

Report

Compile and run:

requires only some standard c library

no external library need to be installed on your machine

```
$ gcc -o shell c_shell.c
```

```
$ ./shell
```

Our shell features:

It can run some basic command like cat, echo, less, ...

It can pipe mutiple commands

Input and output redirection

Trimming trailing and leading white spaces in a command

Command run in the background with `&`

User can run the last command with `!!` (we haven't implement it to run with sudo)

Some notes:

The `fgets()` function doesn't work as intended when user input has the `"|"` character so we choose to use the `gets()` instead.

Notice that the `gets()` doesn't check the length of the input so it is very risky to use it!

We didn't implement the shell to properly parse the argument in single/double quotes

So if you run `ssh> mkdir "Project 02"` it will create a directory with the name `"Project 02"` (with all the quotes in the name)

Main functions:

Functions	Comments
<code>main()</code>	controls the flow of the shell
<code>parse_and_run()</code>	takes the user input and handles all the parsing to the right format for the <code>execvp()</code> function then calls the <code>execute</code> function
<code>execute()</code>	using <code>execvp()</code> to run the command, handles all the file descriptors, commands piping, forking.

Simple command:

```

wayne@linux:~/CS333_project02/C_shell$ ./shell
ssh>>ls -la
total 40
drwxr-xr-x 2 wayne wayne 4096 Jun 7 10:32 .
drwxr-xr-x 3 wayne wayne 4096 Jun 6 22:12 ..
-rw-rw-r-- 1 wayne wayne 11430 Jun 7 10:30 c_shell.c
-rwxrwxrwx 1 wayne wayne 3 Jun 6 22:19 length
-rwxr-xr-x 1 wayne wayne 13688 Jun 7 10:32 shell
ssh>>

```

Simple command with &:

```

ssh>>ping google.com &
ssh>>PING google.com (216.58.200.78) 56(84) bytes of data:
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):
64 bytes from hkg07s30-in-f14.1e100.net (216.58.200.78):

```

Output redirect:

```

ssh>>date > today
ssh>>ls -la
total 40
drwxr-xr-x 2 wayne wayne 4096 Jun 7 10:37 .
drwxr-xr-x 3 wayne wayne 4096 Jun 6 22:12 ..
-rw-rw-r-- 1 wayne wayne 11430 Jun 7 10:30 c_shell.c
-rwxr-xr-x 1 wayne wayne 13688 Jun 7 10:32 shell
-rw---S--T 1 wayne wayne 29 Jun 7 10:37 today
ssh>>cat today
Sun Jun 7 10:37:02 +07 2020

```

Input redirect:

```
ssh>>more < /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/
man:x:6:12:man:/var/cache/man:/usr/sbin/
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nol
mail:x:8:8:mail:/var/mail:/usr/sbin/nolo
news:x:9:9:news:/var/spool/news:/usr/sbi
uucp:x:10:10:uucp:/var/spool/uucp:/usr/s
proxy:x:13:13:proxy:/bin:/usr/sbin/nolog
www-data:x:33:33:www-data:/var/www:/usr/
backup:x:34:34:backup:/var/backups:/usr/
list:x:38:38:Mailing List Manager:/var/l
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin
gnats:x:41:41:Gnats Bug-Reporting System
nobody:x:65534:65534:nobody:/nonexistent
systemd-network:x:100:102:systemd Networ
systemd-resolve:x:101:103:systemd Resolv
syslog:x:102:106:./home/syslog:/usr/sbin
messagebus:x:103:107:./nonexistent:/usr/
_apt:x:104:65534:./nonexistent:/usr/sbin
uidd:x:105:111:./run/uidd:/usr/sbin/no
avahi-autoipd:x:106:112:Avahi autoip dae
usbmux:x:107:46:usbmux daemon,,./var/li
dnsmasq:x:108:65534:dnsmasq,,./var/lib/
rtkit:x:109:114:RealtimeKit,,./proc:/us
cups-pk-helper:x:110:116:user for cups-p
--More--
```

Commands with pipe:

```
ssh>>echo hello_my_is_J | wc -c
14
ssh>>echo hello_there | base64
aGVsbG9fdGhlcmUK
ssh>>
```