

Assignment 3 – Simple Shell

Description:

The focus of this assignment is to program and develop a shell that runs within the linux terminal. The shell takes in user input and text files like a normal prompt and produces the result after entering it. The buffer limit on this assignment is 123 bytes and uses the fork() function to create a separate child process to take over the program and overtake the next instruction.

Approach / What I Did:

A function called inputCMD, which take in an array of commands, as well as a array of tokens with a maximum buffer size of 123 bytes, tokenizing the input commands, whether from a text file or from user input (stdin), and places them from a temporary variable to the array of tokens that was earlier defined as a parameter; all of this is done using a while loop that checks for a null conditions and inserts the last position in the token array as null. This function also echecks for empty string input as well as null termination. Inside the main function we call the inputCMD function and call fork() to create a separate process. If this is successful then execvp will be called that will take over the program (child process), if not, the program will continue with the parent process and exit returning the child processor ID. Breaking the program into separate parts was necessary. Having one big chunk of code would make it difficult to check and revise if anything was wrong.

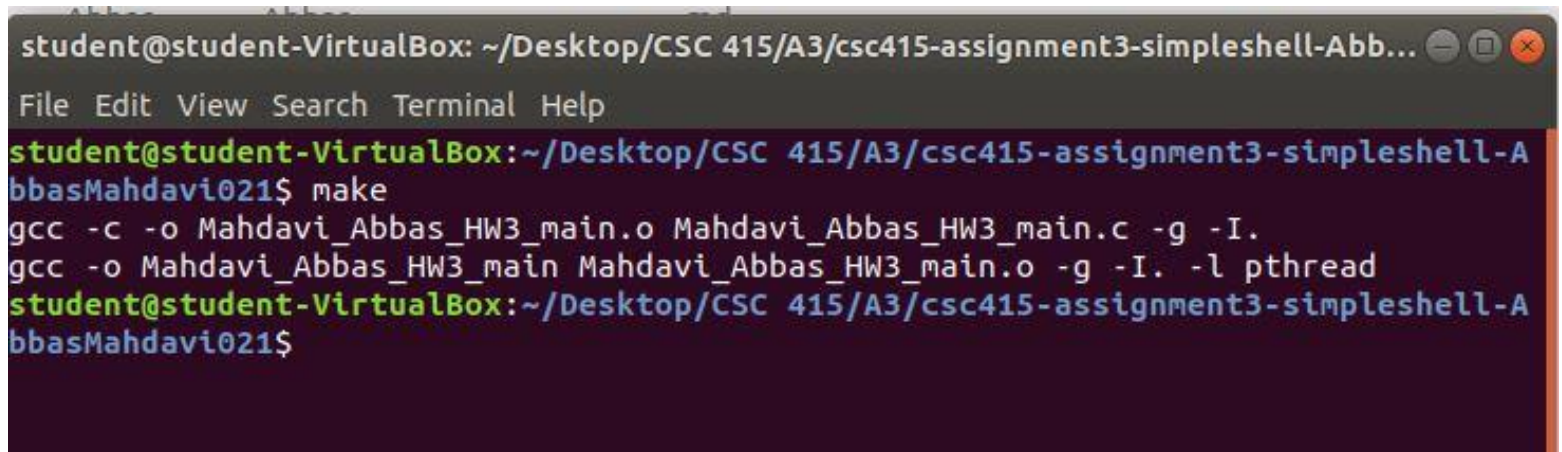
Issues and Resolutions:

- One of the biggest problems I had when programming this assignment was scoping and interchanging between the part and child process.

In the beginning, the child process was being skipped and disregarded, which means something else in the program was preventing it from getting to that point. Once I realized it was because tokens were not properly being substringed and carried in the buffer, then it started to run successfully. Also concatenating the source (/bin/) path and the token array was hard to understand at first.

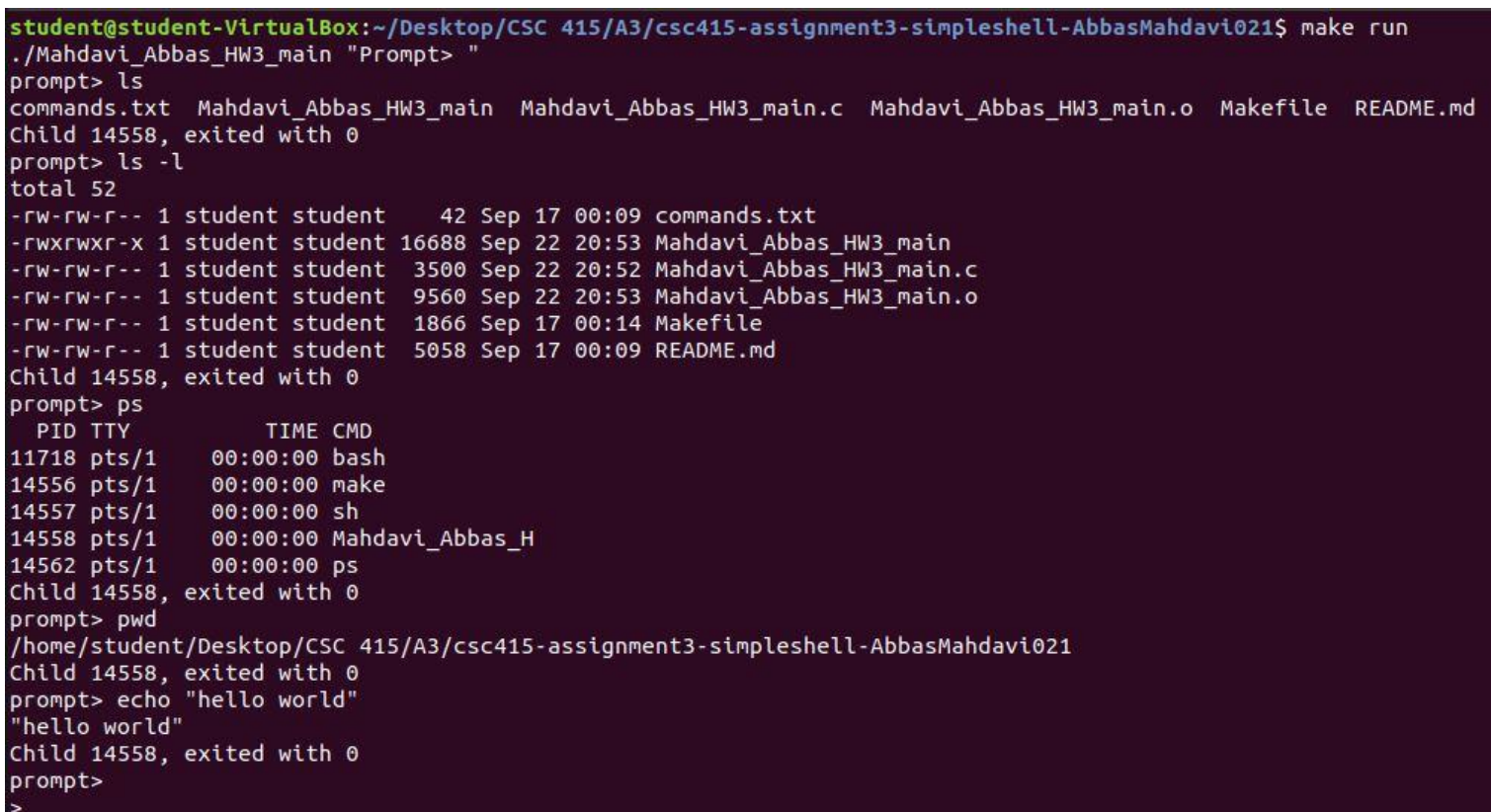
- Another issue was getting the correct output when simply pressing Enter. I was unable to fix this issue properly.

Screen shot of compilation:



```
student@student-VirtualBox: ~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-Abb...
File Edit View Search Terminal Help
student@student-VirtualBox:~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-A
bbasMahdavi021$ make
gcc -c -o Mahdavi_Abbas_HW3_main.o Mahdavi_Abbas_HW3_main.c -g -I.
gcc -o Mahdavi_Abbas_HW3_main Mahdavi_Abbas_HW3_main.o -g -I. -l pthread
student@student-VirtualBox:~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-A
bbasMahdavi021$
```

Screen shot(s) of the execution of the program:



```
student@student-VirtualBox:~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-AbbasMahdavi021$ make run
./Mahdavi_Abbas_HW3_main "Prompt> "
prompt> ls
commands.txt  Mahdavi_Abbas_HW3_main  Mahdavi_Abbas_HW3_main.c  Mahdavi_Abbas_HW3_main.o  Makefile  README.md
Child 14558, exited with 0
prompt> ls -l
total 52
-rw-rw-r-- 1 student student  42 Sep 17 00:09 commands.txt
-rwxrwxr-x 1 student student 16688 Sep 22 20:53 Mahdavi_Abbas_HW3_main
-rw-rw-r-- 1 student student  3500 Sep 22 20:52 Mahdavi_Abbas_HW3_main.c
-rw-rw-r-- 1 student student  9560 Sep 22 20:53 Mahdavi_Abbas_HW3_main.o
-rw-rw-r-- 1 student student  1866 Sep 17 00:14 Makefile
-rw-rw-r-- 1 student student  5058 Sep 17 00:09 README.md
Child 14558, exited with 0
prompt> ps
  PID TTY          TIME CMD
 11718 pts/1    00:00:00 bash
 14556 pts/1    00:00:00 make
 14557 pts/1    00:00:00 sh
 14558 pts/1    00:00:00 Mahdavi_Abbas_H
 14562 pts/1    00:00:00 ps
Child 14558, exited with 0
prompt> pwd
/home/student/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-AbbasMahdavi021
Child 14558, exited with 0
prompt> echo "hello world"
"hello world"
Child 14558, exited with 0
prompt>
>
```

```
student@student-VirtualBox:~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-AbbasMahdavi021$ make run < commands.txt
./Mahdavi_Abbas_HW3_main "Prompt> "
commands.txt      Mahdavi_Abbas_HW3_main.c  Makefile
Mahdavi_Abbas_HW3_main  Mahdavi_Abbas_HW3_main.o  README.md
prompt> Child 14642, exited with 0
"Hello World"
prompt> Child 14642, exited with 0
total 88
drwxrwxr-x 3 student student 4096 Sep 22 20:53 .
drwxrwxr-x 3 student student 4096 Sep 17 00:09 ..
-rw-rw-r-- 1 student student  42 Sep 17 00:09 commands.txt
drwxrwxr-x 8 student student 4096 Sep 17 00:09 .git
-rwxrwxr-x 1 student student 16688 Sep 22 20:53 Mahdavi_Abbas_HW3_main
-rw-rw-r-- 1 student student 3500 Sep 22 20:52 Mahdavi_Abbas_HW3_main.c
-rw-rw-r-- 1 student student 9560 Sep 22 20:53 Mahdavi_Abbas_HW3_main.o
-rw-rw-r-- 1 student student 1866 Sep 17 00:14 Makefile
-rw-r--r-- 1 student student 12288 Sep 17 00:12 .Makefile.swo
-rw-r--r-- 1 student student 12288 Sep 17 00:11 .Makefile.swp
-rw-rw-r-- 1 student student 5058 Sep 17 00:09 README.md
student@student-VirtualBox:~/Desktop/CSC 415/A3/csc415-assignment3-simpleshell-AbbasMahdavi021$
```