CIS 415 Operating Systems

Project 1 Report Collection

Submitted to:

Prof. Allen Malony

Author:

Kevin Steele

ksteele

951974749

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Report

Introduction

This project is a pseudo shell. This means it mimics an actual shell, or an interface used for running several different commands that interact with the system. In our case, the pseudo shell runs the commands ls, which lists contents of the directory; cd, which changes the current directory; mkdir, which creates a new directory; pwd, which prints the current directory; cp, which copies a file to another location; mv, which moves a file to another location or name; rm, which removes a file; and cat, which prints out the contents of a file.

There are two ways to run this project. There is the more traditional way that treats it like a regular shell, in which you input the commands one at a time into a shell. There is also the file mode, which reads a text file containing commands and executes them all, then writes the results into an output text file.

Background

Going into this project I did not have much experience with system calls, given that up until this point I've really had no reason to use them. It was a little bit of a challenge figuring out how they work. Some, like write, were pretty simple, especially compared to the opening, reading, and writing required for commands like cp. In particular, I found figuring out flags for open to be a little bit annoying. I think it was in one of the labs where we were shown the linux manual pages for several system calls that I ended up using. I remember thinking at the time that I didn't really understand what I was looking at, but those man pages ended up being a big help in my work on this project.

The algorithm I found to be the most challenging was the one I used in mv. I ended up having it so that if mv was being moved to a different directory, it would create a new path. If it wasn't, it would keep the original path. Then, it would attempt to rename the file by moving it to the new path. If it doesn't work, that means that the file needs to be copied to the directory it belongs to, and the root file is then deleted.

Implementation

I found implementing this project to be tricky, especially in the beginning. I am used to projects being more defined, whereas this one felt a lot more open ended. Previous classes provided me with every file I needed, every function was outlined clearly, etc. Maybe it's just a result of this being a bigger project, but in the beginning I felt like I really didn't know where to start. Thankfully, lab 1 set me on track, as that entire assignment was the whole string parser. The more I got done, the more I realized how defined the project was. Even though I didn't feel like it was in the beginning, as I finished segments of the project I would go back and look at the instructions and see that I had completely overlooked some things that were key to the assignment that if I had followed from the beginning, would have made it a lot clearer how everything comes together.

Performance Results and Discussion

My project performs pretty well. I could not quite figure out multiple commands on one line for file mode though. So the example input worked partially, but I got errors regarding the commands like ' pwd ' because I could not find out how to get it to 'pwd'. I attempted to trim the spaces off, and I was on the right track, but I kept running into errors. If I had given myself more time I'm sure I could have figured it out though.

My test file:

```
cd testDir
pwd
cd ..
pwd
cp example-output.txt testDir
mv move.txt testDir
cd testDir
pwd
ls
cat move.txt
mv move.txt ../
pwd
ls
rm example-output.txt
exit
~
~
~
~
```

My output file:

```
/home/users/ksteele/cs415Project1/testDir
/home/users/ksteele/cs415Project1
/home/users/ksteele/cs415Project1/testDir
.
..
move.txt
example-output.txt
Heyyyyyyyyyy
/home/users/ksteele/cs415Project1/testDir
.
..
example-output.txt
~
~
```

Conclusion

I honestly enjoyed this project. I've never worked on something at this scale before, and it was a useful and interesting experience. I think that my struggles with this project have set me up well for the next one, which I think I will be more prepared for.