

SIMPLE SHELL

Overall organization of the code:

The program keeps waiting for the input and once the user inputs a command the program parses it and detects whether it is a background process or not and then whether it is an exit / cd command then it executes it and prints the output on the CMD and continues to wait for another input command.

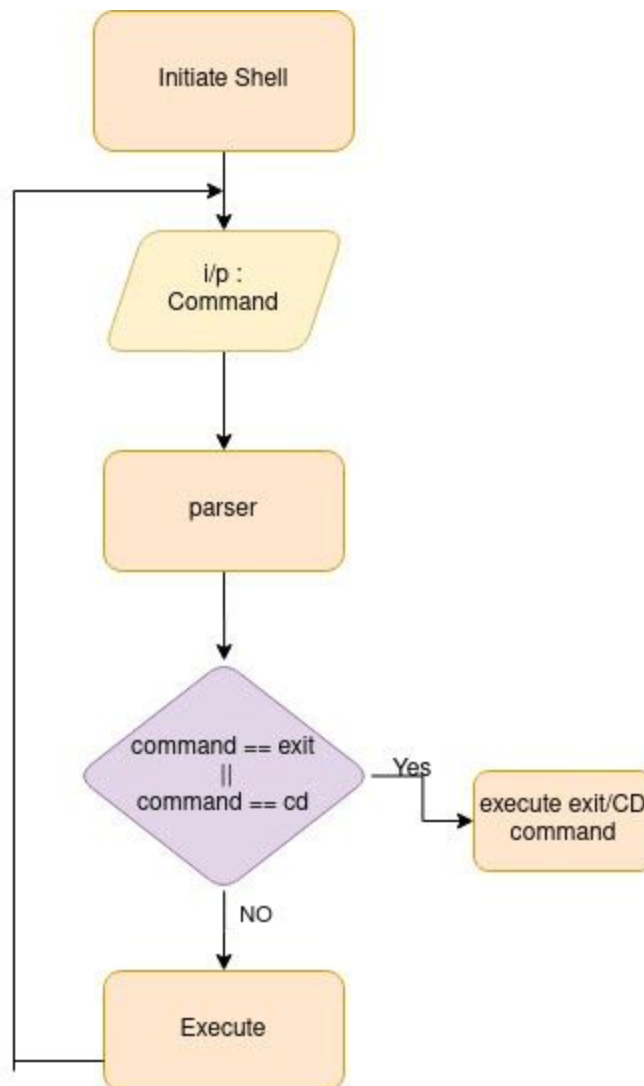


Fig 0.0 : A description for the overall organization of the code.

Main Functions :

Initiate Shell :

Responsible for initiating the shell and preparing the environment to be able to take commands by:

- It clears the terminal window.
- Opens the log file and clears it's content.
- Set up a "SIGCHILD" signal catcher and defining a handler to it.

Parser :

It splits the command with spaces and checks for '&' if the command ends with '&' then it is removed and the process is a background process.

Execute :

It is responsible for executing the given command it forks a new process

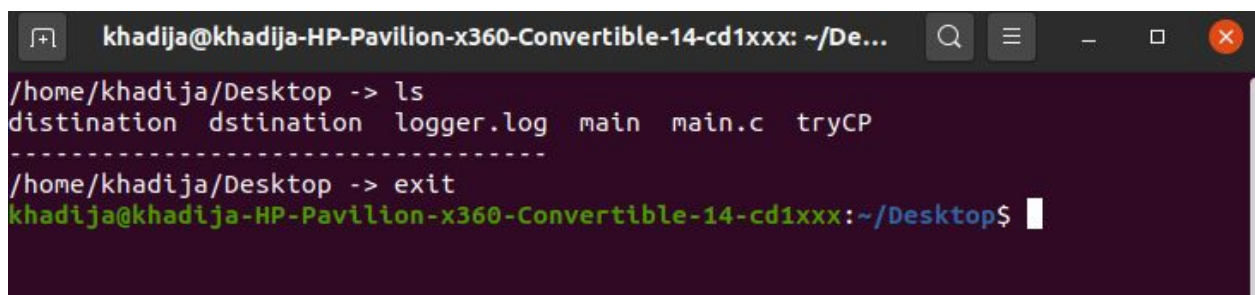
- If the PID of the new process is less than 0 then the forking process didn't work.
- If the PID == 0 then we will execute the process.
- If the PID > 0 then if it was a background process we do nothing if it wasn't a background process we wait till it is done.

The "SIGCHILD" signal handler :

Whenever the signal is caught the handler waits until the termination process is done and writes in the log file that the background process is terminated.

Screenshots:

The exit command :



```
khadija@khadija-HP-Pavilion-x360-Convertible-14-cd1xxx: ~/De...
/home/khadija/Desktop -> ls
distination dstination logger.log main main.c tryCP
-----
/home/khadija/Desktop -> exit
khadija@khadija-HP-Pavilion-x360-Convertible-14-cd1xxx:~/Desktop$
```

Changing directory :

```
/home/khadija/Desktop -> ls
Destination  logger.log  main  main.c
-----
/home/khadija/Desktop -> cd Destination
/home/khadija/Desktop/Destination -> ls
-----
/home/khadija/Desktop/Destination -> █
```

Executing command with argument :

```
/home/khadija/Desktop -> ls -l
total 24
-rw-rw-r-- 1 khadija khadija    0 12:42 10 نف logger.log
-rwxrwxr-x 1 khadija khadija 17584 11:34 10 نف main
-rw-rw-r-- 1 khadija khadija  2100 11:34 10 نف main.c
-----
/home/khadija/Desktop -> █
```

Copying directories to another directory :

```
-----
/home/khadija/Desktop -> ls
Destination  logger.log  main  main.c  ToBeCopied1  ToBeCopied2
-----
/home/khadija/Desktop -> cd Destination
/home/khadija/Desktop/Destination -> ls
-----
/home/khadija/Desktop/Destination -> cd
/home/khadija/Desktop -> cp -r ToBeCopied1 ToBeCopied2 Destination
-----
/home/khadija/Desktop -> ls
Destination  logger.log  main  main.c  ToBeCopied1  ToBeCopied2
-----
/home/khadija/Desktop -> cd Destination
/home/khadija/Desktop/Destination -> ls
ToBeCopied1  ToBeCopied2
-----
```

Removing directories :

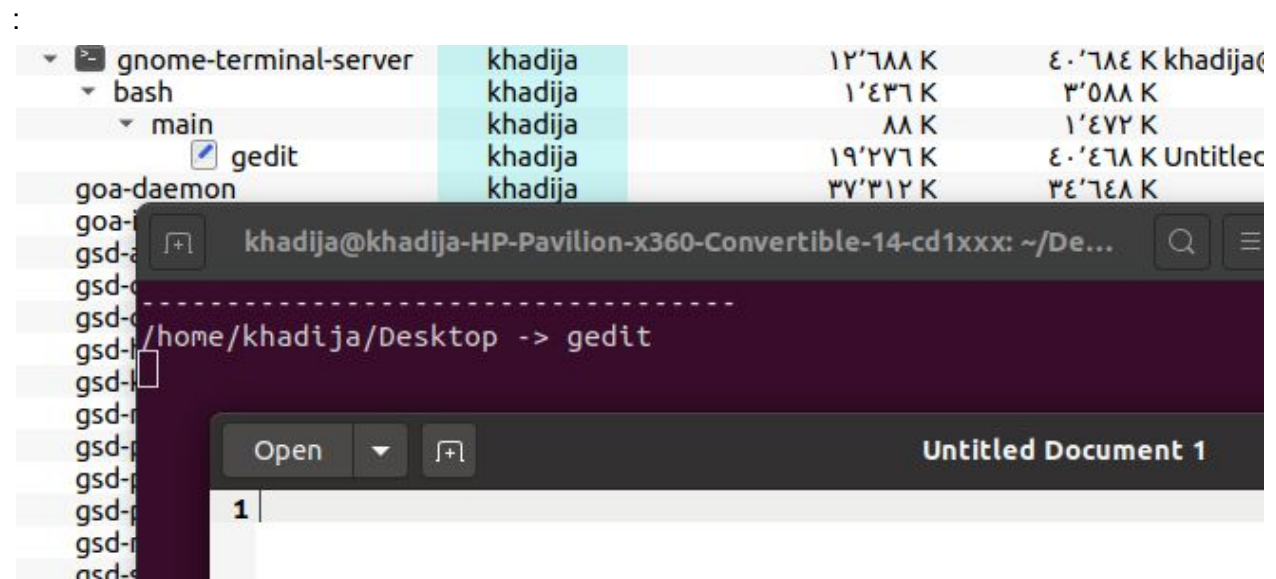
```
/home/khadija/Desktop -> ls
logger.log main main.c ToBeCopied2
-----
/home/khadija/Desktop -> rmdir ToBeCopied2
-----
/home/khadija/Desktop -> ls
logger.log main main.c
-----
/home/khadija/Desktop -> 
```

Removing files :

```
/home/khadija/Desktop -> ls
logger.log main main.c ToBeCopied2 ToBeDeleted.txt
-----
/home/khadija/Desktop -> rm -r ToBeDeleted.txt
-----
/home/khadija/Desktop -> ls
logger.log main main.c ToBeCopied2
-----
/home/khadija/Desktop -> 
```

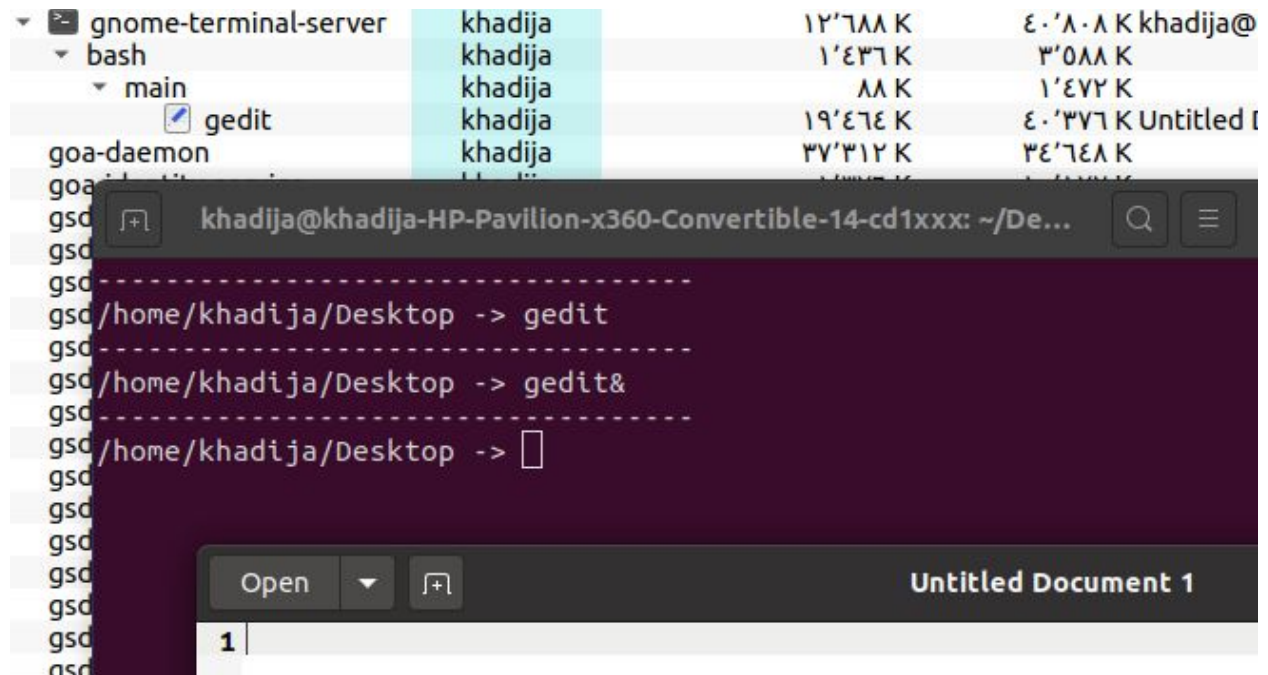
Running process not in the background :

:

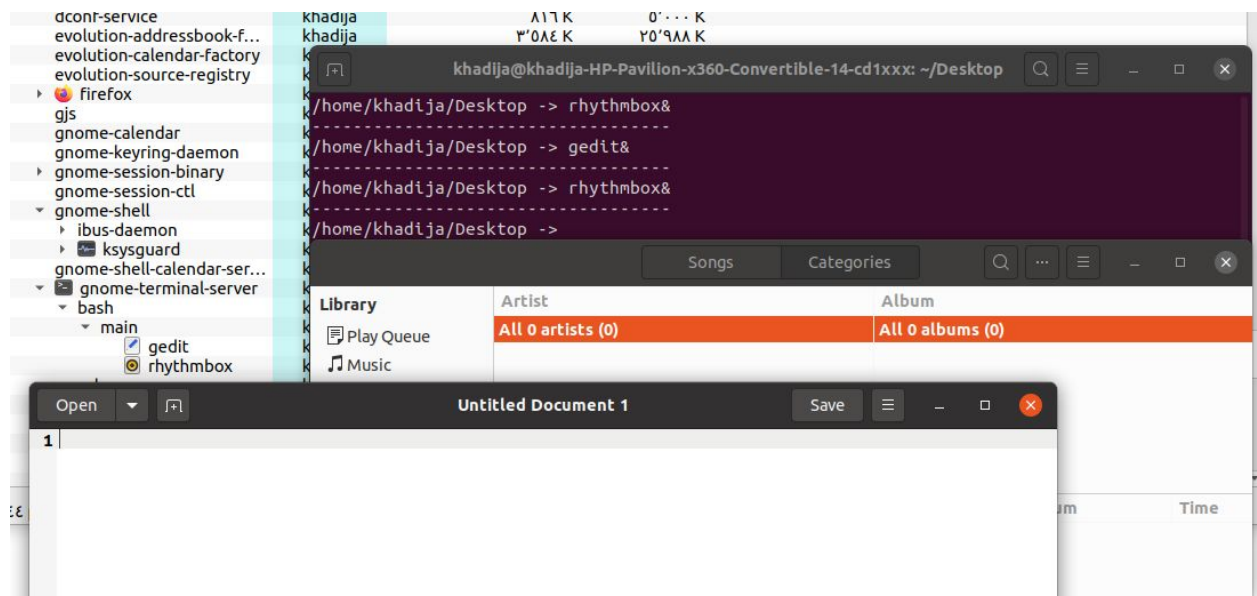


The screenshot shows a terminal window with the command `gedit` being executed. The terminal output shows the command being run and the file being opened. Below the terminal window, a file manager window is visible, showing the 'Untitled Document 1' file. The file manager window has a search bar and a list of files. The terminal window is titled 'khadija@khadija-HP-Pavilion-x360-Convertible-14-cd1xxx: ~/De...'. The file manager window is titled 'Untitled Document 1'.

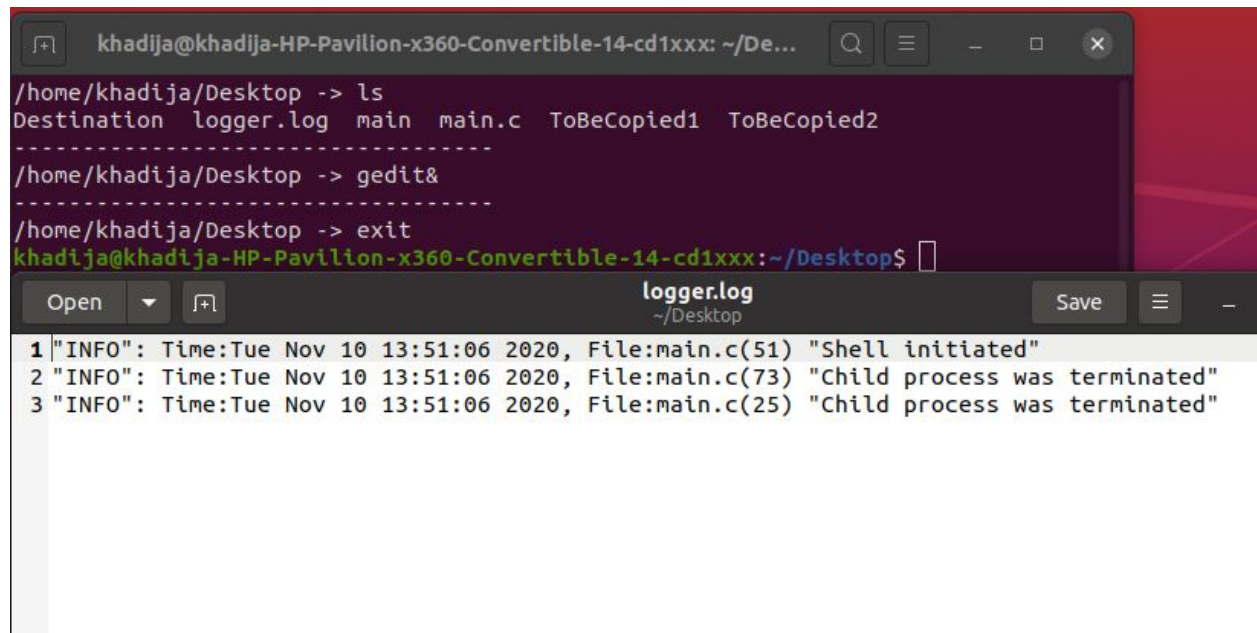
Running process in the background :



Running multiple process in the background :



Logger :



The image shows a terminal window and a log file viewer. The terminal window, titled 'khadija@khadija-HP-Pavilion-x360-Convertible-14-cd1xxx: ~/De...', displays the following commands and output:

```
/home/khadija/Desktop -> ls
Destination logger.log main main.c ToBeCopied1 ToBeCopied2
-----
/home/khadija/Desktop -> gedit&
-----
/home/khadija/Desktop -> exit
khadija@khadija-HP-Pavilion-x360-Convertible-14-cd1xxx:~/Desktop$
```

Below the terminal window is a log file viewer titled 'logger.log' with the path '~/Desktop'. It shows three log entries:

```
1 "INFO": Time:Tue Nov 10 13:51:06 2020, File:main.c(51) "Shell initiated"
2 "INFO": Time:Tue Nov 10 13:51:06 2020, File:main.c(73) "Child process was terminated"
3 "INFO": Time:Tue Nov 10 13:51:06 2020, File:main.c(25) "Child process was terminated"
```