CIS133 – Homework 5 - File System Commands: linking and finding

1. Create a folder at the root of the file system and name it *share*. (You may already have a folder by this name from a previous assignment – if you do, use it.) Configure the permissions on the folder such that the group assigned to the folder is *users* and the owner and group have all rights to the folder and all others have no rights. In addition, configure the permissions so that any file that is created in the folder will receive the group assignment of the folder.
    a. Show me the permissions you configured on the /*share* folder.

2. As root, create 4 files in the */share* folder; name them *file1*, *file2*, *file3* and *file4*. Then, create a folder within the root user's home folder; name the folder *homework*. Create a hard link in the *homework* folder to the *file1* file in the /*share* folder. The link's name must be *file1*.
    a. What command did you use to create the link? If you did not use absolute paths in your command, you must 'show' me your existing location as part of your answer. (This is true of all the ln commands – anytime you don't use an absolute path, be sure to show me your current location.)
    b. What is the inode of the *file1* file in the *shared* folder?
    c. What is the inode of the *file1* file in the *homework* folder?
    d. Display the contents of the shared folder – the output must include the owner, group and inode information for the files in the folder.
    e. Display the contents of the *homework* folder – the output must include the owner, group and inode information for the files in the folder

3. Pick 4 of your users who have a home folder in the /home folder and create a folder named *linktest* within each of their respective home folders. Create 5 files in the *linktest* folder of one of your users; name the files *file1*, *file2*, etc. Now, for each of these files, create a hard link to the file for each of the other 3 users. Place the links in their respective *linktest* folders. When creating the hard links, use the cp command and the ln command interchangeably. (When done you sould have a file1, file2, file3, file4 & file5 file in each of the 4 users' *linktest* folders)
    a. Execute the ls /home –l command and show it's output.
    b. Display the last 20 lines of the /etc/passwd file.
    c. Display the contents of the first user's *linktest* folder - the output must include the owner, group and inode information for the files in the folder.
    d. Do the same for each of the other users; display the contents of their *linktest* folder - the output must include the owner, group and inode information for the files in the folder.
    e. You should have used the cp command to create some of the hard links and the ln command to create some of the hard links. You do not have to show me every single command used but I want to see a complete copy of one of the ln commands and one of the cp commands used to create the hard links.

4. What command could be used to create a hard link in the /share folder named *file1* which links to the first *file1* file created in question 3. Be very specific in your answer.

5. In *each* one of the below lines, identify what the number to the left of janelle represents.

```
drwxr-xr-x 5 janelle users  4096 2009-11-17 11:09 data
drwxr-xr-x 8 janelle users  4096 2009-11-17 11:10 sbin
-rwxr-xr-x 1 janelle users  9828 2009-11-17 11:07 setleds
-rwxr-xr-x 1 janelle users 19112 2009-11-17 11:07 setserial
-rwxr-xr-x 5 janelle users  9828 2009-11-17 11:07 showkey
-rwxr-xr-x 4 janelle users 22240 2009-11-17 11:07 sleep
-rwxr-xr-x 1 janelle users 42792 2009-11-17 11:07 stat
-rwxr-xr-x 1 janelle users 18128 2009-11-17 11:07 sync
```

6. Use the find command to search *only* the file system to which the home folders are mounted for all files that have the same inode as the file3 file created in question 3.
    a. Include the command and its output.

7. Use the find command to find all files that have the same inode as the file4 file created in question3. Delete these files by piping the find command's output to the appropriate command.
    a. What is the exact command used?

8. Use the find command to search *only* the file system to which the home folders are mounted for a list of all files that have 4 or more hard links. The output to the command must be formatted as displayed below:

    Filename: *filename* Links: *NumberOfLinks* Inode#: *iNode*

    a. Include the command and its output.

9. Using one of the file2 files from question 3, create a symbolic link and store it in the /share folder. The link's name should file2.
    a. What command did you use to create the link?
    b. Use the ls –l command to display the contents of the /share folder

10. You should have a partition mounted to the /data folder from a previous assignment. Create a file in the data folder named *testsym*. Create a symbolic link to this file; the link should be named *testsym* and should be stored in one of the *linktest* folders created in question 3.
    a. Confirm to me that a partition is mounted to the /data folder.
    b. What command did you use to create the link?
    c. Use the ls –l command to display the contents of the *linktest* folder.
    d. Explain what happens to the link and why it happens when the partition is unmounted. Be very specific in your answer.

11. Create a symbolic link in one of the *linktest* folders created in #3. The links name should be mnt and it should point to the /mnt folder.
    a. Use the ls –l command to display the contents of the linktest folder.
    b. Move to the mnt link just created and display its contents. Execute the command that will show your current location and will confirm that this location is a symbolic link that 'points' to another folder. Provide the command and its output as your answer.

12. Refer to the two directory listings when answering these questions:
    a. In what inode is the data in the /home/janelle/homework/testit file stored?
    b. In what inode is the data in the /share/file2 stored?
    c. If the showkey file in the below listing is deleted, will the data stored in the file's inode be available? Explain your answer.
    d. If the /home/janelle/homework/file2 file is deleted, will the data the file refers to still be available? Explain your answer
    e. If the /share/file1 file is deleted, will the /home/Janelle/homework/testit file be deleted as well? Explain your answer.
    f. If the sync file in the below list is deleted, will the data stored in the file's inode be available? Explain your answer.

Directory Listing of /home/janelle/homework.

```
302580 lrwxrwxrwx 1 janelle users    12 2009-11-17 11:35 file2 -> /share/file2
302683 -rwxr-xr-x 1 janelle users 19112 2009-11-17 11:07 setserial
302686 -rwxr-xr-x 5 janelle users  9828 2009-11-17 11:07 showkey
302691 -rwxr-xr-x 4 janelle users 22240 2009-11-17 11:07 sleep
302693 -rwxr-xr-x 1 janelle users 42792 2009-11-17 11:07 stat
302696 -rwxr-xr-x 1 janelle users 18128 2009-11-17 11:07 sync
302393 lrwxrwxrwx 1 janelle users    12 2009-11-17 11:32 testit -> /share/file1
```

Directory listing of /share

```
309476 -rw-r--r-- 1 janelle users 21 2009-11-17 10:44 file1
309477 -rw-r--r-- 1 root    users  0 2009-11-17 10:43 file2
309478 -rw-r--r-- 1 root    users  0 2009-11-17 10:43 file3
```

13. Create a new user with a home folder and a password and then use the find command to search /etc/ folder for all files that have been modified in the last 2 minutes.
    a. Provide the command used and its output.

14. Use the find command to search ONLY your home folder (don't include any subfolders) for all empty files (only files). (Note: If you have no empty files in the home folder, create a few.)
    a. Provide the command used and its output.