CMSI 587

OPERATING SYSTEMS (GRADUATE LEVEL)

Spring 2006

Assignment 0411

Not for Submission

We'll cover SGG Chapters 12 and 13 next week, with greater emphasis on Chapter 13.

For Submission

To really get to know file systems, let's work at a really low level. Due to the need for privileged activity, you'll need to do this on a specific machine in the Keck lab, namely *lake*:

1. Find out how to create and mount an *ext3* disk image file in Linux.
2. Create the smallest possible file on which a fully-functional *ext3* file system can be installed.
3. Install an *ext3* file system on that disk image file.
4. Mount that file system (this is where you need superuser privileges).
5. Create the following items in the mounted file system:
   a. A non-empty text file at the top-level directory of the file system
   b. A directory at the top-level directory of the file system
   c. Another non-empty text file inside that subdirectory
   d. A symbolic link inside that subdirectory to the non-empty text file in the top-level directory
   e. A hard link from the top-level directory to the text file in the subdirectory
6. Unmount the file system, then use *hexdump* to display the raw bytes and characters on your disk-image file.
7. Print out the hex dump, then annotate it to identify these items:
   a. The directory entries for the files, links, and directories that you created
   b. Where applicable, the data blocks for these items

Submit your annotated hex dump to me on hardcopy.

Extra Credit

For extra credit, mark out the following items in the hex dump as well:

   a. The disk's superblock
   b. The inodes for the items that you created (if they have one)

To get the extra credit, you must identify *all* of these elements, and identify them *correctly*.