Christian Mcglothen GITHUB: chris3953

ID: 918406078 CSC415 Operating Systems

ASSIGNMENT 3 - SIMPLE SHELL

Description:

The purpose of this assignment is to practice forking and understanding processes. The assignment covers prompting user input while parsing and using commands such as execvp() and strtok() which allows for use of linux command line executions and tokenizing C strings.

Approach:

My approach began by researching and looking up the man pages for the commands execvp() and strtok(). After realizing that strtok() accepts a string and tokenizes the words based on whitespaces (which took care of most of the parsing). Then I realized the command execvp() corresponds with forking., along with accepting an array in its parameters which then executes linux commands.

Below is an image of me using the commands in practice to learn how they work!

```
int main(void) {
  char UserInput[2429];
  char delim[] = " ";
  int WordCount;

fgets(UserInput, 2429, stdin);

char * portion1 = strtok(UserInput, delim);
  char * portion2 = strtok(NULL, delim);

printf("%s\n", portion1);
  printf("%s\n", portion2);
  char* args[4];

args[0] = portion1;
  args[1] = portion2;

if(execvp(portion1, args) == -1) {
    perror("exec");
}
```

Christian Mcglothen ID: 918406078

GITHUB: chris3953 CSC415 Operating Systems

After understanding the commands, I then proceeded to the README file in which I was instructed to gather user input and parse the data. I had to account for certain scenarios such as the user inputting a blank line or entering control D. This led me to creating a while loop in which I continue to prompt the user until something has been entered into the scanner while also checking for an EOF error. After gathering a line of input I used strtok() in order to tokenize the string and place the commands in an array in order to use them in execvp()...

Issues And Resolutions:

I understood most of the assignment but there were a few things I had to research in order to fix bugs which show my trial and error. Below is an issue that occurred before handling EOF

```
/Mcglothen_Christian_HW3_main "Prompt> "
akefile Mcglothen_Christian_HW3_main Mcglothen_Christian_HW3_main.c Mcglothen_Christian_HW3_main.o README.md commands.txt
rompt$ Child 2039166, exited with 0
   ompt$ Child 2039167, exited with 0
 otal 64
 rwxrwxr-x 4 parallels parallels 4096 Jun 20 19:30 .
rwxr-xr-x 5 parallels parallels 4096 Jun 16 00:28 .
rwxr-xr-x 5 parallels parallels 4096 Jun 16 00:28 ..

rwxrwxr-x 8 parallels parallels 4096 Jun 19 14:25 .git

rwxrwxr-x 2 parallels parallels 4096 Jun 16 00:32 .vscode

rw-rw-r-- 1 parallels parallels 1872 Jun 16 00:32 Makefile

rwxrwxr-x 1 parallels parallels 13368 Jun 20 19:30 Mcglothen_Christian_HW3_main

rw-rw-r-- 1 parallels parallels 2546 Jun 20 19:30 Mcglothen_Christian_HW3_main.c

rw-rw-r-- 1 parallels parallels 10648 Jun 20 19:30 Mcglothen_Christian_HW3_main.o

rw-rw-r-- 1 parallels parallels 5333 Jun 16 00:28 README.md

rw-rw-r-- 1 parallels parallels 42 Jun 16 00:28 commands.txt

rromptS Child 2039168. exited with 0
    omptS Child 2039168, exited with 0
PID TTY TIME CMD
174989 pts/0 00:00:00 bash
 PID TTY
874989 pts/0
   888436 pts/0
                                                                      00:00:00 make
                                                                      00:00:00 sh
00:00:09 Mcglothen_Chris
00:00:00 make
   888446 pts/0
 888447 pts/0
892804 pts/0
   92814 pts/0
                                                                         00:00:00 sh
  392815 pts/0
                                                                        00:00:02 Mcglothen_Chris
039163 pts/0
039164 pts/0
                                                                     00:00:00 make
00:00:00 sh
00:00:00 Mcglothen_Chris
   39165 pts/0
 039169 pts/0 00:00:00 ps
rompt$ Child 2039169, exited with 0
s: cannot access 'foo': No such file or directory
   ompt$ Child 2039170, exited with 512
  rompts Prompts Prompts
```

At the very end of running commands.txt, I got an infinite loop after receiving the correct output. After inspecting the commands,txt, I noticed there was a null line which meant I wasn't handling the EOF error along with the README file hinting at the possible error. To fix this issue I looked up how to use the FEOF command. Inserting the following into my code fixed the issue

IF (FEOF(STDIN)) { EXIT(0); }

Christian Mcglothen GITHUB: chris3953

ID: 918406078 CSC415 Operating Systems

Screenshot Of Compilation:

```
parallels@ubuntu-linux-22-04-desktop:~/Desktop/csc415-assignment3-simpleshell-chris3953$ make run
./Mcglothen_Christian_HW3_main "Prompt> "
Prompt> |
```

Screenshot Of Output:

```
parallels@ubuntu-linux-22-04-desktop:~/Desktop/csc415-assignment3-simpleshell-chris3953$ make run
./Mcglothen_Christian_HW3_main "Prompt> "
Prompt> ls -l
total 52
-rw-rw-r-- 1 parallels parallels 1872 Jun 16 00:32 Makefile
-rwxrwxr-x 1 parallels parallels 17256 Jun 20 23:39 Mcglothen_Christian_HW3_main
-rw-rw-r-- 1 parallels parallels 3021 Jun 20 23:34 Mcglothen_Christian_HW3_main.c
-rw-rw-r-- 1 parallels parallels 10576 Jun 20 23:39 Mcglothen_Christian_HW3_main.o
-rw-rw-r-- 1 parallels parallels 5333 Jun 16 00:28 README.md
 rw-rw-r-- 1 parallels parallels
                                            42 Jun 16 00:28 commands.txt
Child 2080782, exited with 0
Prompt> ./Mcglothen_Christian_HW3_main
Prompt> ps
PID TTY
                         TIME CMD
2047263 pts/0
                    00:00:00 bash
2047433 pts/0
                    00:00:00 make
2047440 pts/0
                    00:00:00 sh
2047441 pts/0
                    00:00:00 Mcglothen_Chris
2047640 pts/0
                     00:00:00 Mcglothen_Chris
2080563 pts/0
                     00:00:00 make
2080564 pts/0
                    00:00:00 sh
2080565 pts/0
2081059 pts/0
                    00:00:00 Mcglothen_Chris
                    00:00:00 Mcglothen_Chris
2081078 pts/0
                    00:00:00 ps
Child 2081078, exited with 0
Prompt>
```

```
parallels@ubuntu-linux-22-04-desktop:~/Desktop/csc415-assignment3-simpleshell-chris3953$ make run
./Mcglothen_Christian_HW3_main "Prompt> "
Prompt> ls -l
total 52
-rw-rw-r-- 1 parallels parallels 1872 Jun 16 00:32 Makefile
rwxrwxr-x 1 parallels parallels 17256 Jun 20 23:39 Mcglothen_Christian_HW3_main
-rw-rw-r-- 1 parallels parallels 3021 Jun 20 23:34 Mcglothen_Christian_HW3_main.c
-rw-rw-r-- 1 parallels parallels 10576 Jun 20 23:39 Mcglothen_Christian_HW3_main.o
-rw-rw-r-- 1 parallels parallels 5333 Jun 16 00:28 README.md
-rw-rw-r-- 1 parallels parallels
                                         42 Jun 16 00:28 commands.txt
Child 2080782, exited with 0
Prompt> ./Mcglothen_Christian_HW3_main
rompt> ps
   PID TTY
                       TIME CMD
                 00:00:00 bash
2047263 pts/0
2047433 pts/0
                   00:00:00 make
2047440 pts/0
                   00:00:00 sh
2047441 pts/0
                   00:00:00 Mcglothen_Chris
2047640 pts/0
2080563 pts/0
                   00:00:00 Mcglothen_Chris
                   00:00:00 make
2080564 pts/0
                   00:00:00 sh
2080565 pts/0
                   00:00:00 Mcglothen_Chris
2081059 pts/0
                   00:00:00 Mcglothen_Chris
2081078 pts/0
                   00:00:00 ps
Child 2081078, exited with 0
Prompt> exit
Child 2081059, exited with 0
Prompt> exit
parallels@ubuntu-linux-22-04-desktop:~/Desktop/csc415-assignment3-simpleshell-chris3953$
```

ID: 918406078 CSC415 Operating Systems