COMP210 - Lab 5

Spring 2014

For this lab you'll be work in groups and brainstorm about different possible OO designs for a single problem.

The Problem

For this lab you're tasked with thinking about a class hierarchy design for the following problem.

> The file system of a computer is comprised of files and directories. Directories contain files and other directories. On Linux systems, both files and directories are viewed as files by the system, directories just have some different properties. This makes for some more uniform operations. For files and directories, we need to know the name and user name of the owner. For files, we also need to know size in Bytes, and date last modified. Like in Unix/Linux, we'll consider file systems that begin with a Root directory named /.

We'll be thinking about three options for managing file/directory containment:

1. Files and directories contain a reference to their parent
2. Directories contain references to all their contained files and subdirectories
3. Both of the above at once

A few common tasks we'll likely want to perform on the file system are:

- For a directory, compute the total size of the files in that directory
- For a directory, compute the total size of the files in that directory and all the files in all its subdirectories
- Filter out the part of the system owned by a particular user
- Get the absolute path for a file or directory
- Determine if a file/directory is in the system by name[1]
- given a directory, get its parent
- given a directory, get all of its subdirectories

[1] maybe name and owner, or some other attributes

Lab

Your task is to *explore space of design solutions* for this problem. In general this means thinking about different data structures and algorithms. In this lab we're only considering the three options listed in the problem statement and from scratch implementations. No Java built in collections or structures beyond programmer defined classes. In an OO setting this means we imagine our data structures and algorithms mapping out to things like:

1. Usage of Class containment
2. Usage of Interfaces
3. Usage of Class extension
4. Usage of access restrictions (public,private,protected,default)

You need to discuss, compare, and contrast each of the options given in the problem. For this lab, you'll work as a group and present your findings in class tomorrow. Your presentation must include:

1. UML diagrams for each option
2. At least one concrete example traced across each of the options. Include how the test file system is constructed and how different operations might be carried out on example.
3. Recommended design based on efficiency, flexibility and ease of implementation.