

CS39002 Operating Systems Laboratory
Spring 2014

Assignment 3
Due on 14-Feb-2014, 1:00pm

Part 1

In this part, you complete the shell that you started in Assignment 2. More precisely, you add the following features to your shell.

1. Support *background* execution of commands. Normally, when you type a command at the shell prompt, the prompt does not return until the command is finished. For background executions, the prompt returns immediately, the command continues execution in the background. Typing an `&` at the end of a command (like *a.out* `&`) should make it execute in the background.
2. Allow the redirection of the output of a program to a file using `>` and the redirection of the input of a program from a file using `<`. For example, typing *a.out* `> outfile` should send whatever was supposed to be displayed on the screen by *a.out* to the file *outfile*. Similarly, typing *a.out* `< infile` should make *a.out* take the inputs from the file *infile* instead of the keyboard. Both redirections may be used like *a.out* `< infile > outfile`.
3. Allow the redirection of the output of one command to the input of another by using the `|` symbol. For example, if there is a program *a.out* that writes a string *abcde* to the display, and there is a program *b.out* that takes as input a string typed from the keyboard, counts the number of characters in the string, and displays it, then typing *a.out* `| b.out` at your shell prompt should display *5* (the output *abcde* from *a.out* was fed as input to *b.out*, and *5*, the number of characters in *abcde*, is printed). Use the pipe command. Any number of redirections should be allowed (like *ls -l* `| grep -v A` `| wc` `| wc`). Moreover, pipes may be used in conjunction with input or output redirection (like *cat* `< input.txt` `| grep -v A` `| wc` `| wc` `> output.txt`).
4. When the shell is executing a command, the user may hit *Control+c* in order to terminate the execution of the command. However, hitting *Control+c* in the idle shell does not terminate the shell. The user should hit *Control+d* (or type *exit*) in order to terminate the shell.

Part 2

This part will be uploaded later.

Submit the two files separately: the updated *myshell.c*, and the source code for Part 2.