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CS 406

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Project 1 Report

The project was completed individually. There were several major obstacles in this project. The first was converting a single pipe into an arbitrary number of pipes and chaining the pipes together. The second obstacle was process control. Configuring the waits and managing the PIDs correctly was a huge challenge, and much time was spent debugging this part. A third obstacle was the signal handling. I realized late in the project that the system tracks the foreground group and I wasn't changing that, causing programs like nano and more to not work. Fixing this messed up all of my signal handling, which then also had to be fixed.

I learned a lot of things while working on this project. I knew how pipes worked from a user level, but I have a much deeper understanding of them now at the system level. I also learned a lot about the difference between system commands and builtin commands. This has given me a deeper understanding and appreciation of C, including how signals and race conditions work, and hopefully I won't take for granted the level of abstraction higher-level languages that I'm used to working with provide to the programmer.

I added several extra features to my project. The first was adding the readline module to allow for line editing and history. This was done mostly for convenience of

debugging, but is a useful feature for any shell. I also added another status, “stop”, to my jsum table to show which processes were stopped versus currently executing. Lastly, I added the “cd” command to allow for changing of the working directory of the shell.

As far as enhancements go, there are a few I have in mind. Bash has a more complicated syntax to deal with single and double quotes, which would be nice to implement. Also, I would like to persist history between sessions, which would require some kind of writing to files and accessing at the beginning of a new session. Lastly, it would be good to implement I/O redirection, which is one of the only major features of bash that would be missing.