System Programming – Project 3

Using FUSE, implement a file system that will navigate the provided Turkish postal codes data[1]. The file system will analyze a CSV file that contains this data and display a hierarchy of the neighborhoods based on the location names and codes.

The first two digits of the postal code represent the city and the remaining three digits represent a neighborhood in the city. Every neighborhood is in a district of the city. The format of the CSV file is as follows (separated by tabs):

    CODE   NEIGHBORHOOD   CITY   DISTRICT   LATITUDE   LONGITUDE

The top-level directory will contain two-directories: NAMES and CODES. The NAMES directory will display a subdirectory for every city. A city directory will display a subdirectory for every district. A district directory will display a text file for every neighborhood. For example, the entry for "Maslak" in the CSV file is:

    34398   Maslak Istanbul Sariyer   41.1083 29.0183

The path for the file will be: NAMES → Istanbul → Sariyer → Maslak.txt.

The contents of this file will be the data presented as key-value pairs:

    code: 34398
    neighborhood: Maslak
    city: Istanbul
    district: Sariyer
    latitude: 41.1083
    longitude: 29.0183

The size of the file will be reported as the length of its contents string.

The CODES directory will display a subdirectory for every city code. A code subdirectory will display a text file for every neighborhood code. The contents of these files will be the same as above. The path for the same example above will be: CODES → 34 → 34398.txt.

Any changes to the CSV file will be instantly visible through the FUSE-based file system. The only modifications allowed on the file system will be deleting or renaming neighborhood files, for example deleting the file Maslak.txt or renaming the file 34398.txt as 34469.txt. These operations will update the CSV file accordingly.

The file system should be testable using standard shell commands such as ls and cat, or using any file manager. Read operation offsets and lengths should be implemented. For example, the command "od -j 23 -N 9 -a Maslak.txt" should work correctly.

To read and manipulate the CSV file, you can write the code yourself or you can use any library you prefer. An example library can be found at the following address:

http://libcsv.sourceforge.net/

Each member of the group must make a submission, even though the submitted files may be the same for all group members.

Group members will be graded individually based on their performance in the lab session and the submitted group project. Students who are not present during the lab session will not receive a grade for the project, even though they may have made a submission through the Ninova system.

Any form of cheating or plagiarism will not be tolerated. This includes actions such as, but not limited to, submitting the work of others as one's own (even if in part and even with modifications) and copy/pasting from other resources (even when attributed). The submitted work should be the product of the group itself; collaboration or code sharing between different groups will also be regarded as plagiarism. Serious offences will be reported to the administration for disciplinary measures.

Your code should not contain any leftover code you might have copy-pasted from other resources. For example, references

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1   This data is taken from http://www.geonames.org/

like "rofs" and "hello" should not be part of your submitted homework.