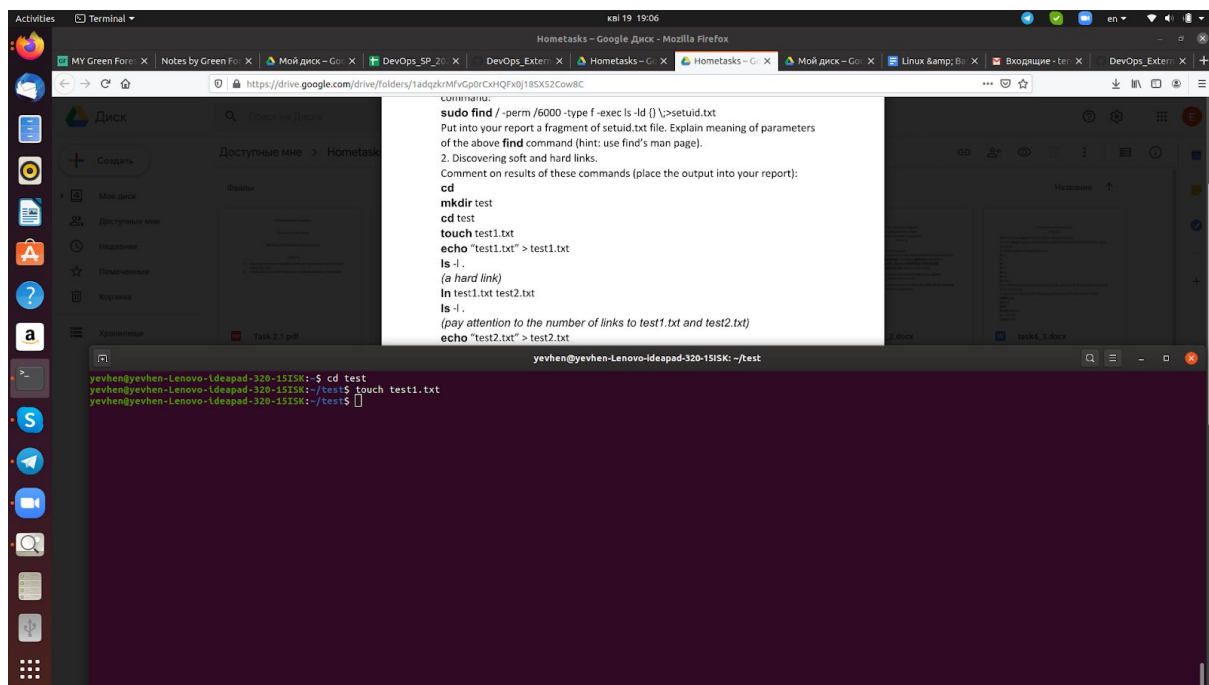
mkdir test



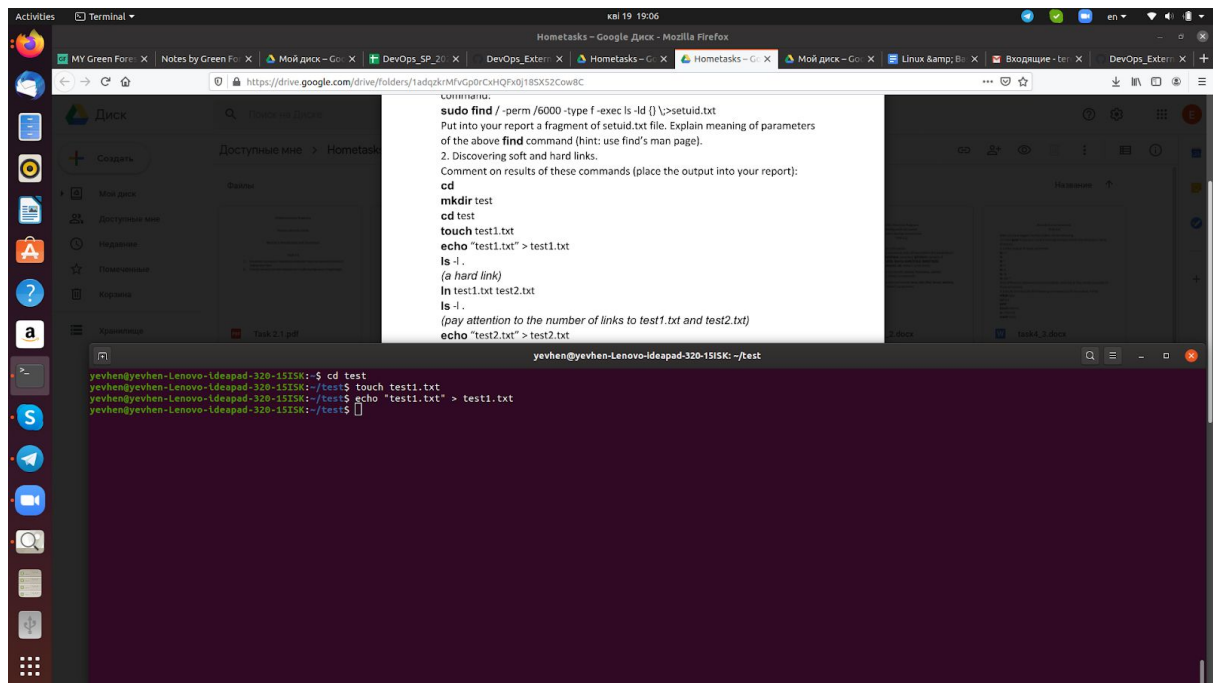
cd test



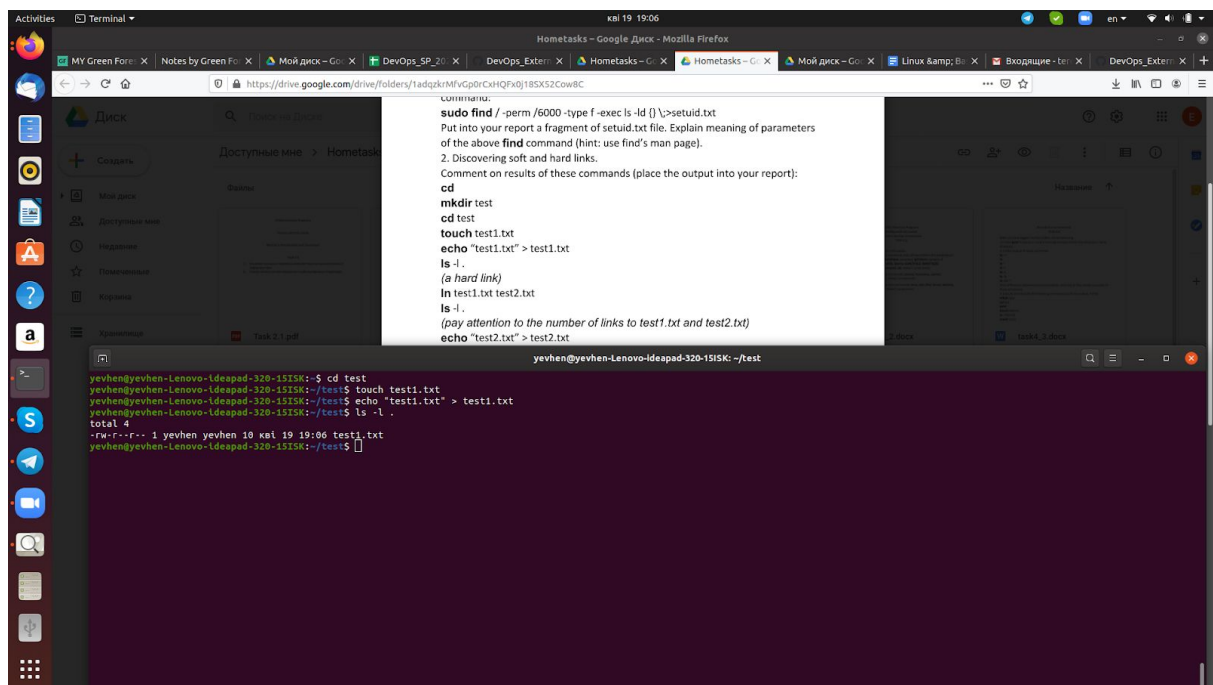
touch test1.txt



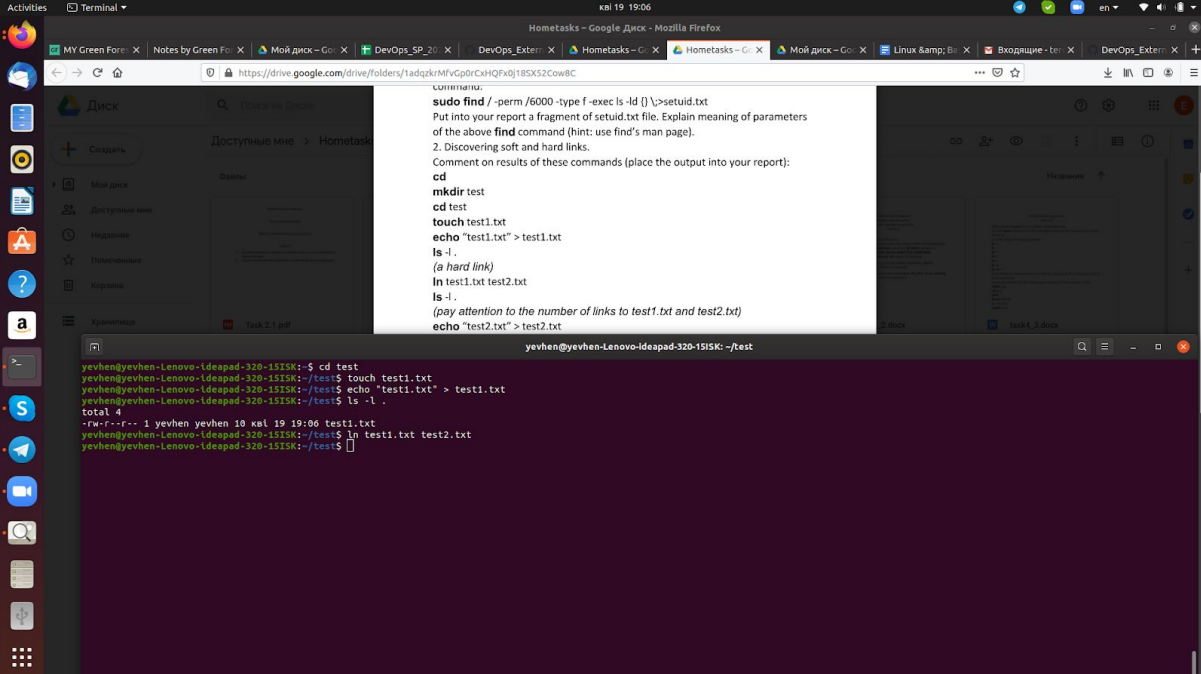
echo "test1.txt" > test1.txt



ls -l .



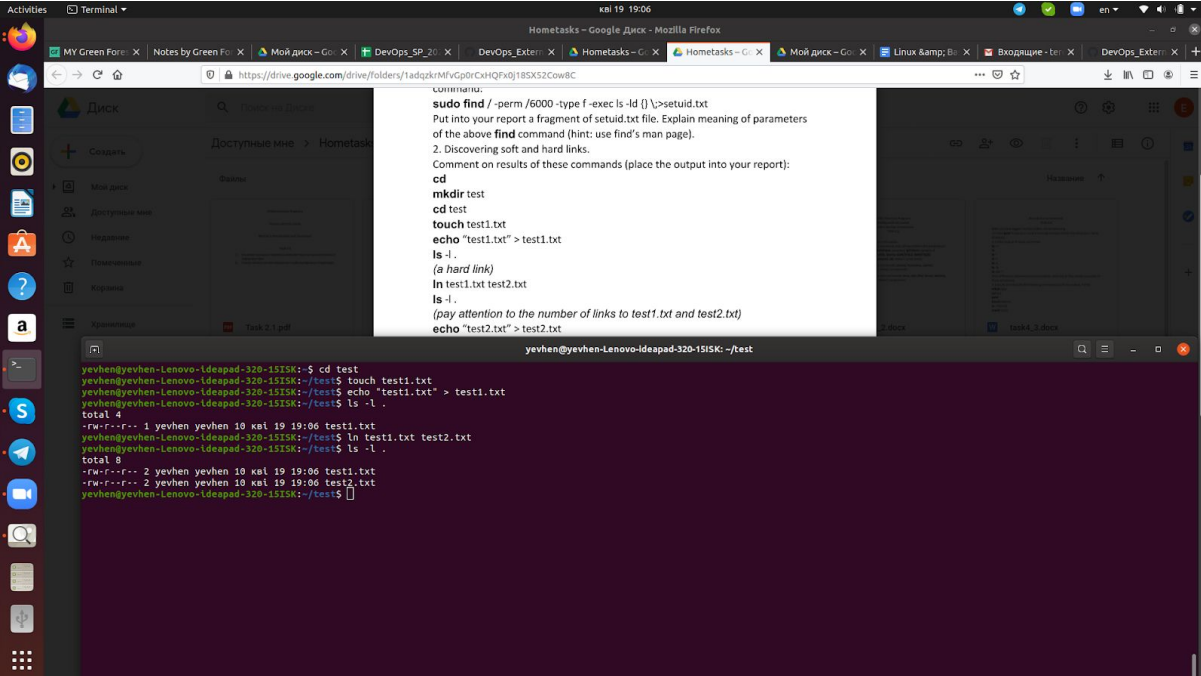
In test1.txt test2.txt



The screenshot shows a Kali Linux desktop environment. In the background, a web browser (Mozilla Firefox) displays a Google Drive page with a task description. The task involves creating a directory named 'test', creating a file 'test1.txt', and creating a hard link 'test2.txt' to 'test1.txt'. The terminal window in the foreground shows the execution of these commands:

```
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 kcal 19 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

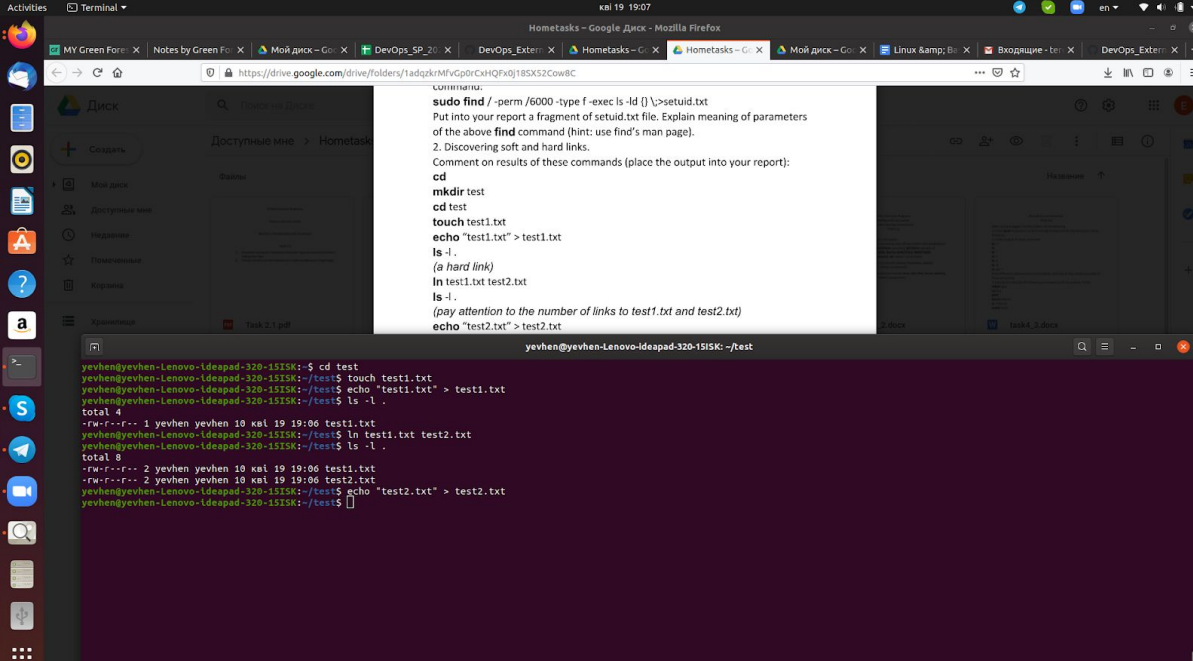
ls -l .



The screenshot shows a Kali Linux desktop environment. In the background, a web browser (Mozilla Firefox) displays a Google Drive page with a task description. The task involves creating a directory named 'test', creating a file 'test1.txt', and creating a hard link 'test2.txt' to 'test1.txt'. The terminal window in the foreground shows the execution of these commands, followed by a directory listing:

```
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 kcal 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 kcal 19 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 kcal 19 19:06 test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

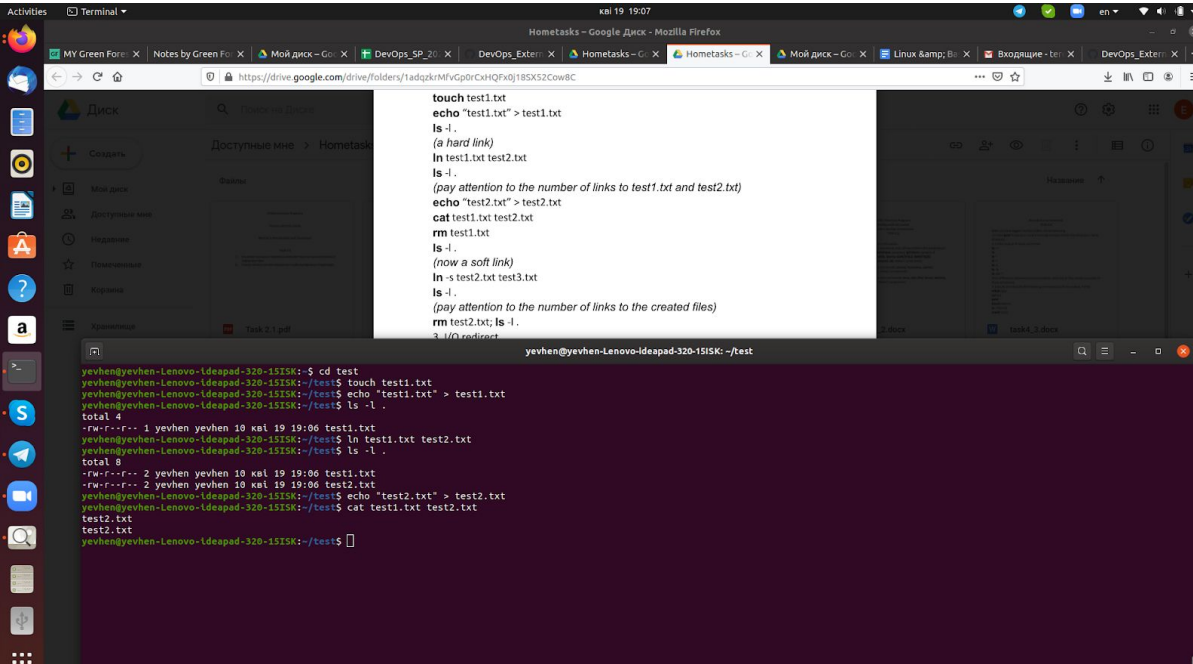
echo "test2.txt" > test2.txt



```

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/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$
```

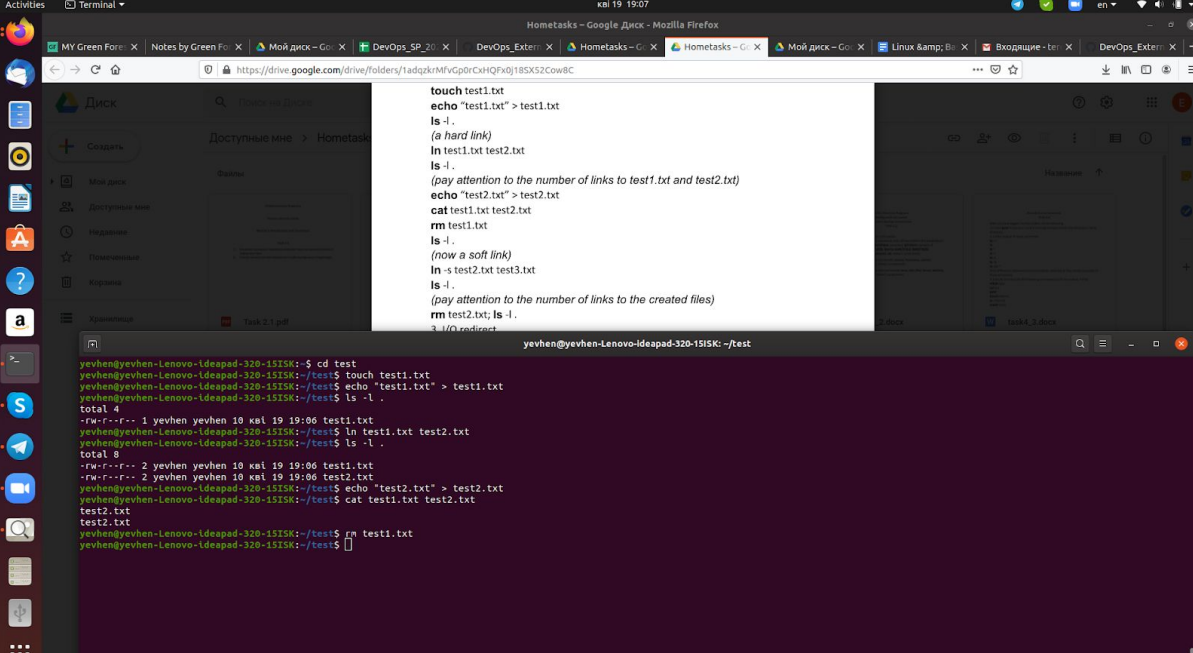
cat test1.txt test2.txt



```

yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/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
test2.txt
test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```


rm test1.txt



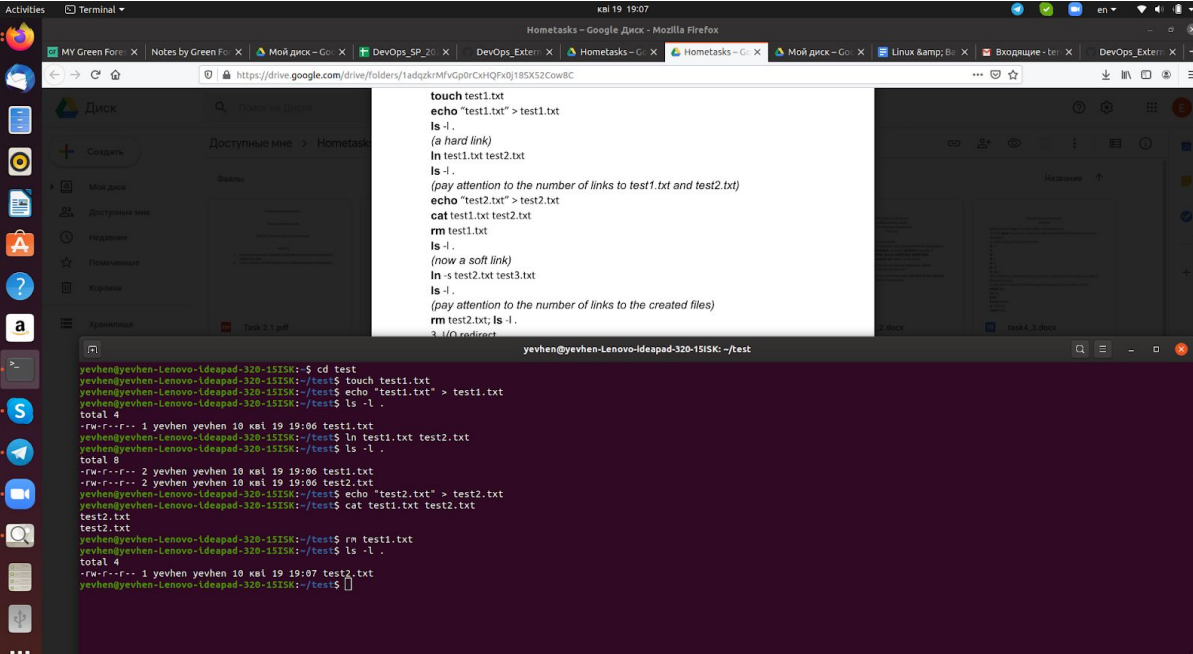
The screenshot shows a terminal window with the following commands and output:

```
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 file permissions and the number of links for each file:

```
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.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 .



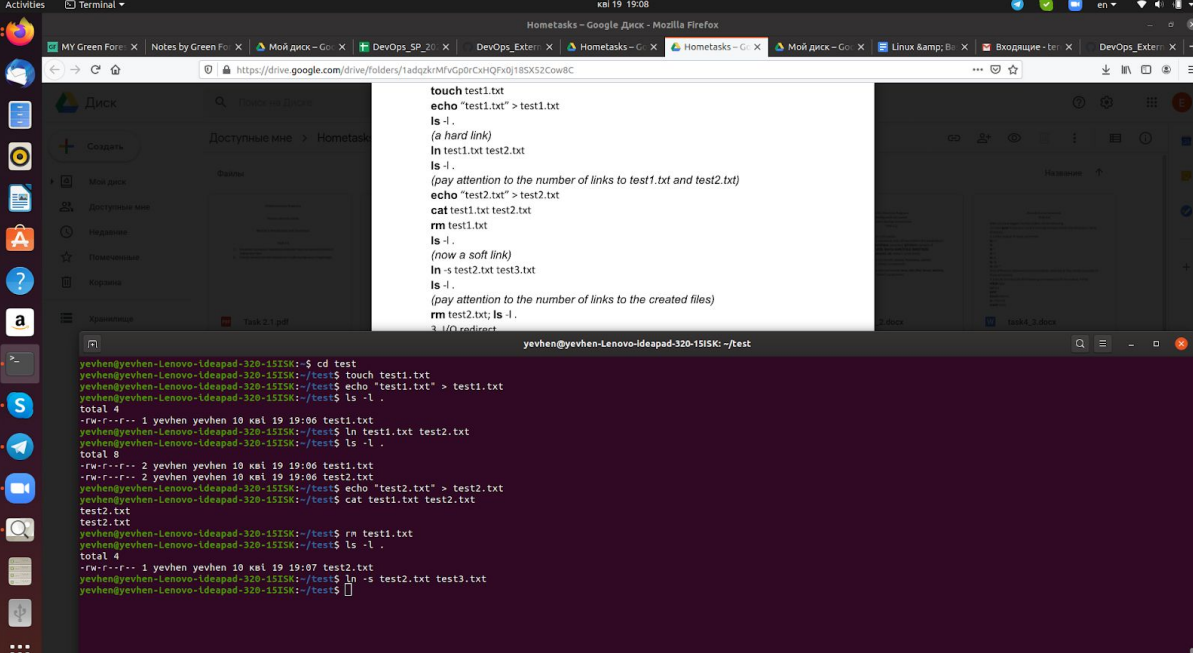
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touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
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 file permissions and the number of links for each file:

```
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.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$
```

In -s test2.txt test3.txt



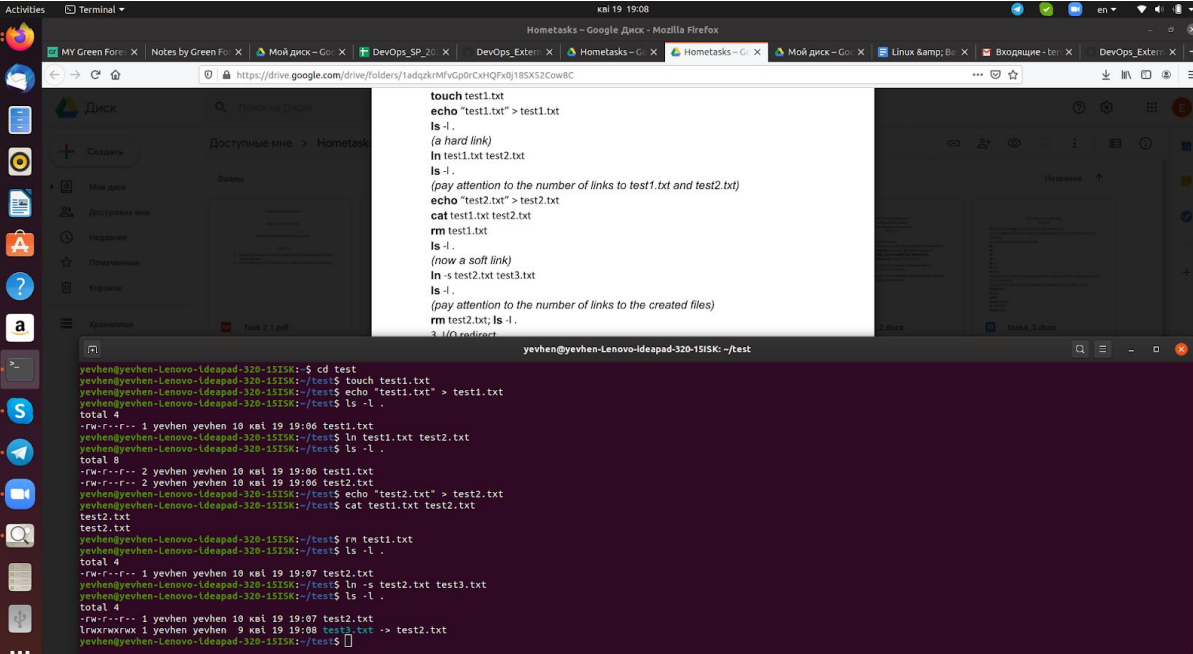
The screenshot shows a terminal window with the following commands and output:

```
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 file permissions and the number of links for each file:

```
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 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 .



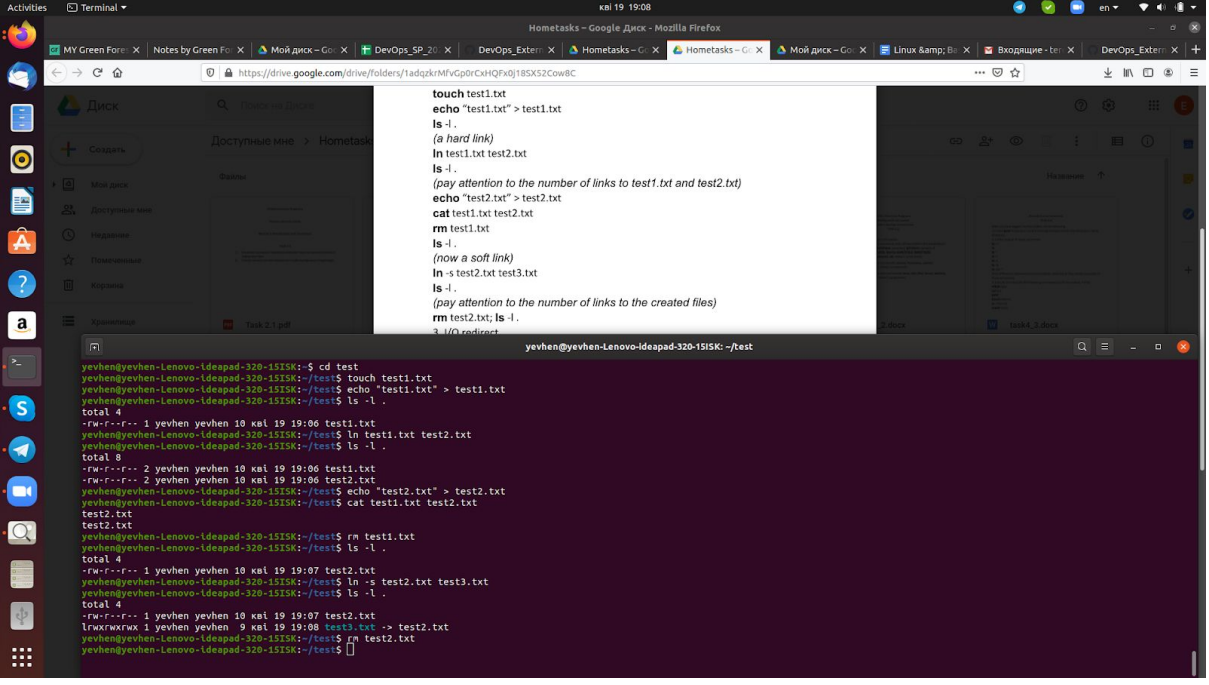
The screenshot shows the terminal window after the final command:

```
ln -s test2.txt test3.txt
ls -l
rm test2.txt; ls -l
3.1/0 reading...
```

The terminal output shows the final state of the files:

```
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 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

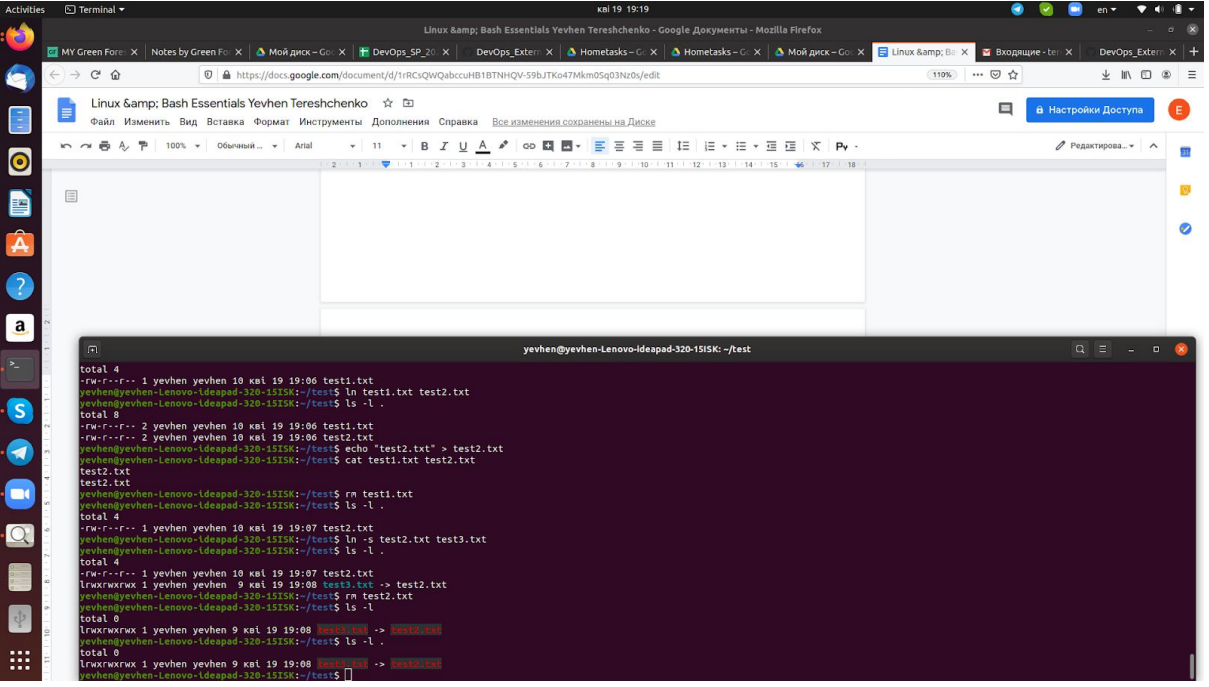


```
touch test1.txt
echo "test1.txt" > test1.txt
ls -l
(a hard link)
ln test1.txt test2.txt
ls -l
(pay attention to the number of links to test1.txt and test2.txt)
echo "test2.txt" > test2.txt
cat test1.txt test2.txt
rm test1.txt
ls -l
(now a soft link)
ln -s test2.txt test3.txt
ls -l
(pay attention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

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 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$
```

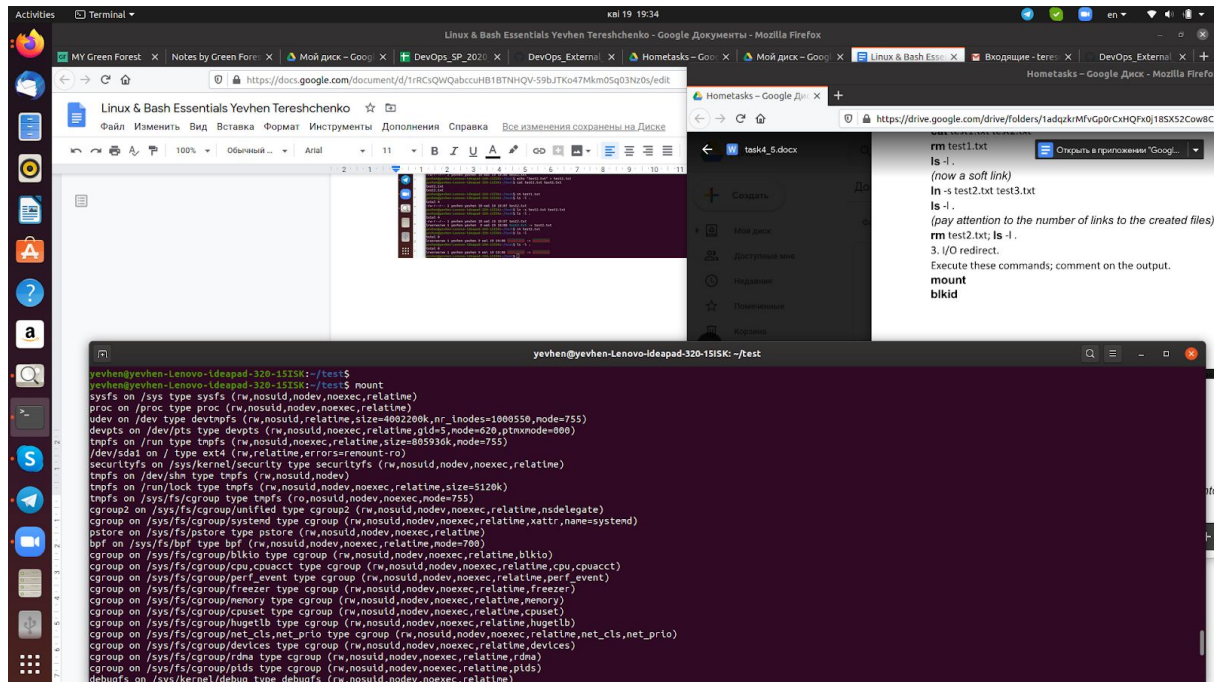
ls -l .



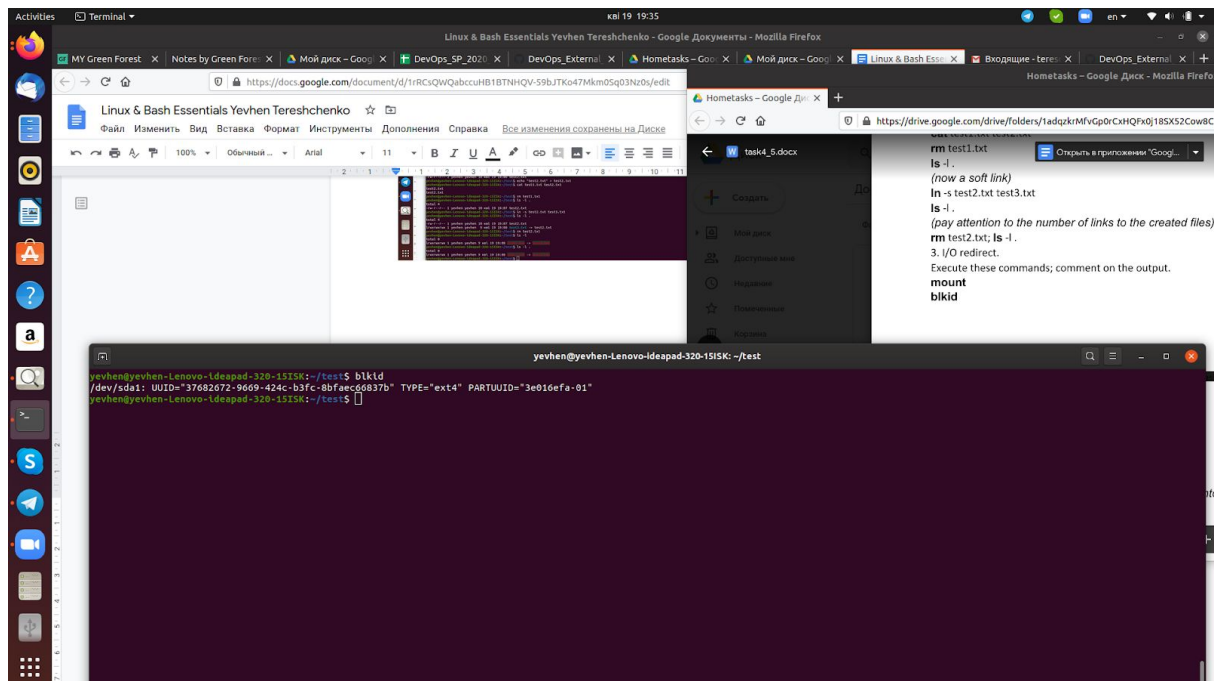
```
total 4
-rw-r--r-- 1 yevhen yevhen 10 kал 19 19:06 test1.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ln test1.txt test2.txt
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ ls -l
total 8
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test1.txt
-rw-r--r-- 2 yevhen yevhen 10 kал 19 19:06 test2.txt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

3 I/O redirect

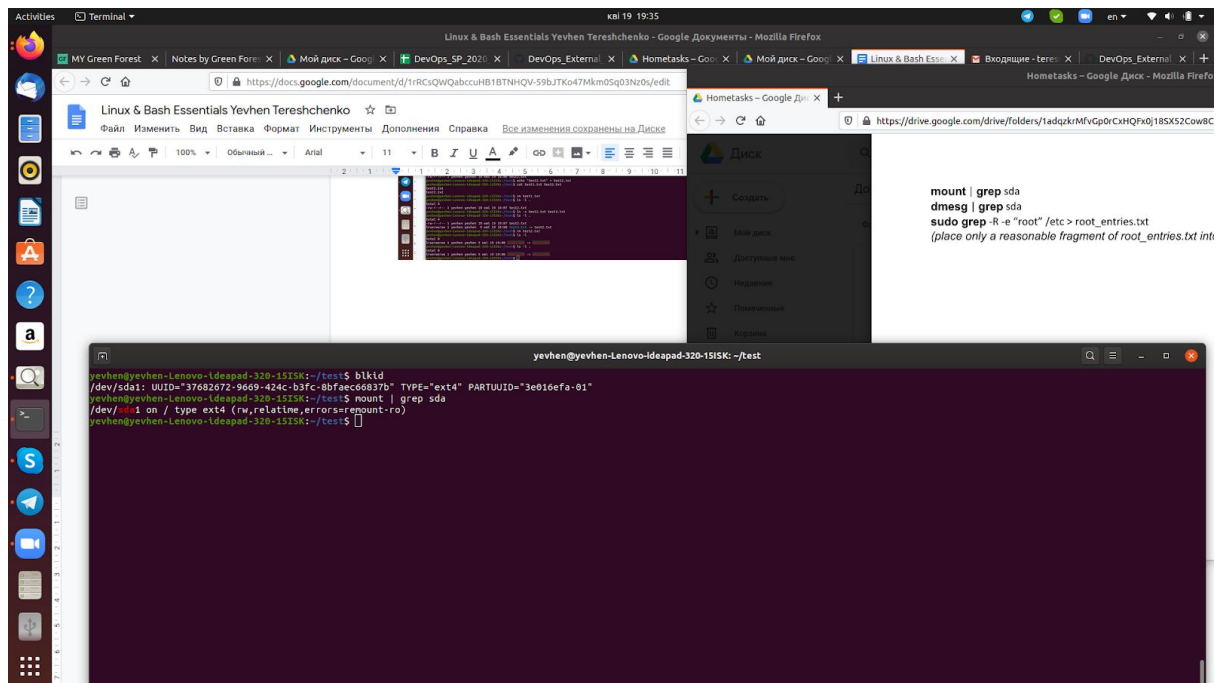
mount



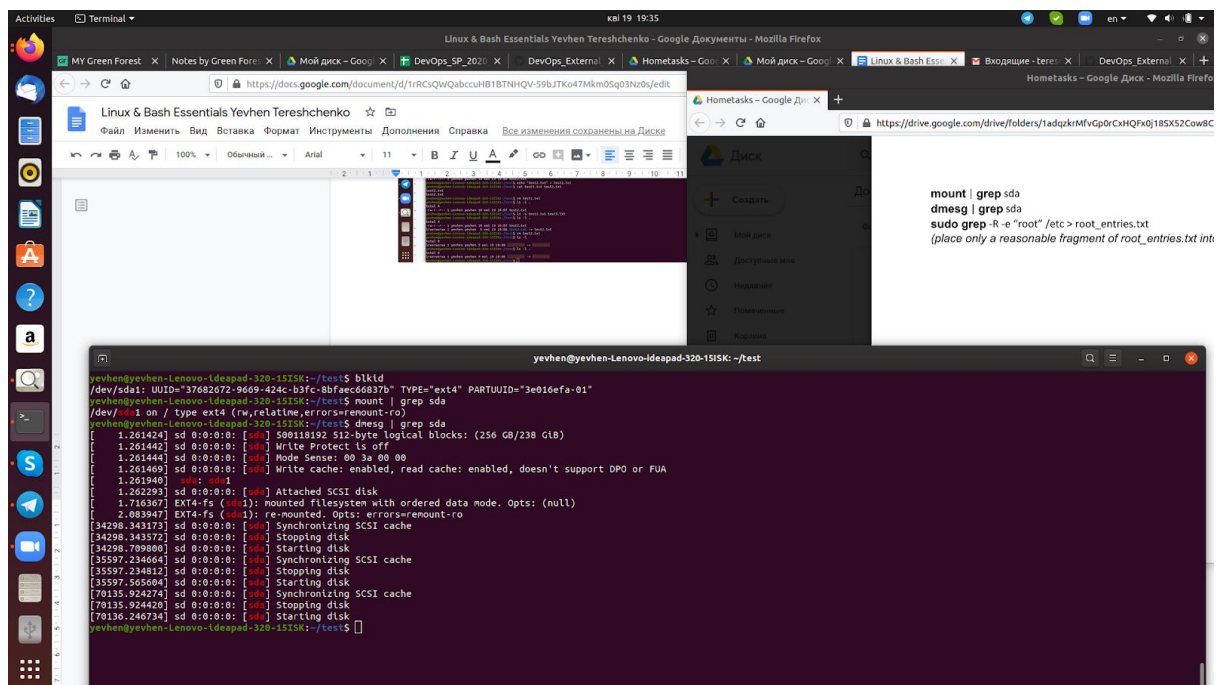
blkid



mount | grep sda



dmesg | grep sda



`sudo grep -R -e "root" /etc > root_entries.txt`

The screenshot shows a Kali Linux desktop environment. In the foreground, a terminal window titled "yevhen@yevhen-Lenovo-Ideapad-320-15ISK: ~/test" displays the output of the command `sudo grep -R -e "root" /etc > root_entries.txt`. The output lists various system files and directories containing the word "root", such as `/etc/passwd`, `/etc/group`, and `/etc/shadow`. In the background, a Google Drive document titled "task4_6.docx" is open, showing the same command and a note: "(place only a reasonable fragment of root_entries.txt into your report)".

```
[34298.343173] sd 0:0:0:0: [sda] Synchronizing SCSI cache
[34298.343572] sd 0:0:0:0: [sda] Stopping disk
[34298.799800] sd 0:0:0:0: [sda] Starting disk
[35597.234664] sd 0:0:0:0: [sda] Synchronizing SCSI cache
[35597.234812] sd 0:0:0:0: [sda] Stopping disk
[35597.565604] sd 0:0:0:0: [sda] Starting disk
[78135.924274] sd 0:0:0:0: [sda] Synchronizing SCSI cache
[78135.924426] sd 0:0:0:0: [sda] Stopping disk
[78136.246734] sd 0:0:0:0: [sda] Starting disk
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ sudo grep -R -e "root" /etc > root_entries.txt
[sudo] password for yevhen:
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$ head -n 15 root_entries.txt
/etc/passwd:root:x:0:0:root:/root:/bin/bash
/etc/group:root:x:0:
/etc/shadow:root:x:0:root:/root:/bin/bash
/etc/passwd:nn-openvpn:x:117:123:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
/etc/motd:order# After modifying this file, be sure to run /usr/sbin/update-mime (as root)
/etc/group:root:x:0:
/etc/dkms/template-dkms-mkdsd/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdsd/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdeb/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdeb/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdeb/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdeb/debian/rules: dh_testroot
/etc/dkms/template-dkms-mkdeb/debian/rules: dh_testroot
yevhen@yevhen-Lenovo-Ideapad-320-15ISK:~/test$
```

task4_6.docx

mount | grep sda
dmesg | grep sda
sudo grep -R -e "root" /etc > root_entries.txt
(place only a reasonable fragment of root_entries.txt into your report,