CS39002: Operating Systems Lab
Spring 2015
Assignment 3a
Due on: Feb 26, 2015

In the basic shell created in Assignment 2, the following functionality is to be added:

- redirection of the output of a program to a file using ">" and reading the input to 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. **Refer to duplicating file handlers (dup() system call).**

- redirection 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 pipes.** Any number of redirections should be allowed (for ex., a | b | c, a | b | c | d | e,...).

Give your program the name *advshell.c*.

Hints and Resources:

- **GNU C Library:** http://www.delorie.com/gnu/docs/glibc/libc_toc.html
  - *File Descriptors:* http://www.delorie.com/gnu/docs/glibc/libc_169.html
  - *Duplicating File Descriptors*:
    http://www.delorie.com/gnu/docs/glibc/libc_257.html
  - *Pipes:* http://www.delorie.com/gnu/docs/glibc/libc_296.html
- *I/O Redirection*: http://www.tldp.org/LDP/abs/html/io-redirection.html
- *Interprocess communication*: http://www.advancedlinuxprogramming.com/alp-folder/alp-ch05-ipc.pdf