CSCE 3600: Systems Programming

Minor Assignment 5 (4 bonus points)

Due: 11:59 PM on Monday, November 30, 2020

PROGRAM DESCRIPTION:

In this assignment, you will write a complete C program that will act as a simple command-line interpreter (i.e., a shell) for the Linux kernel. In writing your shell, you are expected to use the `fork-exec-wait` model discussed in class. In particular, you are to implement the following:

- Loop continuously until the user enters `quit`, which exits your shell.
- Inside the loop, you will print your "`minor5`" prompt and read in the user's command, which may consist of a Linux command with 0 or more options and arguments supported by the command. You are expected to read in and process only 1 command at a time with no pipelining or redirection, but you must be able to handle any options and arguments supported by the command. Note that shell built-in commands, such as `cd`, `history`, and `exit`, are not expected to work as they are built-in to the shell itself.
- In a child process, you are to execute the command as given, including all options and arguments given. If the command is not valid, rather than display an "`exec failed`" message as shown in class examples, you will simply print out the command itself with "`command not found`" as shown in the SAMPLE OUTPUT and then exit the child process. The parent process should wait for the child process to finish. vi m

SAMPLE OUTPUT (user input shown in **bold**):

```
$ ./a.out
minor5> ls
a.out    grades.txt    rec01.txt    testdir      phone.txt    route.txt    who.txt
du.txt   rec01.c       file1        rec01sol.c   minor5.c
minor5> ls -a -l -t
total 144
-rwx------  1  user   user   7835 Nov 14 17:39 a.out
drwx------  4  user   user   4096 Nov 14 17:39 .
-rw-------  1  user   user   2665 Nov 14 17:39 minor5.c
-rw-------  1  user   user     33 Nov  5 03:30 du.txt
-rw-------  1  user   user     33 Nov  5 01:28 file1
-rw-------  1  user   user    333 Nov  5 01:02 route.txt
drwx------  2  user   user   4096 Nov  3 20:36 testdir
-rw-------  1  user   user    116 Nov  2 23:38 who.txt
-rw-------  1  user   user     52 Oct 24 11:15 phone.txt
-rw-------  1  user   user    200 Oct 19 02:37 grades.txt
-rw-------  1  user   user   1634 Oct  2 15:08 rec01.c
```

```
-rw-------  1 user user        160 Oct  2 14:58 rec01.txt
-rw-------  1 user user        1451 Oct 2 14:58 rec01sol.c
drwx------ 18 user user        4096 Dec 12 21:04 ..
minor5> ls -alt
total 144
-rwx------  1   user    user   7835 Nov 14 17:39 a.out
drwx------  4   user    user   4096 Nov 14 17:39 .
-rw-------  1   user    user   2665 Nov 14 17:39 minor5.c
-rw-------  1   user    user     33 Nov  5 03:30 du.txt
-rw-------  1   user    user     33 Nov  5 01:28 file1
-rw-------  1   user    user    333 Nov  5 01:02 route.txt
drwx------  2   user    user   4096 Nov  3 20:36 testdir
-rw-------  1   user    user    116 Nov  2 23:38 who.txt
-rw-------  1   user    user     52 Oct 24 11:15 phone.txt
-rw-------  1   user    user    200 Oct 19 02:37 grades.txt
-rw-------  1   user    user   1634 Oct  2 15:08 rec01.c
-rw-------  1   user    user    160 Oct  2 14:58 rec01.txt
-rw-------  1   user    user   1451 Oct  2 14:58 rec01sol.c
drwx------ 18   user    user   4096 Dec 12 21:04 ..
minor5> sdjdsf
sdjdsf: command not found
minor5> cd ..
cd: command not found
minor5> quit
$
```

REQUIREMENTS:

- Your code should be well documented in terms of comments. For example, good comments in general consist of a header (with your name, course section, date, and brief description), comments for each variable, and commented blocks of code.
- Your program should be named "**`minor5.c`**", without the quotes.
- Your program will be graded based largely on whether it works correctly on the CSE machines (e.g., `cse01`, `cse02`, ..., `cse06`), so you should make sure that your scripts do not have any runtime errors and runs on a CSE machine.
- This is an individual programming assignment that must be the sole work of the individual student. Any instance of academic dishonesty will result in a grade of "F" for the course, along with a report filed into the Academic Integrity Database.

SUBMISSION:

- You will electronically submit your C program to the **Minor 5** dropbox in Canvas by the due date and time.