AP(IT) – Composite Design Pattern Laboratory

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29th Feb 2016

Aims

To get experience of designing and implementing a system using the `composite` design pattern.

Background

You are building a computer operating system. Within your system you have files and directories. Directories can include other directories and/or files. All files and directories are within one top directory. The operating system needs to be able to do three things:

- Get the number of files inside any directory (including the number of files within sub-directories). Directories do not count as files.
- Get the total size of the files within a directory (the size of a directory is equal to the size of its contents)
- Display a directory and all of its contents as in the following example (the number in brackets is the total size for that directory). In this example, there are directories `root`, `pictures`, `music`, `jazz` and `classical` and various files. Directory contents should be indented.

```
root (886)
    Settings (10)
    pictures (120)
        portrait (120)
    music (756)
        jazz (335)
            Kind of Blue (201)
            Giant Steps (134)
        classical (421)
            Beethoven, Symphony no 6 (421)
```

Tasks

- Sketch out the three components you will need to build (an `interface` and two concrete classes)
- Create the three components. Remember to ensure that Directories should be able to include other directories.
- Create another class with a main that demonstrates the system.