Chapter 4: Highlights of the filesystem

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Single hierarchical filesystem

- ▶ Directories and files
- ▶ Pathnames, absolute and relative
- ▶ Directories and their utilities
- ▶ Links
- ▶ Utilities review

Drives are *on* the tree

- Rather than creating newly rooted trees, adding drives in the Unix world creates subtrees off the single hierarchical filesystem

Directories and files

- You can visualize files as leaves on the filesystem tree, and directories as interior nodes, though that's not correct since directories can be childless, and thus in a leaf position.

Access permissions

- Use a simple "user", "group", "other" scheme
- The program to change permissions is chmod; chown to change ownership (including groups these days)

Links

- Hard links are ordinary directory entries
- Soft links are ordinary files with a bit set to indicate that they are to be used to provide path information

```
% ls -li
touch file1
$ ln file1 file2
$ ln -s file1 file3
$ ls -li file{1,2,3}
3083 -rw-r--r-- 2  0 Sep 10 10:18 file1
3083 -rw-r--r-- 2  0 Sep 10 10:18 file2
3120 lrwxrwxrwx 1  5 Sep 10 10:18 file3 -> file1
```

Utilities for working with directories

- pwd, mkdir, cd, rmdir, mv, cp, rsync
- chmod, ls,
- ln, link

From the exercises on page 122

- How *do* you create a file named '-i'?
- Do you think that a system administrator has access to a program to decode user passwords? If so, all of them? Some of them?
- What is a possible explanation for problem 18?

```
$ ls -ld dirtmp
drwxr-xr-x 2 langley langley 4096 Sep 10 10:23 dirtmp
$ ls dirtmp
$ rmdir dirtmp
rmdir: failed to remove 'dirtmp': Directory not empty
$ rm dirtmp/*
rm: No match
```