

Lab 11: File System 1

Sejong Yoon, Ph.D.

References:

- Silberschatz, et al. *Operating System Concepts* (9e), 2013
- Materials from OS courses offered at TCNJ (Dr. Jikai Li), Princeton, Rutgers, Columbia (Dr. Junfeng Yang), Stanford, MIT, UWisc, VT

Agenda

- UNIX file system and inode exercise

Exercise 12.21

- Create two simple text files named file1.txt and file3.txt whose contents are unique sentences.
- Open file1.txt and examine its contents. Next, obtain the inode number of this file with the command

`ls -li file1.txt`

- This will produce output similar to the following:

16980 -rw-r--r-- 2 os os 22 Sep 14 16:13 file1.txt

- The inode number is boldfaced. The inode number of file1.txt is likely to be different on your system.

Exercise 12.21 (cont.)

- The UNIX `ln` command creates a link between a source and target file. This command works as follows: `ln [-s] <source file> <target file>`
- UNIX provides two types of links: (1) **hard links** and (2) **soft links**. A hard link creates a separate target file that has the same inode as the source file. Enter the following command to create a hard link between `file1.txt` and `file2.txt`: `ln file1.txt file2.txt`
- What are the inode values of `file1.txt` and `file2.txt`? Are they the same or different? Do the two files have the same—or different—contents?
- Next, edit `file2.txt` and change its contents. After you have done so, examine the contents of `file1.txt`. Are the contents of `file1.txt` and `file2.txt` the same or different?
- Next, enter the following command which removes `file1.txt`: `rm file1.txt`
- Does `file2.txt` still exist as well?

Exercise 12.21 (cont.)

- Now examine the man pages for both the `rm` and `unlink` commands. Afterwards, remove `file2.txt` by entering the command
`strace rm file2.txt`
- The `strace` command traces the execution of system calls as the command `rm file2.txt` is run. What system call is used for removing `file2.txt`?
- A soft link (or symbolic link) creates a new file that “points” to the name of the file it is linking to. In the source code available with this text, create a soft link to `file3.txt` by entering the following command:
`ln -s file3.txt file4.txt`
- After you have done so, obtain the inode numbers of `file3.txt` and `file4.txt` using the command:
`ls -li file*.txt`

Exercise 12.21 (cont.)

- Are the inodes the same, or is each unique? Next, edit the contents of file4.txt. Have the contents of file3.txt been altered as well?
 - Lastly, delete file3.txt. After you have done so, explain what happens when you attempt to edit file4.txt.
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- No lab assignment submission this week!