

# Shell

## *Code Organization*

The code is divided into multiple files. The following points describe briefly what each file is responsible for.

- 1- [main.c](#) : The file that contains the logic of the program and the main function where the shell starts.
- 2- [custom\\_types.h](#) : It is the model for 3 data structures used to store the data.
  - `Command_line` → The model that represents any inserted command.'
  - `Map` → a simple map to store the variables
  - `Bool` → a boolean to be used in the logical expressions instead of using `int`.
- 3- [command\\_parser.h](#) : It contains the logic for parsing the inserted `char*` to a `command_line`
- 4- [command.h](#) : It handles some commands that are not handled by the “`execv`” function
- 5- [file\\_processing.h](#) : It handles the files operations for the history, `batch_input` and log files.
- 6- [environment.h](#) : It handles setting the program configurations once it is run and before it is used.
- 7- [utils.h](#) : It contains some helper methods that c doesn't contains like methods for handling strings manipulation.

## *Main Functions*

- *`shell_loop`* → It handles the loop of executing the main command like reading and executing the read command.
- *`handle_command`* → It handles the execution of the command
- *`handle_variables`* → With the help of **`handle_expression`** function, It handles the commands that are for assigning a variable to a value and stores that value in the **`variables`** map.
- *`valid_variable_name`* : validates that the variable in the assigning expression has a valid name.

- **handle\_exec\_mode** : It handles the execution mode whether it is a **foreground** or **background**
- **trim, split, cpy\_string, substring and join\_by** : These are helper functions for manipulating strings.
- **cd** : For handling the **cd** command.
- **echo** : For handling the echo command.
- **open/close(log\_file/history\_file/batch\_input\_file)** : For dealing with the file operations.
- **parse\_command** : For parsing the command from a char\* to command\_line
- **replace\_variables\_by\_values** : For replacing the variables in the input expression by its values.
- **setup\_environment** : For setting the environment of the program and preparing the environment values.

## *Compile*

- Open the terminal in the project path and enter “make all”
- An executable file with the name Shell will be generated
- In the same path enter “./Shell”
- To undo the changes in the same path enter “make clean”

## *Sample runs*

- For Compiling

```
mahmoud@mahmoud-Inspiron-3542: ~/Desktop/Shell
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$ make all
mkdir -p /home/mahmoud/Shell
touch /home/mahmoud/Shell/history
touch /home/mahmoud/Shell/log
gcc -o Shell custom_types.c command_parser.c commands.c environment.c file_proce
ssing.c main.c utils.c map.c
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$
```

- For running the Shell

```
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$ ./Shell
Shell>
```

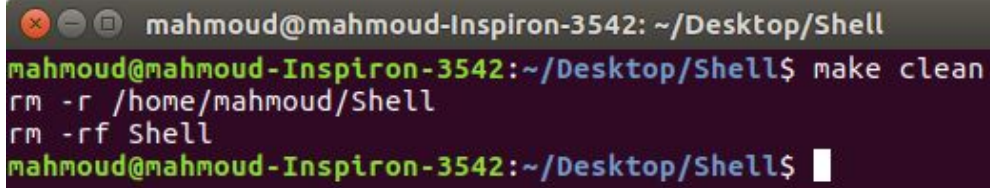
## - Sample run\_1

```
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$ ./Shell
Shell>cd ..
Shell>cd ..
Shell>pwd
/home/mahmoud
Shell>ls -l
total 68
drwxrwxr-x 2 mahmoud mahmoud 4096 Apr 19 23:42 CLionProjects
drwxr-xr-x 4 mahmoud mahmoud 4096 Oct 12 02:44 Desktop
drwxr-xr-x 3 mahmoud mahmoud 4096 Apr 21 16:55 Documents
drwxr-xr-x 5 mahmoud mahmoud 4096 Oct 11 18:58 Downloads
-rw-r--r-- 1 mahmoud mahmoud 8980 Feb 12 2017 examples.desktop
drwxrwxr-x 5 mahmoud mahmoud 4096 Apr 16 23:01 git
drwxr-xr-x 2 mahmoud mahmoud 4096 Feb 12 2017 Music
drwxrwxr-x 3 mahmoud mahmoud 4096 Jun 23 01:34 node_modules
drwxr-xr-x 2 mahmoud mahmoud 4096 Mar 17 2017 Pictures
drwxr-xr-x 2 mahmoud mahmoud 4096 Feb 12 2017 Public
drwxr-xr-x 2 mahmoud mahmoud 4096 Oct 12 02:45 Shell
drwxr-xr-x 2 mahmoud mahmoud 4096 Feb 12 2017 Templates
drwxr-xr-x 2 mahmoud mahmoud 4096 Mar 27 2017 TestCases
drwxr-xr-x 2 mahmoud mahmoud 4096 Feb 12 2017 Videos
drwxrwxr-x 3 mahmoud mahmoud 4096 Feb 24 2017 VirtualBox VMs
Shell>
```

## -Sample Run\_02

```
Shell>cd ..
Shell>pwd
/home
Shell>ls
mahmoud
Shell>cd mahmoud
Shell>ls
CLionProjects  Downloads  Music  Public  TestCases
Desktop        examples.desktop  node_modules  Shell  Videos
Documents      git          Pictures  Templates  VirtualBox VMs
Shell>cd Public
Shell>ls
Shell>ls -l
total 0
Shell>cd ..
Shell>asdsa
asdsa : command not found
Shell>echo $HOME
/home/mahmoud
Shell>
```

## - Cleanning

A terminal window titled 'mahmoud@mahmoud-Inspiron-3542: ~/Desktop/Shell' with a dark background. It shows the execution of two 'rm' commands to clean up files. The first command is 'rm -r /home/mahmoud/Shell' and the second is 'rm -rf Shell'. The prompt returns to the shell after each command.

```
mahmoud@mahmoud-Inspiron-3542: ~/Desktop/Shell
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$ make clean
rm -r /home/mahmoud/Shell
rm -rf Shell
mahmoud@mahmoud-Inspiron-3542:~/Desktop/Shell$
```