

Michael Raafat Mikahil Zaki

(55)

Lab 1-Shell-Report

Shell

A Unix shell is a command-line interpreter that provides a traditional user interface for the Unix operating system and for Unix-like systems. The shell can run in two modes: interactive and batch.

We tried to make a similar one of our design which has the basic features of the Unix shell.

How the code is organized :

We partitioned our code into several files, each file has the responsibility for doing some operations.

- Main.c : which is responsible for executing the program, receiving inputs from user, managing the fork process, and displaying the suitable output.
- Command_parser.c : the main important file as it's responsible for parsing the command into several parts to make it easy for the main.c file to manage the executing process.
- File_processing.c : This is responsible for any dealing with files ex: history file, logfile ...etc.
- Commands.c : This is responsible for implementation of cd command and echo command as these commands have a special implementation.
- Variables.c : This is responsible for storing variables in our shell during running time, it consists of an array which stores a value and a key for each variable.
- Environment.c : This is responsible for setting up the files that we read from or write into.

Main functions:

1- Parse Command:

This function is the main important function in our program, it's in the `command_parser` file, it takes a command string and an integer that represent number of command argument including the command. It uses some functions that help it to parse the command.

2- Handle Command:

This function is in the main file, it is responsible for the execution process, It calls the parse command function then it takes the command parts to call the fork process to execute command and it returns false if command is incorrect

3- Fork process:

This function is responsible for the fork, it executes the child process and handles if this command is in background or not.

4- RuncdEchoCommands:

This function is responsible for execution of these two commands only as they are really special.

5- RunAdditionalCommands:

This function is responsible for execution of other commands that are not executed by function `execv()`.

6- Shell_loop:

This function is responsible for managing the receiving of inputs and calls `handleCommand` to give it the new command to be parsed. It also manages the end of the shell when the user decides to do so.

How to compile and run code:

It is just very easy, all what you need is:

- 1- Enter the directory of the shell project.
- 2- Enter command “make”.
- 3- Type “./shell absolutePath”.

Sample runs

```
michael@michael-HP-Notebook:~$ cd workspace/shell
michael@michael-HP-Notebook:~/workspace/shell$ ./shell
Shell:/home/michael>cd workspace
Shell:/home/michael/workspace>cd shell
Shell:/home/michael/workspace/shell>ls
batch.jpg      command_parser.o  cscope.out      environment.txt  main.c          shell          shell.layout    variables.o
bin            commands.c       environment.c    file_processing.c main.o          shell.cbp      testcases
command_parser.c  commands.h      environment.h    file_processing.h Makefile       shell.cscope_file_list  variables.c
command_parser.h  commands.o      environment.o    file_processing.o obj            shell.depend    variables.h
Shell:/home/michael/workspace/shell>ls -l -a
total 360
drwxr-xr-x 4 michael michael 4096 Oct 12 04:23 .
drwxrwxr-x 3 michael michael 4096 Oct 5 19:14 ..
-rw-rw-r-- 1 michael michael 35 Oct 10 00:25 batch.jpg
drwxr-xr-x 4 michael michael 4096 Oct 9 23:45 bin
-rw-rw-r-- 1 michael michael 12604 Oct 12 03:05 command_parser.c
-rw-rw-r-- 1 michael michael 1360 Oct 10 23:05 command_parser.h
-rw-rw-r-- 1 michael michael 12816 Oct 12 04:02 command_parser.o
-rw-rw-r-- 1 michael michael 1965 Oct 12 04:09 commands.c
-rw-rw-r-- 1 michael michael 381 Oct 5 10:57 commands.h
-rw-rw-r-- 1 michael michael 3616 Oct 12 04:07 commands.o
-rw-rw-r-- 1 michael michael 161887 Oct 11 23:20 cscope.out
-rw-rw-r-- 1 michael michael 114 Oct 12 02:37 environment.c
-rw-rw-r-- 1 michael michael 616 Oct 5 10:59 environment.h
-rw-rw-r-- 1 michael michael 1400 Oct 12 02:50 environment.o
-rw-rw-r-- 1 michael michael 299 Oct 5 17:52 environment.txt
-rw-rw-r-- 1 michael michael 1832 Oct 12 03:07 file_processing.c
-rw-rw-r-- 1 michael michael 715 Oct 12 02:43 file_processing.h
-rw-rw-r-- 1 michael michael 4680 Oct 12 04:02 file_processing.o
-rw-rw-r-- 1 michael michael 9238 Oct 12 04:20 main.c
-rw-rw-r-- 1 michael michael 13408 Oct 12 04:02 main.o
-rw-rw-r-- 1 michael michael 298 Oct 5 18:56 Makefile
drwxr-xr-x 4 michael michael 4096 Oct 9 23:45 obj
-rwxrwxr-x 1 michael michael 29528 Oct 12 04:07 shell
-rw-rw-r-- 1 michael michael 1909 Oct 5 12:46 shell.cbp
-rw-rw-r-- 1 michael michael 503 Oct 11 23:20 shell.cscope_file_list
-rw-rw-r-- 1 michael michael 1237 Oct 12 04:21 shell.depend
-rw-rw-r-- 1 michael michael 3010 Oct 12 04:23 shell.layout
-rw-rw-r-- 1 michael michael 1090 Oct 12 04:04 testcases
-rw-rw-r-- 1 michael michael 2481 Oct 12 03:07 variables.c
-rw-rw-r-- 1 michael michael 880 Oct 5 10:59 variables.h
-rw-rw-r-- 1 michael michael 4144 Oct 12 04:02 variables.o
```

```

michael@michael-HP-Notebook:~$ cd workspace/shell
michael@michael-HP-Notebook:~/workspace/shell$ ./shell
Shell:/home/michael>ps
  PID TTY          TIME CMD
 2527 pts/0    00:00:00 bash
 2537 pts/0    00:00:00 shell
 2543 pts/0    00:00:00 ps
Shell:/home/michael>ls
2~      23_4p.c~  cs333    first~   logfile  one~      Release.key  tmp      Untitled Document~
21_3.c~ Android  Desktop  git       Music    originaltwo~ session21.c~ try.c~    Untitled Folder
22_4.c~ assignment~ Documents historyfile netbeans-8.2 Pictures  Templates  tryTwo.c~ Videos
23_4c.c~ childprog.c~ Downloads IdeaProjects NetBeansProjects Public     testforHomeSymbol two~     workspace
Shell:/home/michael>cd /
Shell:/>cd -
/home/michael
Shell:/home/michael>x="-l -a"
Shell:/home/michael>cd workspace
Shell:/home/michael/workspace>ls $x
total 12
drwxrwxr-x 3 michael michael 4096 Oct 5 19:14 .
drwxr-xr-x 42 michael michael 4096 Oct 12 05:32 ..
drwxr-xr-x 4 michael michael 4096 Oct 12 04:23 shell
Shell:/home/michael/workspace>

```

```

michael@michael-HP-Notebook:~$ cd workspace/shell
michael@michael-HP-Notebook:~/workspace/shell$ ./shell
Shell:/home/michael>cd workspace
Shell:/home/michael/workspace>cd shell
Shell:/home/michael/workspace/shell>cd /
Shell:/>cd -
/home/michael/workspace/shell
Shell:/home/michael/workspace/shell>cd -
/
Shell:/>ls
bin  cdrom  etc  initrd.img  lib  lib64  media  npm-debug.log  proc  run  snap  sys  usr  vmlinuz
boot dev  home  initrd.img.old  lib32  lost+found  mnt  opt  root /sbin  srv  tmp  var  vmlinuz.old
Shell:/>ls -l
total 148
drwxr-xr-x 2 root root 12288 Sep 27 17:19 bin
drwxr-xr-x 3 root root 4096 Oct 12 04:02 boot
drwxrwxr-x 2 root root 4096 Jul 31 10:51 cdrom
drwxr-xr-x 20 root root 4340 Oct 12 05:30 dev
drwxr-xr-x 150 root root 12288 Oct 12 04:03 etc
drwxr-xr-x 3 root root 4096 Jul 31 10:51 home
lrwxrwxrwx 1 root root 32 Oct 12 04:01 initrd.img -> boot/initrd.img-4.4.0-97-generic
lrwxrwxrwx 1 root root 32 Sep 27 17:27 initrd.img.old -> boot/initrd.img-4.4.0-96-generic
drwxr-xr-x 25 root root 4096 Aug 29 20:31 lib
drwxr-xr-x 2 root root 4096 Aug 24 06:58 lib32
drwxr-xr-x 2 root root 4096 Aug 18 11:43 lib64
drwx----- 2 root root 16384 Jul 31 10:44 lost+found
drwxr-xr-x 3 root root 4096 Aug 14 09:13 media
drwxr-xr-x 2 root root 4096 Aug 18 11:42 mnt
-rw-r--r-- 1 root root 657 Aug 17 21:39 npm-debug.log
drwxr-xr-x 5 root root 4096 Sep 8 19:51 opt
dr-xr-xr-x 216 root root 0 Oct 12 05:30 proc
drwxrwxrwx 13 root root 4096 Oct 12 00:28 root
drwxr-xr-x 30 root root 900 Oct 12 05:31 run
drwxr-xr-x 2 root root 12288 Sep 27 17:19/sbin
drwxr-xr-x 2 root root 4096 Jul 17 12:15 snap
drwxr-xr-x 2 root root 4096 Feb 18 2016 srv
dr-xr-xr-x 13 root root 0 Oct 12 05:30 sys
drwxrwxrwt 10 root root 36864 Oct 12 05:42 tmp
drwxr-xr-x 12 root root 4096 Oct 12 03:03 usr
drwxr-xr-x 14 root root 4096 Aug 18 16:48 var
lrwxrwxrwx 1 root root 29 Oct 12 04:01 vmlinuz -> boot/vmlinuz-4.4.0-97-generic
lrwxrwxrwx 1 root root 29 Sep 27 17:27 vmlinuz.old -> boot/vmlinuz-4.4.0-96-generic

```

```

michael@michael-HP-Notebook:~$ cd workspace/shell
michael@michael-HP-Notebook:~/workspace/shell$ ./shell
Shell:/home/michael>ps
  PID TTY          TIME CMD
 2527 pts/0    00:00:00 bash
 2537 pts/0    00:00:00 shell
 2543 pts/0    00:00:00 ps
Shell:/home/michael>ls
2~      23_4p.c~  cs333    first~   logfile  one~      Release.key  tmp      Untitled Document~
21_3.c~  Android  Desktop  git       Music    originaltwo~ session21.c~ try.c~   Untitled Folder
22_4.c~  assignment~ Documents historyfile netbeans-8.2 Pictures  Templates  testforHomesymbol two~     Videos
23_4c.c~ childprog.c~ Downloads IdeaProjects NetBeansProjects Public
Shell:/home/michael>cd /
Shell:/>cd -
/home/michael
Shell:/home/michael>x="-l -a"
Shell:/home/michael>cd workspace
Shell:/home/michael/workspace>ls $x
total 12
drwxrwxr-x  3 michael michael 4096 Oct  5 19:14 .
drwxr-xr-x 42 michael michael 4096 Oct 12 05:32 ..
drwxr-xr-x  4 michael michael 4096 Oct 12 04:23 shell
Shell:/home/michael/workspace>cd ~
Shell:/home/michael>cd /
Shell:/>cd ~michael
Shell:/home/michael>x=~
Shell:/home/michael>cd workspace
Shell:/home/michael/workspace>cd $x
Shell:/home/michael>echo "$x"
/home/michael
Shell:/home/michael>x=~'
Shell:/home/michael>echo "$x"
~
Shell:/home/michael>

```

```

drwxr-xr-x 4 michael michael 4096 Oct  9 23:45 bin
-rw-rw-r-- 1 michael michael 12604 Oct 12 03:05 command_parser.c
-rw-rw-r-- 1 michael michael 1360 Oct 10 23:05 command_parser.h
-rw-rw-r-- 1 michael michael 12816 Oct 12 04:02 command_parser.o
-rw-rw-r-- 1 michael michael 1965 Oct 12 04:09 commands.c
-rw-rw-r-- 1 michael michael 381 Oct  5 10:57 commands.h
-rw-rw-r-- 1 michael michael 3616 Oct 12 04:07 commands.o
-rw-rw-r-- 1 michael michael 161887 Oct 11 23:20 cscope.out
-rw-rw-r-- 1 michael michael 114 Oct 12 02:37 environment.c
-rw-rw-r-- 1 michael michael 616 Oct  5 10:59 environment.h
-rw-rw-r-- 1 michael michael 1400 Oct 12 02:50 environment.o
-rw-rw-r-- 1 michael michael 299 Oct  5 17:52 environment.txt
-rw-rw-r-- 1 michael michael 1832 Oct 12 03:07 file_processing.c
-rw-rw-r-- 1 michael michael 715 Oct 12 02:43 file_processing.h
-rw-rw-r-- 1 michael michael 4680 Oct 12 04:02 file_processing.o
-rw-rw-r-- 1 michael michael 9238 Oct 12 04:20 main.c
-rw-rw-r-- 1 michael michael 13408 Oct 12 04:02 main.o
-rw-rw-r-- 1 michael michael 298 Oct  5 18:56 Makefile
drwxr-xr-x 4 michael michael 4096 Oct  9 23:45 obj
-rwxrwxr-x 1 michael michael 29528 Oct 12 04:07 shell
-rw-rw-r-- 1 michael michael 1909 Oct  5 12:46 shell.cbp
-rw-rw-r-- 1 michael michael 503 Oct 11 23:20 shell.cscope_file_list
-rw-rw-r-- 1 michael michael 1237 Oct 12 04:21 shell.depend
-rw-rw-r-- 1 michael michael 3010 Oct 12 04:23 shell.layout
-rw-rw-r-- 1 michael michael 1090 Oct 12 04:04 testcases
-rw-rw-r-- 1 michael michael 2481 Oct 12 03:07 variables.c
-rw-rw-r-- 1 michael michael 880 Oct  5 10:59 variables.h
-rw-rw-r-- 1 michael michael 4144 Oct 12 04:02 variables.o
Shell:/home/michael/workspace/shell>x='5'
Shell:/home/michael/workspace/shell>echo $x
5
Shell:/home/michael/workspace/shell>cd -
/home/michael/workspace
Shell:/home/michael/workspace>cd -
/home/michael/workspace/shell
Shell:/home/michael/workspace/shell>x='helloo world'
Shell:/home/michael/workspace/shell>echo $x
helloo world
Shell:/home/michael/workspace/shell>echo "$x"
helloo world
Shell:/home/michael/workspace/shell>echo '$x'
$х
Shell:/home/michael/workspace/shell>

```