

CSC-415-01 Fall 2020

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Project: Assignment 3 - Simple Shell

Github: rinaykumar

Link: <https://github.com/CSC415-Fall2020/assignment-3-simple-shell-rinaykumar>

#### Description:

The goal of this assignment was to create a simple shell to run on top of the Linux shell that could take and process basic commands from the command line. It displays a prompt, specified by the user in the command arguments, then uses `fgets()` to take the input from `stdin` and place it into an input buffer. The input buffer is then parsed to create tokens of the command and arguments, which are then placed into an arguments array. A `fork()` call is made, and the child process runs an `execvp()` call with the command and arguments from the arguments array. Then the parent process issues a `wait()` call, and prints the child PID and exit code to the console. Error checking was done for cases where the command input was empty, where `fgets()` was unable to read the input, an invalid command (according to the `execvp()` call) was entered, etc.

Parsing the input into tokens was a challenge, with the proper use of `strtok()` to create tokens. The `fork()` -> `exec()` -> `wait()` process done in a switch statement is the core of the assignment, and the only trouble I had was making sure which values had to be returned. It took some digging, but eventually I used the return from the `fork()` call itself as the child PID and the return from the `wait()` call as the exit code.

I also had some trouble deciding how the arguments array should be handled. I first considered using an initial `malloc()` call with size 5, then using `realloc()` if there were more arguments. I eventually decided to just explicitly set the arguments size at the `MAX_SIZE` used for the input buffer, which was 512, assuming there could not be more arguments than that.

#### Sample Output:

```
student@student-VirtualBox: ~/assignment-3-simple-shell-rinaykumar
File Edit View Search Terminal Help
student@student-VirtualBox:~/assignment-3-simple-shell-rinaykumar$ make run
./kumar_rinay_HW3_main "Prompt> "
Prompt> ls -l
total 48
-rw-r--r-- 1 student student 1731 Sep 20 00:38 Makefile
-rw-r--r-- 1 student student 4857 Sep 17 03:44 README.md
-rwxr-xr-x 1 student student 16392 Sep 23 08:08 kumar_rinay_HW3_main
-rw-rw-r-- 1 student student 3500 Sep 23 08:05 kumar_rinay_HW3_main.c
-rw-r--r-- 1 student student 9536 Sep 23 08:08 kumar_rinay_HW3_main.o
Child 3776, exited with 0
Prompt> ls foo
ls: cannot access 'foo': No such file or directory
Child 3777, exited with 2
Prompt> exit
student@student-VirtualBox:~/assignment-3-simple-shell-rinaykumar$
```