

Simple Shell

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Overview

Implementing a UNIX shell program. A shell is simply a program that conveniently allows you to run other programs.

Goals

1. Familiarity with system calls in Unix environment.
2. Introducing processes and their nesting.

Code Organization:

The project consists of three classes; “logger” , “shell_core” and “main”. The “shell_core” class contains the basic functions that are responsible for the shell functionality. The “logger” class is responsible for logging whenever a child is terminated in case of asynchronous execution. While the “main” class is only to initialize the shell.

Functions:

Class: “shell_core”

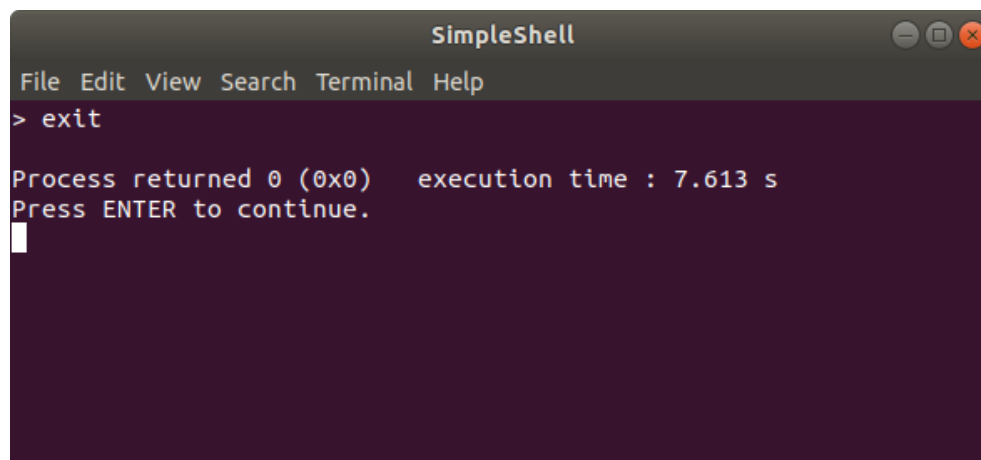
- **“InitializeShell”** : Initializes the basic shell loop which is getting the command line, splitting the command to arguments and finally execute it.
- **“splitCommand”**: Splits the command line from a single string to a vector of strings each containing an argument from the command line.
- **“initializeExecution”**: Determines whether this is an asynchronous or synchronous execution. Also executes some non-execvp-supported commands.
- **“execute”**: Executes execvp-supported commands as either asynchronous or synchronous execution.
- **“signalHandler”** Handles SIGCHLD signal incase of a child termination. Also logs the date and ID of the terminated child.

Class: “logger”

- **“log”**: logs date and ID to a log file when a child is terminated.

Sample Runs:

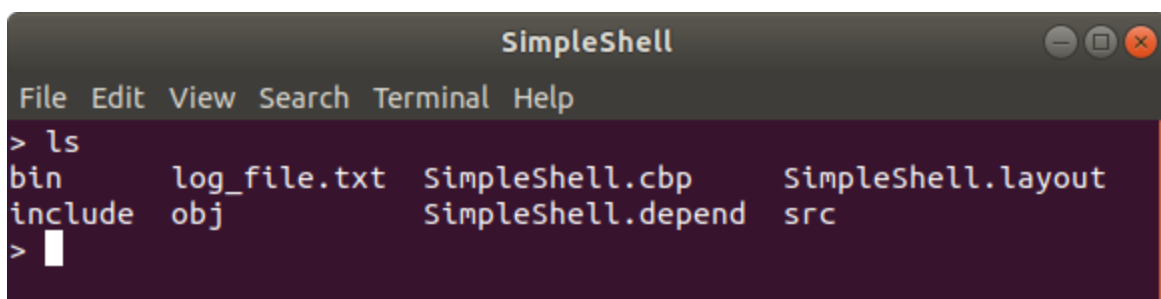
I. Exit:



```
SimpleShell
File Edit View Search Terminal Help
> exit

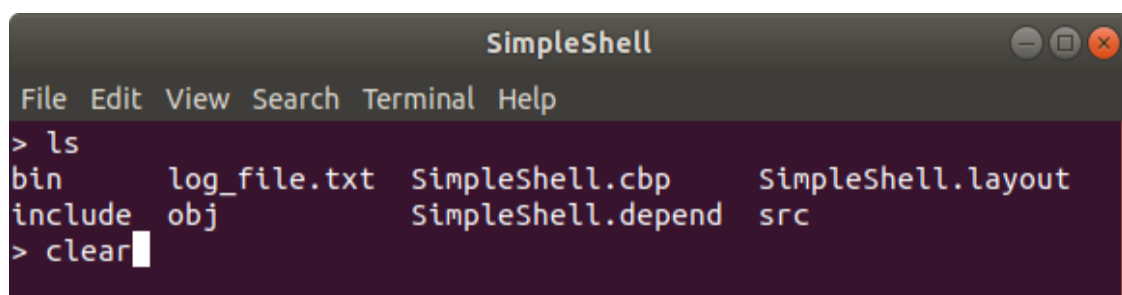
Process returned 0 (0x0)   execution time : 7.613 s
Press ENTER to continue.
```

II. A command with no arguments



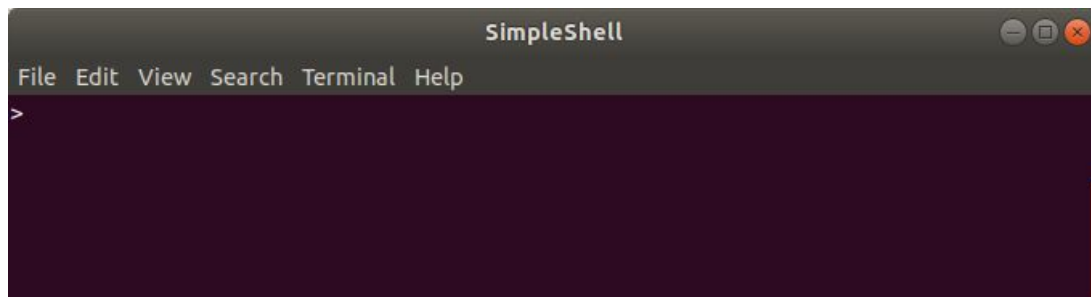
```
SimpleShell
File Edit View Search Terminal Help
> ls
bin      log_file.txt  SimpleShell.cbp  SimpleShell.layout
include  obj           SimpleShell.depend  src
>
```

Before "clear" Command:



```
SimpleShell
File Edit View Search Terminal Help
> ls
bin      log_file.txt  SimpleShell.cbp  SimpleShell.layout
include  obj           SimpleShell.depend  src
> clear
```

After “clear” command:



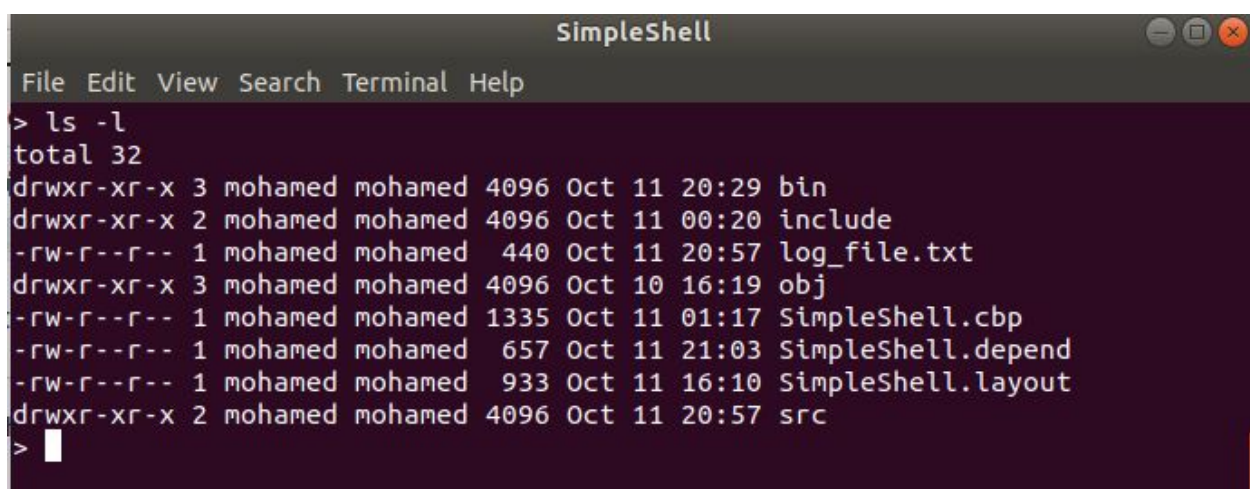
Before “gedit” command:

▼ systemd	mohamed	1,080 K	2,968 K
▼ gnome-terminal-server	mohamed	8,828 K	28,192 K SimpleShell
▼ cb_console_runner	mohamed	144 K	1,652 K
▼ sh	mohamed	64 K	716 K
SimpleShell	mohamed	184 K	3,092 K

After “gedit” command

▼ gnome-terminal-server	mohamed	8,828 K	28,192 K SimpleShell
▼ cb_console_runner	mohamed	144 K	1,652 K
▼ sh	mohamed	64 K	716 K
▼ SimpleShell	mohamed	184 K	3,092 K
gedit	mohamed	15,248 K	30,156 K Untitled Document...

III. A command with arguments

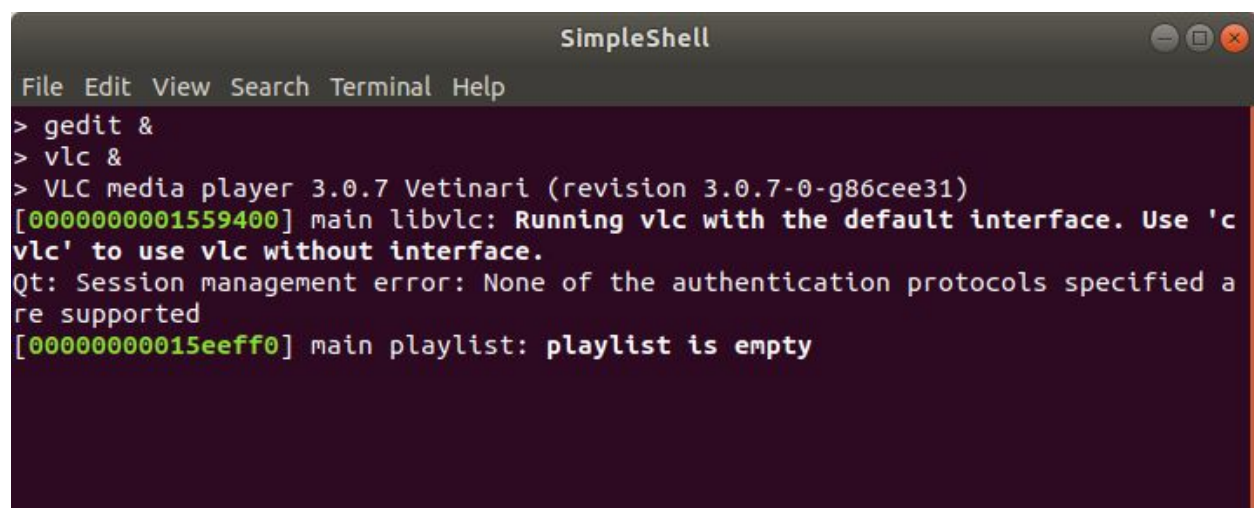


IV. A command, with or without arguments, executed in the background

```
> gedit &
> ls -l
total 28
drwxr-xr-x 3 mohamed mohamed 4096 Oct 11 20:29 bin
drwxr-xr-x 2 mohamed mohamed 4096 Oct 11 00:20 include
drwxr-xr-x 3 mohamed mohamed 4096 Oct 10 16:19 obj
-rw-r--r-- 1 mohamed mohamed 1335 Oct 11 01:17 SimpleShell.cbp
-rw-r--r-- 1 mohamed mohamed 709 Oct 11 22:27 SimpleShell.depend
-rw-r--r-- 1 mohamed mohamed 934 Oct 11 21:36 SimpleShell.layout
drwxr-xr-x 2 mohamed mohamed 4096 Oct 11 22:46 src
> ls
bin include obj SimpleShell.cbp SimpleShell.depend SimpleShell.layout src
> ls &
> bin include obj SimpleShell.cbp SimpleShell.depend SimpleShell.layout src
sd
```

Sample Runs:

Asynchronous Execution:



The screenshot shows a terminal window titled "SimpleShell" with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal output is as follows:

```
> gedit &
> vlc &
> VLC media player 3.0.7 Vetinari (revision 3.0.7-0-g86cee31)
[000000001559400] main libvlc: Running vlc with the default interface. Use 'c
vlc' to use vlc without interface.
Qt: Session management error: None of the authentication protocols specified a
re supported
[0000000015eeff0] main playlist: playlist is empty
```

▼	gnome-terminal-server	mohamed	8,848 K	28,476 K SimpleShell
▼	cb_console_runner	mohamed	140 K	1,620 K
▼	sh	mohamed	68 K	856 K
▼	SimpleShell	mohamed	148 K	1,736 K
▲	vlc	mohamed	15,524 K	37,344 K VLC media pla

Synchronous Execution:

Before closing "gedit":

A screenshot of a SimpleShell terminal window. The title bar says "SimpleShell". The menu bar includes "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the command "> gedit" followed by the output: "you can't be executed untill child terminates". A cursor is visible on the line following the output.

▼	gnome-terminal-server	mohamed	8,884 K	28,476 K SimpleShell
▼	cb_console_runner	mohamed	140 K	1,620 K
▼	sh	mohamed	68 K	856 K
▼	SimpleShell	mohamed	200 K	3,292 K
▲	gedit	mohamed	15,280 K	29,864 K Untitled Docu...

After closing "gedit":

A screenshot of a SimpleShell terminal window. The title bar says "SimpleShell". The menu bar includes "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the same output as before: "you can't be executed untill child terminates". Below this, the output continues with a series of error messages: "> you: No such file or directory", "> can't: No such file or directory", "> be: No such file or directory", "> executed: No such file or directory", "> untill: No such file or directory", "> child: No such file or directory", and "> terminates: No such file or directory". A cursor is visible on the line following the last error message.