

# **OPERATING SYSTEMS**

## **Report Lab 1**

### **Simple Shell**

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The Project of a simple shell was to create a shell command window similar to the ubuntu terminal where you enter commands such as ls,pwd,cd,exit...etc and you get same results as you would get in a terminal

i started with a function that reads a line from user called **readandparse()**

this function takes an array of arguments and a line where the array of arguments is the number of commands allowed in one line (i.e ls -l ) and line is the maximum number of letters allowed in the whole line of the command

inside this function i call the function **readInput()** which uses "fgets" to scan from user and i call the function **removeEOL()** which takes the line entered as parameter, checks on every character in line

until it reaches the end of line and when it does it appends a '\0' to the array of characters because we need to stay on the same line

i then call the function **Parsing()** which uses a tokenizer to split the line to its separate commands and with that the scanning process is complete

this process is put in a while loop in the main function of the program which keeps running while(1) and terminates when the word "exit" is entered which i handled using and if condition and a **strcmp()** function that returns 0 and terminates the program once found

i also handled that if the user types in the word "clear" the whole command window clears out using system("clear") a builtin function in c

after that in the while loop in main i call the function **startfork()** which takes the array of arguments as parameter

it uses the pid\_t function to call fork() and if its ==0 then child process is running else its the parent process that is working

inside the if condition after making sure its the child process running i call the function **execvp()** a built in function that puts the commands ls , -l ,pw in action

however it doesn't handle the cd command so i had a separate function called **ChangeDirectory()** do the job. it takes for a parameter a pointer to the array of arguments

if the 2nd element in the array is NULL meaning that the user entered cd with nothing next to it, the directory goes back to home .

else it changes into whatever the user has entered using **strcat()** function it appends a backslash and the correct directory in the array of arguments

an extra function called **showdirect()** prints out "shell:home/guehad/directory>" form every time the user has to enter a command so that it resembles the actual terminal

and i do so using the builtin c function **getcwd()**

this also works when the command cd is called so yo can see where you're at after changing the directory.

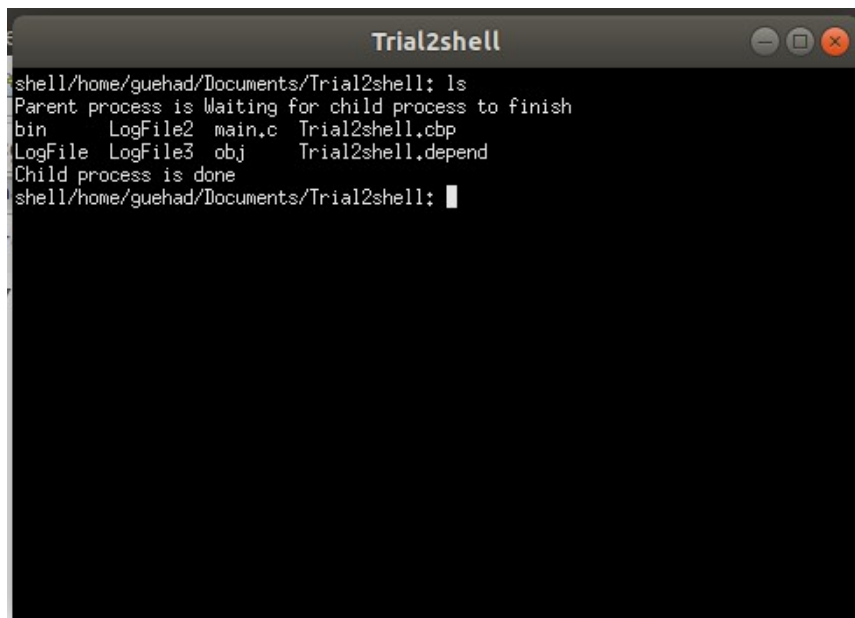
the function **setflag()**

takes the line as parameter and uses the function **strchr()** to check if an '&' exists in the line and if so it sets a flag to 1

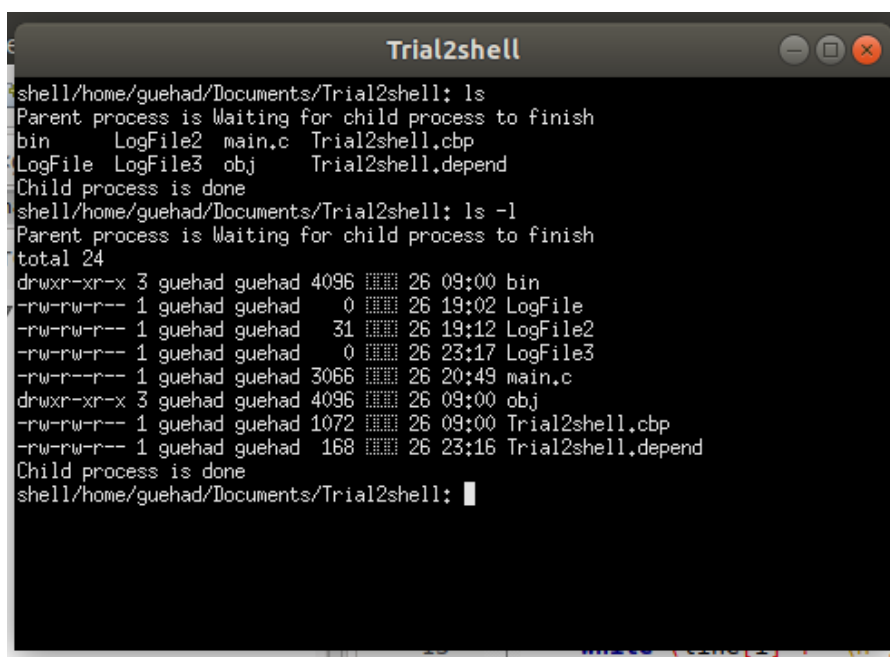
this flag is later on used when the wait() function has to be called and it doesn't activate the wait when it's found

i print in the command window step by step everytime a child or parent process is running and everytime a child process is terminated which is later printed in a file called log file to keep track of such signals

here are some sample runs of the code..



```
shell/home/guehad/Documents/Trial2shell: ls
Parent process is Waiting for child process to finish
bin      LogFile2  main.c   Trial2shell.cbp
LogFile  LogFile3  obj      Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: █
```



```
shell/home/guehad/Documents/Trial2shell: ls
Parent process is Waiting for child process to finish
bin      LogFile2  main.c   Trial2shell.cbp
LogFile  LogFile3  obj      Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: ls -l
Parent process is Waiting for child process to finish
total 24
drwxr-xr-x 3 guehad guehad 4096 26 09:00 bin
-rw-rw-r-- 1 guehad guehad   0 26 19:02 LogFile
-rw-rw-r-- 1 guehad guehad  31 26 19:12 LogFile2
-rw-rw-r-- 1 guehad guehad   0 26 23:17 LogFile3
-rw-rw-r-- 1 guehad guehad 3066 26 20:49 main.c
drwxr-xr-x 3 guehad guehad 4096 26 09:00 obj
-rw-rw-r-- 1 guehad guehad 1072 26 09:00 Trial2shell.cbp
-rw-rw-r-- 1 guehad guehad  168 26 23:16 Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: █
```

```
Trial2shell
bin      LogFile2 main.c Trial2shell.cbp
LogFile LogFile3 obj    Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: ls -l
Parent process is Waiting for child process to finish
total 24
drwxr-xr-x 3 guehad guehad 4096  26 09:00 bin
-rw-rw-r-- 1 guehad guehad   0  26 19:02 LogFile
-rw-rw-r-- 1 guehad guehad  31  26 19:12 LogFile2
-rw-rw-r-- 1 guehad guehad   0  26 23:19 LogFile3
-rw-rw-r-- 1 guehad guehad 3066  26 20:49 main.c
drwxr-xr-x 3 guehad guehad 4096  26 09:00 obj
-rw-rw-r-- 1 guehad guehad 1072  26 09:00 Trial2shell.cbp
-rw-rw-r-- 1 guehad guehad  168  26 23:16 Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: pwd
Parent process is Waiting for child process to finish
/home/guehad/Documents/Trial2shell
Child process is done
shell/home/guehad/Documents/Trial2shell: exit

Process returned 0 (0x0)    execution time : 23.033 s
Press ENTER to continue.
```

```
Trial2shell
-rw-rw-r-- 1 guehad guehad   0  26 23:17 LogFile3
-rw-rw-r-- 1 guehad guehad 3066  26 20:49 main.c
drwxr-xr-x 3 guehad guehad 4096  26 09:00 obj
-rw-rw-r-- 1 guehad guehad 1072  26 09:00 Trial2shell.cbp
-rw-rw-r-- 1 guehad guehad  168  26 23:16 Trial2shell.depend
Child process is done
shell/home/guehad/Documents/Trial2shell: cd
Parent process is Waiting for child process to finish
child process running now
shell/home/guehad: ls
Parent process is Waiting for child process to finish
Desktop      examples.desktop      LogFile  Music      Templates
Documents    '<invalid path>'      LogFile2 Pictures  Videos
Downloads    '<invalid path>.layout' LogFile3 Public
Child process is done
shell/home/guehad: cd Documents
Parent process is Waiting for child process to finish
child process running now
shell/home/guehad/Documents: ls
Parent process is Waiting for child process to finish
Lab10S.zip ProjectShell shell120 shell13 shell16 shellproject
LogFile3   shell17      shell122 shell15 shell19 Trial2shell
Child process is done
shell/home/guehad/Documents:
```