Lab 9 – File System Simulator

We know that a hierarchical file system is essentially a general-purpose tree. In this exercise you will be implementing a file system simulator that is done as a tree.

In a file system there are files which contain data and there are folders (sometimes called directories) which contain multiple files and/or folders called children.

At the top of the file system is a special folder called root. In the world of Linux, the root directory goes by the name ‘/’ (slash).

Consider the following tree structure:



We have marked the folders in green and the files in white.

The commands in Linux to create the folder structure above could be (I say could because there are several alternative solutions):

1. mkdir etc
2. mkdir usr
3. mkdir home
4. cd etc
5. touch student.conf
6. cd ..
7. cd home
8. mkdir student
9. cd student
10. mkdir public\_html
11. touch student.conf

Notes:

* The “cd” command is used to move from folder to folder.
* The command “cd ..” means to move to your parent folder
* The “mkdir” command is used to create a folder
* The “touch” command is used to create a file.

If you would like to practice the commands, you can use the simulator:

<https://sit.cna-qatar.edu.qa/inft3203_web/labs/tree_empty/>

# Python Implementation

Download a copy of the program FileSystemSim.py and add the code necessary to get the small demonstration program working. See the comments in the Python file for the details of the functions required. If you want to add additional private functions make sure to start the functions with two underscore characters.

There are two “Node” like elements in the code:

* “FileEntry” is a node without children.
* “FolderEntry” is a node with children stored in a Python list.

Both types of “node” elements include a parent reference to make some of the operations a bit easier.

The tree and find operations are recursive.