BLG 413E – System Programming Project 3

Due **28.12.2021 09:00**

Project Description

You are asked to implement a file system using FUSE. Your file system is required to classify the files in a directory (underlying path) by their types.

When the contents of the mounted directory root folder is requested, types of files in the main directory will be reported as subdirectories. For example, if there are several JPG, PDF and PNG files in the main directory, the files themselves will not be reported, but the subdirectories PDF, JPG and PNG will be reported instead.

Whenever one of these subdirectories is selected, only the files of the corresponding type (in the main directory) will be reported. For example, “ls -l ./PDF” will list on the pdf files in the main directory.

You can use the file extension to determine the type of a file but it is preferred if you check the file type using libmagic. You will need the libmagic-dev package for this. A sample demo file for libmagic is given in the class files section. CAREFUL: The demo file does not do any error checking but you should.

Your filesystem must satisfy following properties:
1- Creating, deleting, modifying **directories** will result in an “read-only file system” error.
2- Creating and modifying **files** will result in an “read-only file system” error
3- Deleting **files** will also delete the real file in the underlying directory.
4- **Read** operation must be functional. “cat” command should be able to read contents of a file, an image file should be displayed when user double-clicks an image file (same for a text editor and a text file).
5- Filesystem **is not going to create any real files** in the mounted directory, any content that needs to be displayed/read is going to be shown on-demand by using the information in the main directory.
6- When files in the mounted filesystem is being displayed, their properties must also be displayed properly.

Example:

Main Directory:
- document1.pdf
- document2.pdf
- picture1.png
- p2.jpg
- picture3.jpg
- myfavoritepicture.png
- text1.txt
- anothertext.txt

YourFilesystem Directory:
- pdf
  - document1.pdf
  - document2.pdf
- jpg
  - p2.jpg
  - picture3.jpg
- png
  - picture1.png
  - myfavoritepicture.png
- txt
  - text1.txt
  - anothertext.txt

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ls YourFilesystem                → shows pdf, jpg, png, txt

ls YourFilesystem/txt            → shows text1.txt, anothertext.txt

cat YourFilesystem/txt/text1.txt → prints contents of text1.txt

rm YourFilesystem/jpg/p2.jpg     → deletes p2 from both main
     directory and mounted filesystem directory

ls YourFilesystem/jpg            → shows picture3.jpg only since p2
     is deleted

rm YourFilesystem/jpg/picture3.jpg
ls YourFilesystem                → shows pdf, png and txt. Since
     there are no jpg files in the main directory anymore.
```

Submission Details

- Upload your solutions through Ninova. Homework files sent via e-mail and late submissions will not be accepted.
- Every group member is required to submit source code file(s) through the Ninova system as a zip file.
- 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). Serious offenses will be reported to the administration for disciplinary measures.
- If you have any questions, please use the message board.