

## Assignment 3 – Simple Shell

### Description:

Assignment 3 – Simple Shell was an assignment to write a C program that takes inputs from the user and executes those inputs as if they were linux commands. This program included making sure the behavior was the same as the linux command line where the user can input anything and only if the commands were correctly found and could be executed with `execvp()` it would then be done.

### Approach / What I Did:

What I did for this assignment was start out with a loop where we will keep looping for user input and if the user input “exit” the loop would stop. If the user did not input “exit” the program would then decide to try the user input as if it was a command using “execvp” after a `fork()` so the parent process could continue looping and the `execvp` would not take over the original program process. After the program calls `execvp` the child process terminates we move back to the parent who has been on hold due to `wait()` this whole time and prints out the child’s process id and what it exited with. The program continues looping as long as no errors occurs, does not reach end of file, and user does not enter “exit.”

### Issues and Resolutions:

Huge issues with this assignment, first of all I forgot that `execvp` takes over the child process and was trying for days to get the parent process to stop infinitely looping and stop looping only once. Second big issue was that I did not put the `fork()` in the right spot in the loop which caused the first issue. I put the `fork()` in the very beginning of the loop instead of having the `fork()` just before the `exec()`. The last issue I had was very simple but very infuriating to find out. When debugging my code I often typed in “yes” as my command thinking that linux surely doesn’t have this command in its database of premades. I was wrong and there is a command that is titled “yes” in linux and it prints “y” repeatedly. I thought this was because my program somehow had problems with something and I was trying to fix a ghost bug. Big resolutions made were placing the `fork()` in the right place which solved the first and second issue, and knowing that “yes” was a command on linux so I knew to stop typing that into my program as a test input.

### Analysis:

n/a

### Screen shot of compilation:

Compilation down below

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

```
student@student-VirtualBox:~/Documents/github/projects/csc415-assignment3-simpleshell-tzphuang$ make clean
rm *.o huang_tony_HW3_main
student@student-VirtualBox:~/Documents/github/projects/csc415-assignment3-simpleshell-tzphuang$ make run
gcc -c -o huang_tony_HW3_main.o huang_tony_HW3_main.c -g -I.
gcc -o huang_tony_HW3_main huang_tony_HW3_main.o -g -I. -l pthread
./huang_tony_HW3_main "Prompt> "
Prompt> exit
student@student-VirtualBox:~/Documents/github/projects/csc415-assignment3-simpleshell-tzphuang$ make run
./huang_tony_HW3_main "Prompt> "
Prompt> student@student-VirtualBox:~/Documents/github/projects/csc415-assignment3-simpleshell-tzphuang$ make run
./huang_tony_HW3_main "Prompt> "
Prompt> ls -a
. .. commands.txt .git huang_tony_HW3_main huang_tony_HW3_main.c huang_tony_HW3_main.o Makefile README.md
Child 3761, exited with 0
Prompt> ls -l
total 56
-rw-r--r-- 1 student student 42 Sep 9 13:03 commands.txt
-rwxr-xr-x 1 student student 17200 Sep 20 18:37 huang_tony_HW3_main
-rw-rw-r-- 1 student student 5796 Sep 20 18:36 huang_tony_HW3_main.c
-rw-r--r-- 1 student student 11368 Sep 20 18:37 huang_tony_HW3_main.o
-rw-r--r-- 1 student student 1774 Sep 9 15:11 Makefile
-rw-r--r-- 1 student student 4967 Sep 9 13:03 README.md
Child 3762, exited with 0
Prompt> ls -a -l
total 68
drwxr-xr-x 3 student student 4096 Sep 20 18:37 .

./huang_tony_HW3_main "Prompt> "
Prompt> ls -a
. .. commands.txt .git huang_tony_HW3_main huang_tony_HW3_main.c huang_tony_HW3_main.o Makefile README.md
Child 3761, exited with 0
Prompt> ls -l
total 56
-rw-r--r-- 1 student student 42 Sep 9 13:03 commands.txt
-rwxr-xr-x 1 student student 17200 Sep 20 18:37 huang_tony_HW3_main
-rw-rw-r-- 1 student student 5796 Sep 20 18:36 huang_tony_HW3_main.c
-rw-r--r-- 1 student student 11368 Sep 20 18:37 huang_tony_HW3_main.o
-rw-r--r-- 1 student student 1774 Sep 9 15:11 Makefile
-rw-r--r-- 1 student student 4967 Sep 9 13:03 README.md
Child 3762, exited with 0
Prompt> ls -a -l
total 68
drwxr-xr-x 3 student student 4096 Sep 20 18:37 .
drwxr-xr-x 13 student student 4096 Sep 9 13:03 ..
-rw-r--r-- 1 student student 42 Sep 9 13:03 commands.txt
drwxr-xr-x 8 student student 4096 Sep 20 18:37 .git
-rwxr-xr-x 1 student student 17200 Sep 20 18:37 huang_tony_HW3_main
-rw-rw-r-- 1 student student 5796 Sep 20 18:36 huang_tony_HW3_main.c
-rw-r--r-- 1 student student 11368 Sep 20 18:37 huang_tony_HW3_main.o
-rw-r--r-- 1 student student 1774 Sep 9 15:11 Makefile
-rw-r--r-- 1 student student 4967 Sep 9 13:03 README.md
Child 3763, exited with 0
Prompt> ps
  PID TTY          TIME CMD
 1899 pts/0    00:00:00 bash
 3758 pts/0    00:00:00 make
 3759 pts/0    00:00:00 sh
 3760 pts/0    00:00:00 huang_tony_HW3_
 3764 pts/0    00:00:00 ps
Child 3764, exited with 0
Prompt> exit
student@student-VirtualBox:~/Documents/github/projects/csc415-assignment3-simpleshell-tzphuang$
```

```
student@student-VirtualBox:~/Documents/github_projects/csc415-assignment3-simpleshell-tzphuang$ make clean
rm *.o huang_tony_HW3_main
student@student-VirtualBox:~/Documents/github_projects/csc415-assignment3-simpleshell-tzphuang$ make run <commands.txt
gcc -c -o huang_tony_HW3_main.o huang_tony_HW3_main.c -g -I.
gcc -o huang_tony_HW3_main huang_tony_HW3_main.o -g -I. -l pthread
./huang_tony_HW3_main "Prompt> "
commands.txt huang_tony_HW3_main huang_tony_HW3_main.c huang_tony_HW3_main.o Makefile README.md
Prompt> Child 3366, exited with 0
"Hello World"
Prompt> Child 3367, exited with 0
total 72
drwxr-xr-x  3 student student 4096 Sep 20 18:15 .
drwxr-xr-x 13 student student 4096 Sep  9 13:03 ..
-rw-r--r--  1 student student  42 Sep  9 13:03 commands.txt
drwxr-xr-x  8 student student 4096 Sep 19 18:10 .git
-rwxr-xr-x  1 student student 17248 Sep 20 18:15 huang_tony_HW3_main
-rw-rw-r--  1 student student 8750 Sep 20 18:14 huang_tony_HW3_main.c
-rw-r--r--  1 student student 11440 Sep 20 18:15 huang_tony_HW3_main.o
-rw-r--r--  1 student student 1774 Sep  9 15:11 Makefile
-rw-r--r--  1 student student 4967 Sep  9 13:03 README.md
Prompt> Child 3368, exited with 0
  PID TTY          TIME CMD
 1899 pts/0    00:00:00 bash
 3357 pts/0    00:00:00 make
 3364 pts/0    00:00:00 sh
 3365 pts/0    00:00:00 huang_tony_HW3_
 3369 pts/0    00:00:00 ps
Prompt> Child 3369, exited with 0
ls: cannot access 'foo': No such file or directory
Prompt> Child 3370, exited with 512
Prompt> Child 3371, exited with 139
Prompt> student@student-VirtualBox:~/Documents/github_projects/csc415-assignment3-simpleshell-tzphuang$
```