

CSCI.4210 Operating Systems
Fall, 2008
Programming Assignment 3

Take the shell that you wrote for project 2 and add pipes and input/output redirection using the bash characters `|` for pipes, `<` for input redirection, and `>` for output redirection.

The command line entered by the user should consist of one or more commands connected by pipes (the number of commands should be the number of pipe characters plus one). Each command can have up to ten arguments. Also, input and output can be redirected with the `<` (redirect input input), `>` (redirect standard output), `>>` (append standard output to the end of the file), and `2>` (redirecting standard error). Input redirection to a file applies to the first command only regardless of where the `<` appears in the command line, and output and standard error redirection to a file apply only to the last command. If the user appends an ampersand (`&`), the process should run in background.

The following are all valid command lines

```
command
command arg1 arg2
command arg1 arg2 > outfile < infile
command arg1 arg2>outfile &
command | command < infile
command arg1 arg2 | < infile command arg3 | command arg4 arg5 arg6 > outfile
```

This project is due at 11:59PM on Friday, October 10.