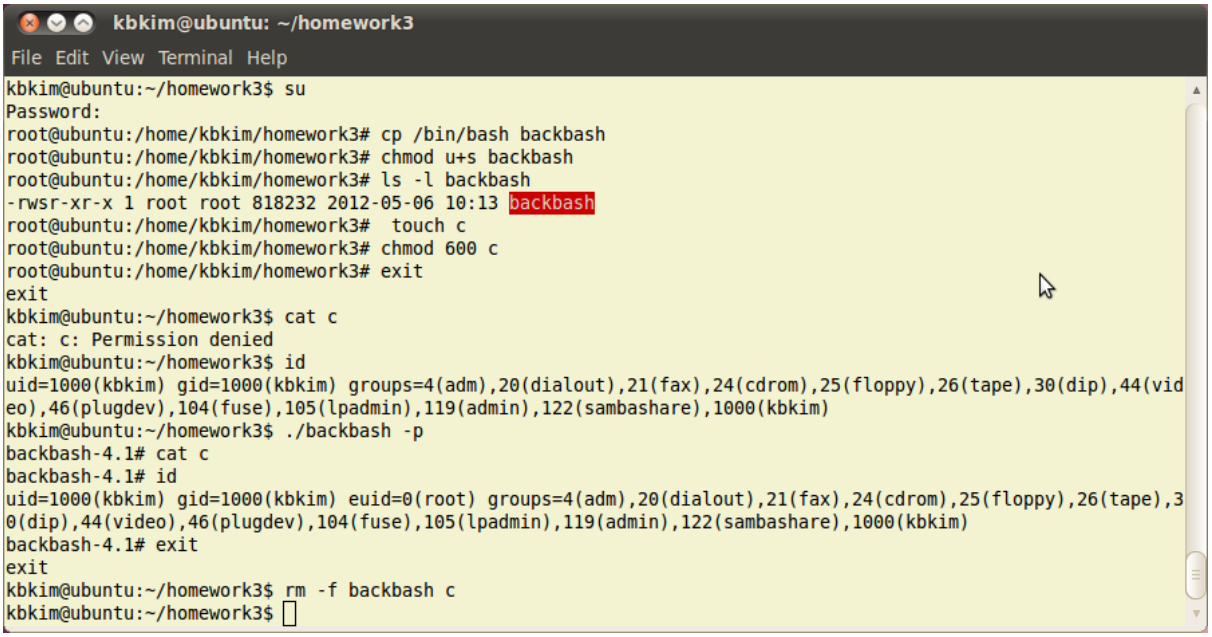
Homework #3 Solution

1. Do "mkdir ~/homework3", then do "cd ~/homework3", then do "su", then do "cp /bin/bash backbash", then do "chmod u+s backbash", then do "ls –l backbash", then do "touch c", then do "chmod 600 c", then do "exit", then do "cat c", then do "id", then do "./backbash –p", then do "cat c", then do "id", then do "exit". Then do "rm –f backbash c"

- Take a screenshot



- Explain the difference between the first "cat" result and the second "cat" result.

➔ **The first "cat" is run by normal user and cannot access the file c. The second "cat" is run by root and can access the file c.**

- Describe the difference between the first "id" result and the second "id" result.

➔ **The second "id" shows that euid is 0.**

2. Do "su – peterpan" (user peterpan should exist), then do "clear", then do "mkdir proj1", then do "mkdir proj1/sub1", then do "ls –l proj1", then do "chgrp defender proj1", then do "chmod g+s proj1", then do "mkdir proj1/sub2", then do "touch proj1/a", then do "ls –l proj1".

- Take a screenshot

- What is difference between the "sub1" directory and the "sub2" directory? Why?

➔ **The ownership of sub1 is peterpan:peterpan, but the ownership of sub2 is peterpan:defender. It is because, peterpan sets setgid for the proj1 directory before creating sub2 sub-directory under proj1 directory.**

- What is the ownership of the file proj1/a. Why?

➔ **The ownership of the file proj1/a is peterpan:defender. The same reason of the above question.**

3. Do "clear", then do "mkdir shared", then do "chmod 777 shared", then do "mkdir shared_t", then do "chmod 1777 shared_t", then do "touch shared/a", then do "touch shared_t/a", then do "su hook" (user hook should exist), then do "rm shared/a", then do "rm shared_t/a", then do "exit", then do "exit".

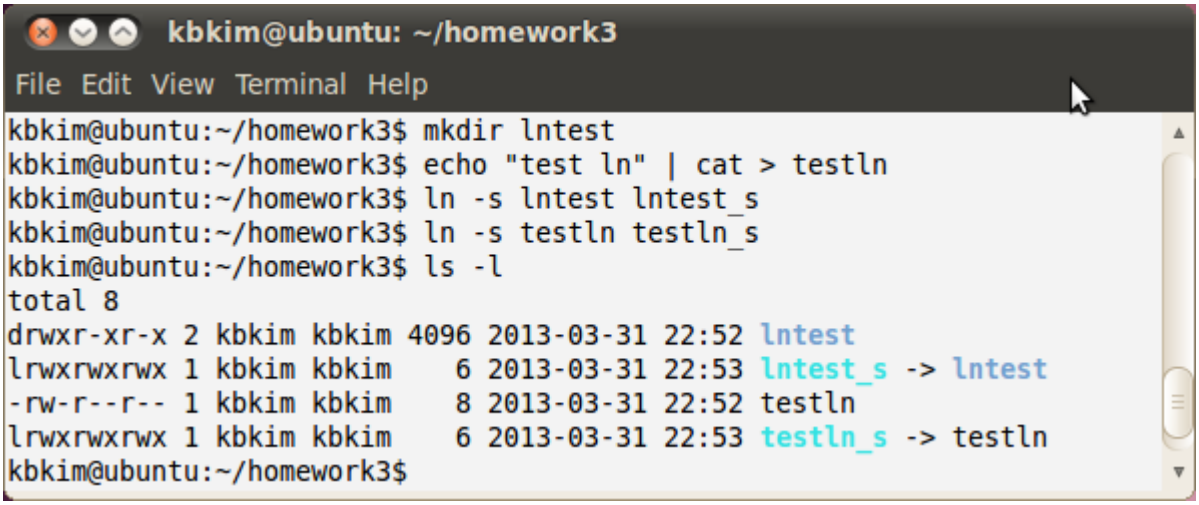
- Take a screenshot

- Which file is removed? Why?

➔ **The file, shared/a, is removed. The file, shared_t/a locates the sticky bit set directory shared_t, and it cannot be removed by other users except peterpan.**

4. Do "cd ~/homework3", then do "clear", then do "mkdir lntest", then do "echo "test ln" | cat > testln", then do "ln –s lntest lntest_s", then do "ln –s testln testln_s", then do "ls –l"

- Take a screenshot

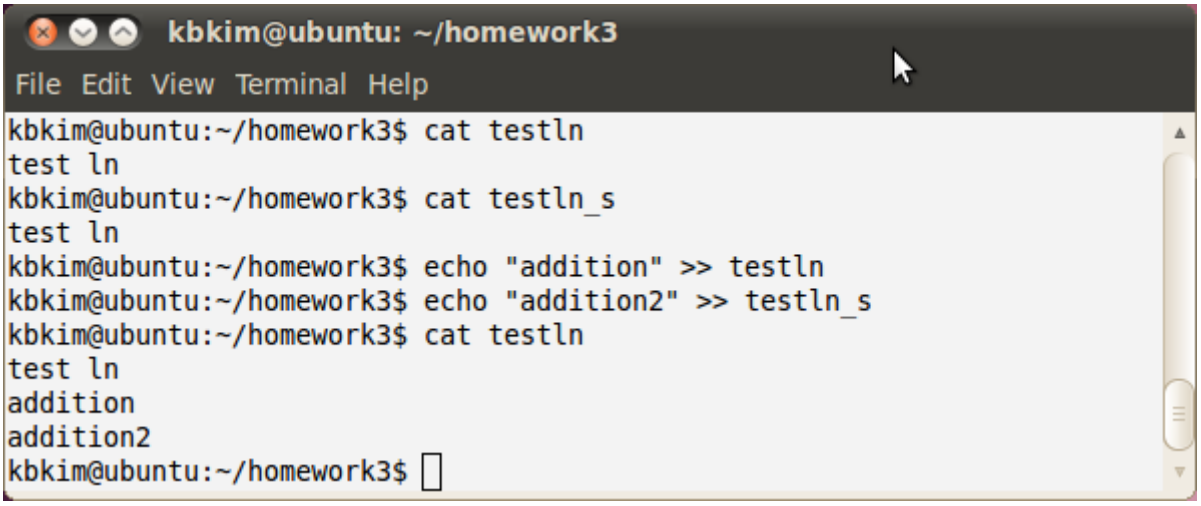


- What are the files named "lntest_s" and "testln_s"?

➔ **Symbolic links for the directory named as lntest and the file named as testln.**

5. Do “clear”, then do “cat testln”, then do “cat testln_s”, then do “echo “addition” >> testln”, then do “echo “addition2” >> testln_s”, then do “cat testln”

- Take a screenshot

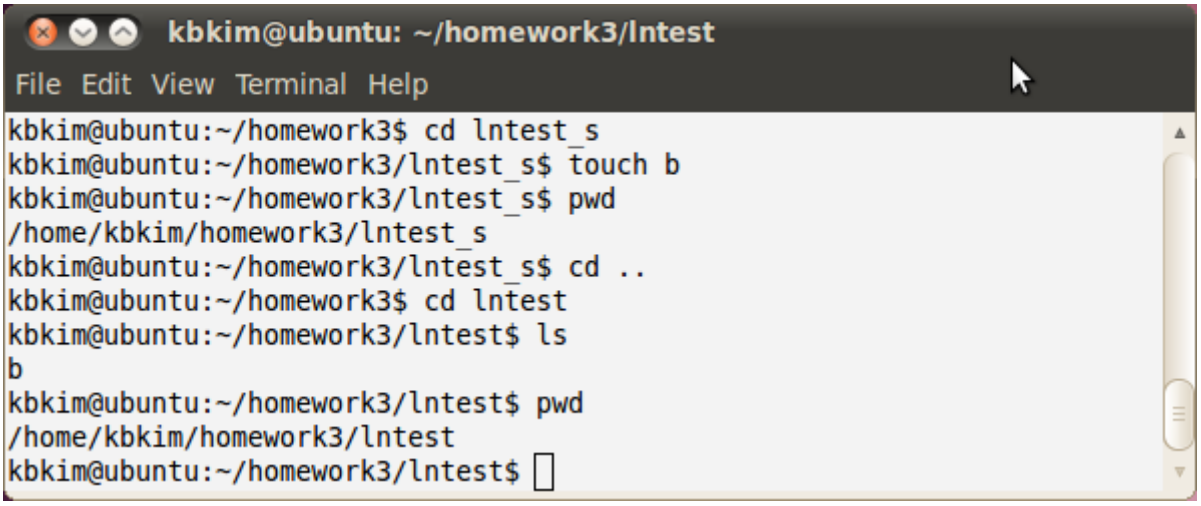


- What is the last result? Why?

➔ **“cat testln” and “cat testln_s” returns the same result. And the addition of text using testln_s modifies the contents of the file “testln”. It is because the testln_s is the symbolic link of the testln file**

6. Do “clear”, then do “cd lntest_s”, then do “touch b”, then do “pwd”, then do “cd ..”, then do “cd lntest”, then do “ls”, then do “pwd”

- Take a screenshot



- Compare the results between first “pwd” and second “pwd”.

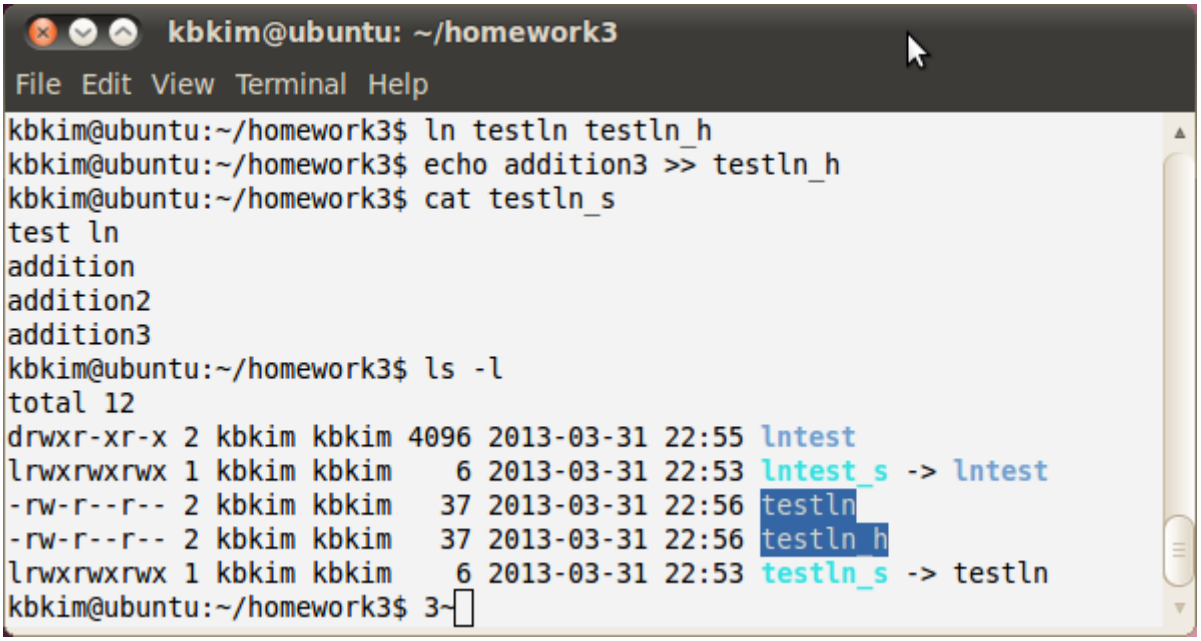
➔ **First pwd shows the current directory is “/home/kbkim/homework4/lntest_s”, but the first pwd shows the current directory is “/home/kbkim/homework4/lntest”.**

- What is the result of “ls”? Why?

➔ **“ls” command shows the file b. It is because lntest_s is the symbolic link of the directory named as lntest.**

7. Do “cd ..”, then do “clear”, then do “ln testln testln_h”, then do “echo “addition3” >> testln_h”, then do “cat testln_s”, then do “ls –l”

- Take a screenshot



- What is the file “testln_h”?

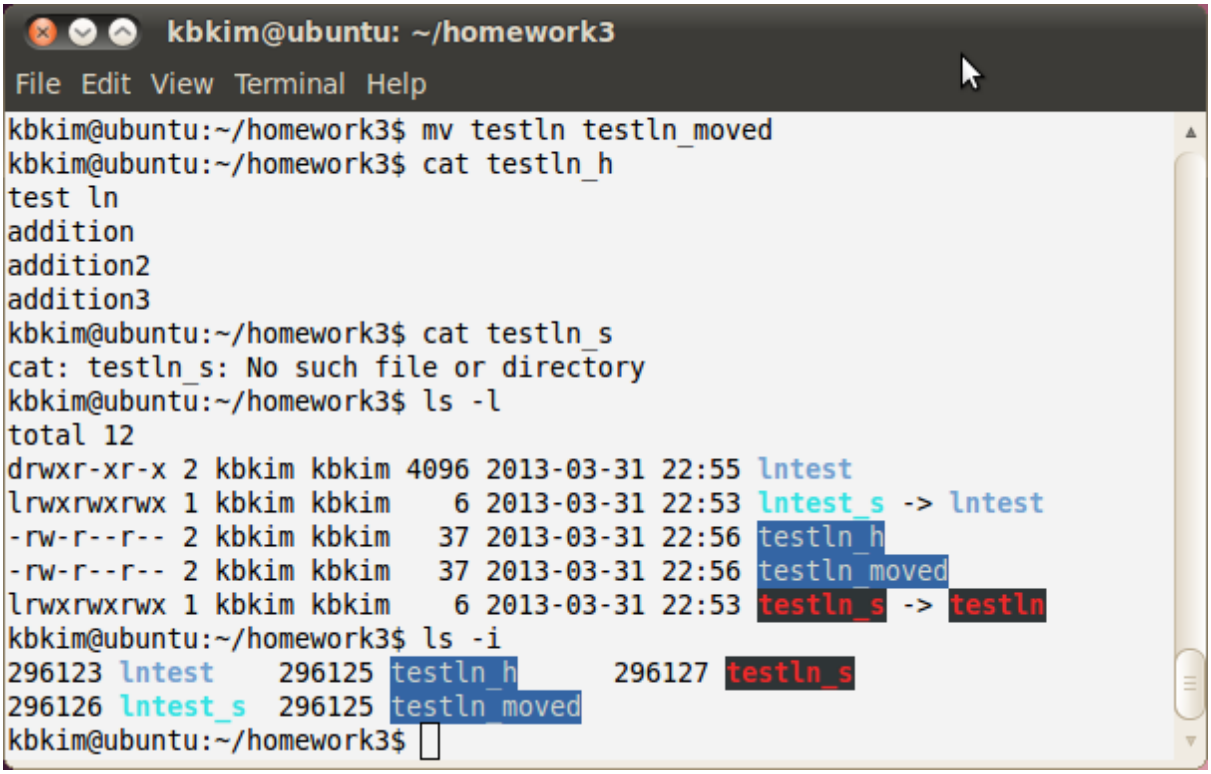
➔ **Hard link of the file named “testln”.**

- What is the difference between “testln_s” and “testln_h”

➔ **Based on the results of “ls –l”, the size of “testln_s” and “testln_h” is different. The symbolic link “testln_s” points the directory entry of the file “testln”, but the hard link “testln_h” points the inode of the file “testln”.**

8. Do "clear", then do "mv testln testln_moved", then do "cat testln_h", then do "cat testln_s", then do "ls –l", then do "ls –i"

- Take a screenshot



- Compare the results between the first "cat" and the second "cat"

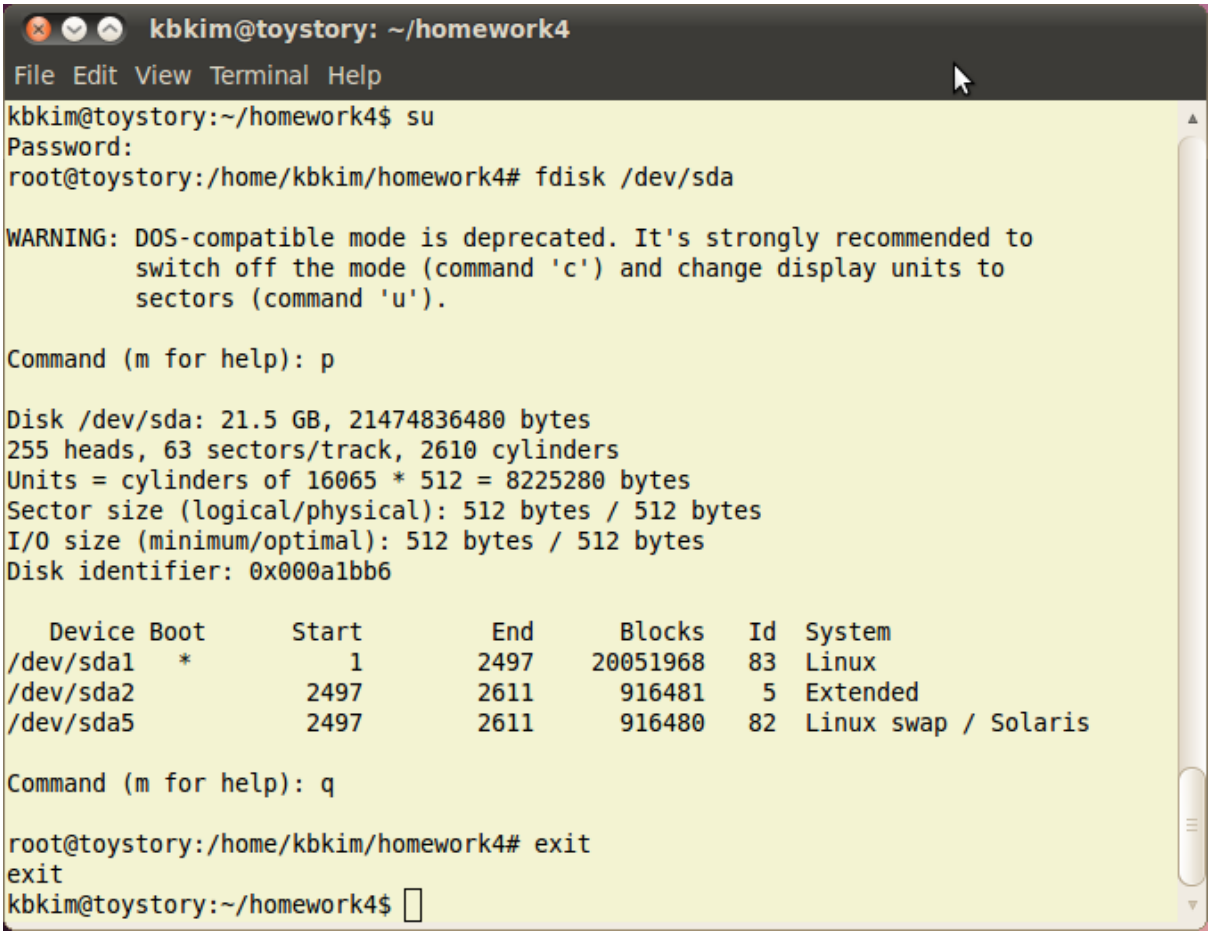
➔ The first cat shows the contents of the file "testln_moved", but the second cat occurs an error.

- What is the difference between "testln_s" and "testln_h" from the results of "ls –l" and "ls –i"?

➔ In the results of "ls –l", the entry of testln_s is shown as dark which means this symbolic link is corrupted. It is because the linked file testln is moved to testln_moved. In the results of "ls –i", the inode number of testln_h is still same to the inode number of testln_moved. This is the main reason of the difference between the results of "cat testln_h" and "cat testln_s".

9. Do "mkdir homework4", then do "cd homework4", then do "su" (password required), then do "fdisk /dev/sda", then press "p", then press "q", then do "exit"

- Take a screenshot



- What is the specification of the disk "sda"? (heads, sectors, cylinders, sector bytes)

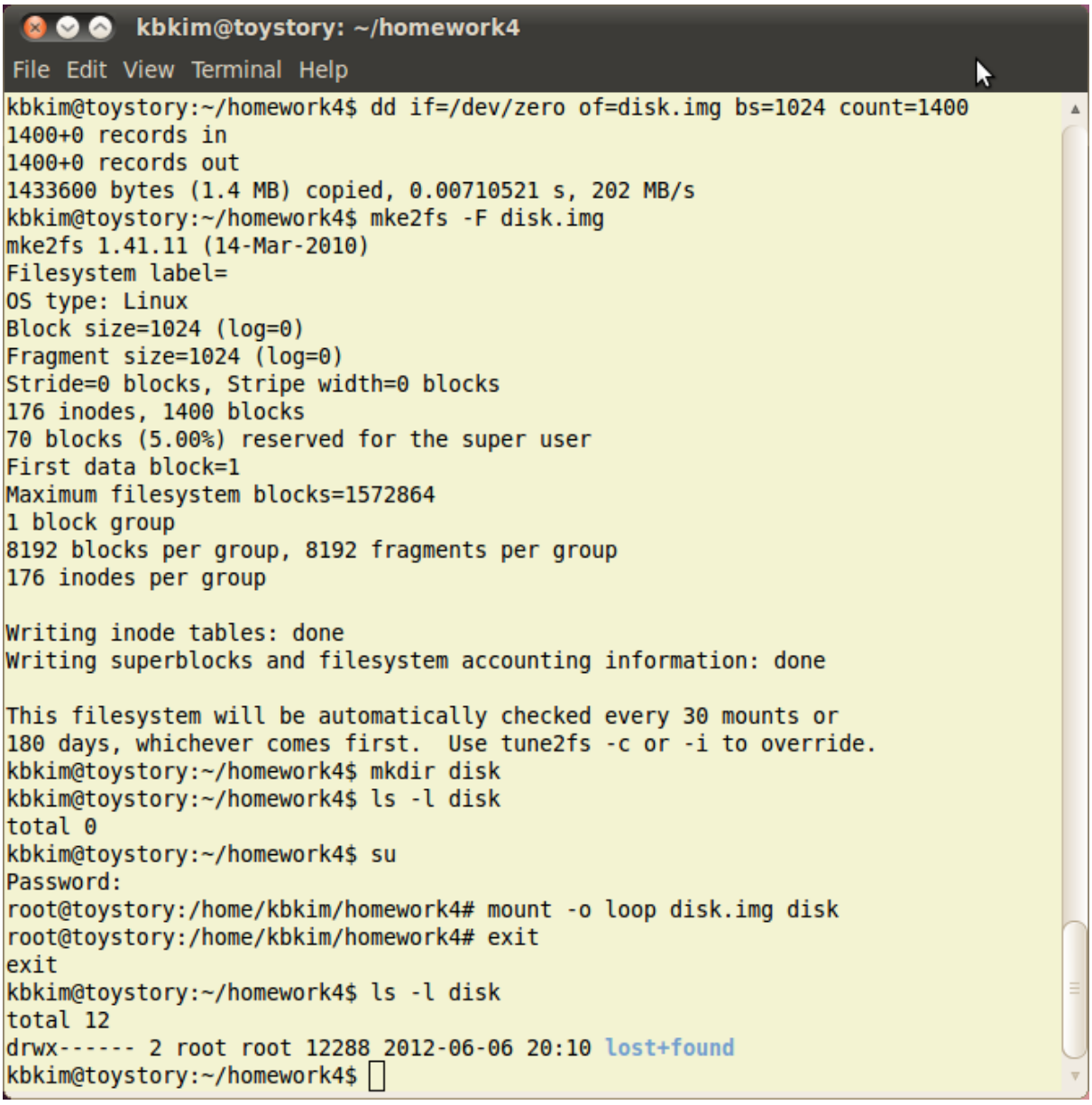
➔ **Heads : 255, Sectors : 63, Cylinders : 2610, Sector/Bytes : 512**

- How many partitions are there?

➔ **Three partitions (/dev/sda1, /dev/sda2, /dev/sda5)**

10. Do "clear", then do "dd if=/dev/zero of=disk.img bs=1024 count=1400", then do "mke2fs –F disk.img", then do "mkdir disk", then do "ls –l disk", then do "su" (password required), then do "mount –o loop disk.img disk", then do "exit", then do "ls –l disk"

- Take a screenshot



- What is the functionality of "dd" command?

➔ Copy blocks from a input file to output file.

- What is the functionality of "mke2fs" command?

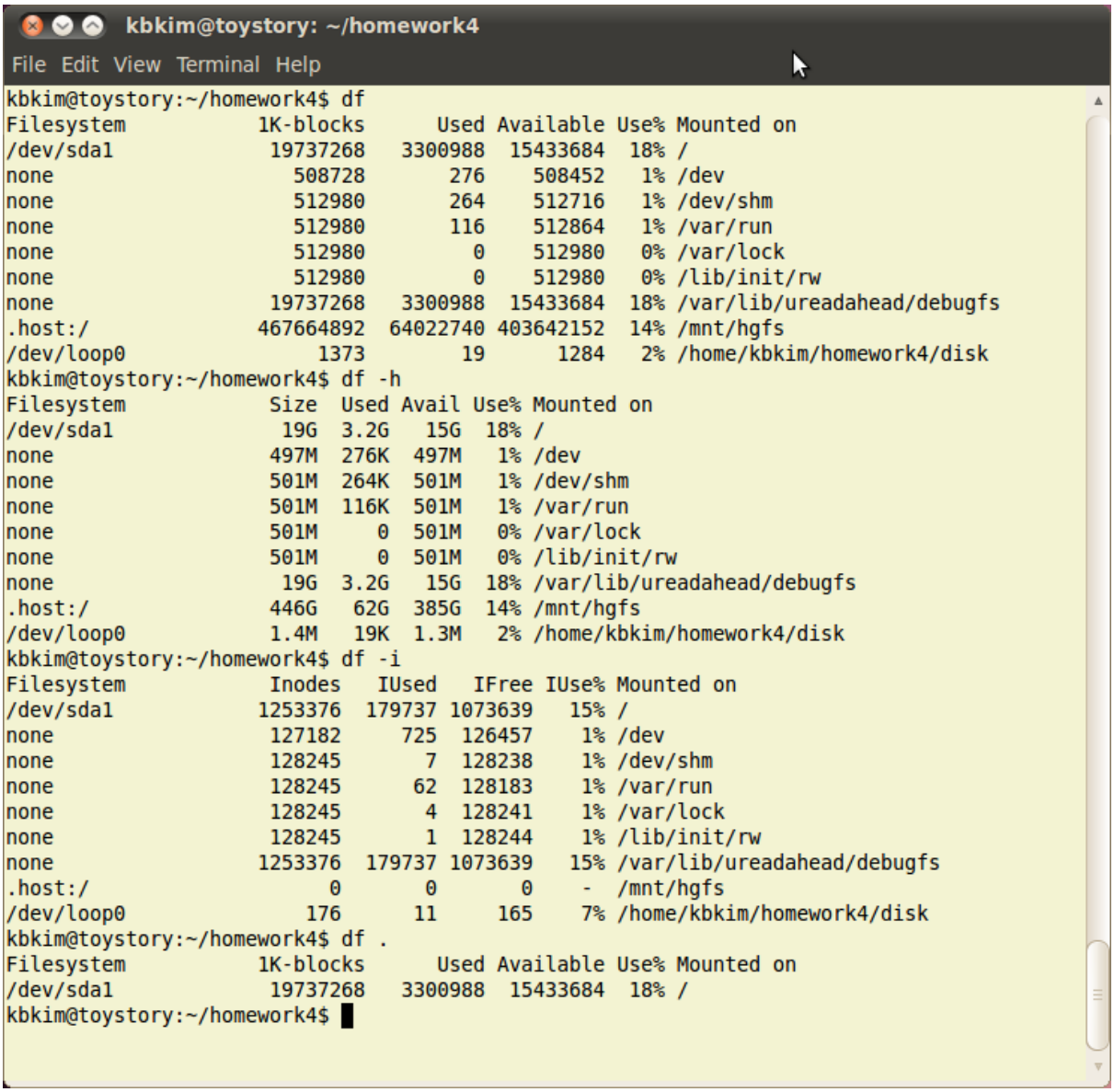
➔ Create an ext2/ext3/ext4 filesystem to a given partition. In this example, mke2fs use "-F" option to create a filesystem on a file.

- Compare the difference between the results of the first "ls" and the second "ls". Why?

➔ First "ls" shows nothing, but the second "ls" shows a directory "lost+found". It is because the disk.img file having a new filesystem is mounted to the directory ~/homework4/disk.

11. Do “clear”, then do “df”, then do “df –h”, then “df –i”, then do “df .”

- Take a screenshot



- What are the options “-h” and “–i" for?

➔ **“-h” : display results in a human-readable format. “-i” : display inode usage**