

Simple Shell

Implement a Unix shell program that allows to run other programs and supports the command exit, commands with no arguments, commands with arguments, commands with or without arguments executed in the background using &.

Code organization

Global variables

- LogFile to write terminated child processes.
- A set of built-in commands (cd and exit).

Command Class

Public methods

- Constructor: takes command line as arguments and calls the function parse;
- execute(): decides whether the command is a built-in command or not and calls executeBuiltin() or executeOther() accordingly.

Private methods

- parse(): splits line command based on spaces and checks if the command is a background or a foreground command.
- executeBuiltin(): executes built-in commands
- executeOther(): executes non built-in commands by creating a new child process using the method fork() and then checks for pid if it is less than zero then an error occurred and a the child is not created, if pid is equal to zero then it is the child process and we execute the command using execvp method, if pid is bigger than zero then it is the parent process and here we check if it is a foreground process we wait for the child process to terminate using wait method, write in the log file and check if the child process terminated normally.

Global methods

- SIGCHLD_handler(int sig): the signal handler responsible for the SIGCHLD signal, it waits for the terminated child background process to be freed, writes in the log file and checks if the child process terminated normally.
- printShellLine(): gets current directory path and prints it.
- setBuiltins(): inserts built-ins commands in the built_in_commands set.

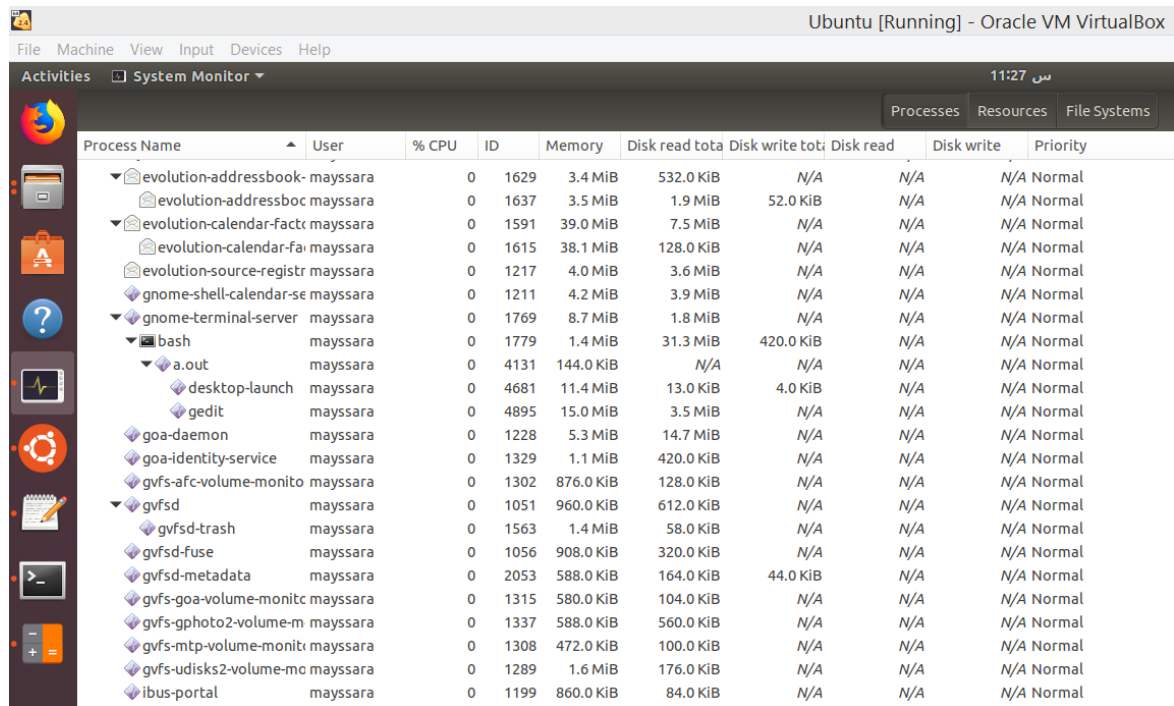
Main

- Sets signal handler for SIGCHLD signal.
- Sets built-ins commands.
- Opens log file.
- Prints shell line and takes new commands inputs and executes them.
- Closes log file.

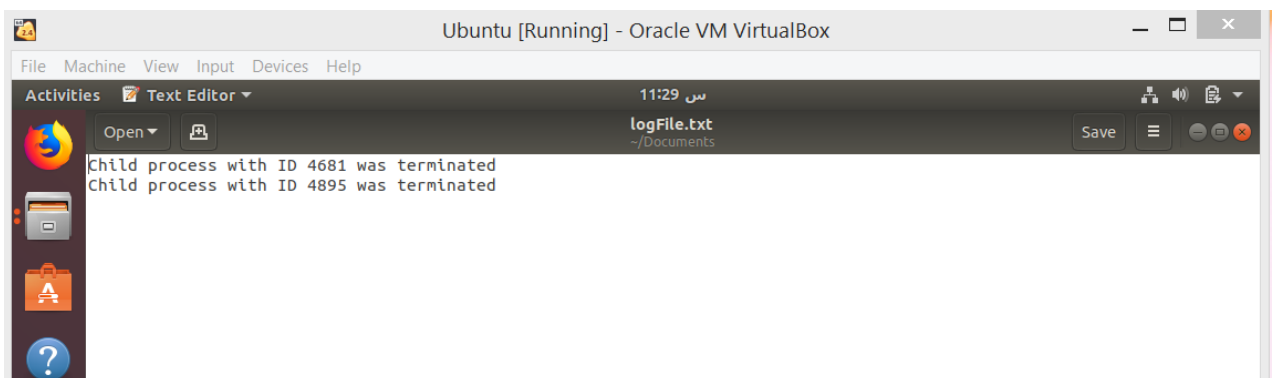
Sample runs

commands

- `gnome-calculator &`
- `gedit &`

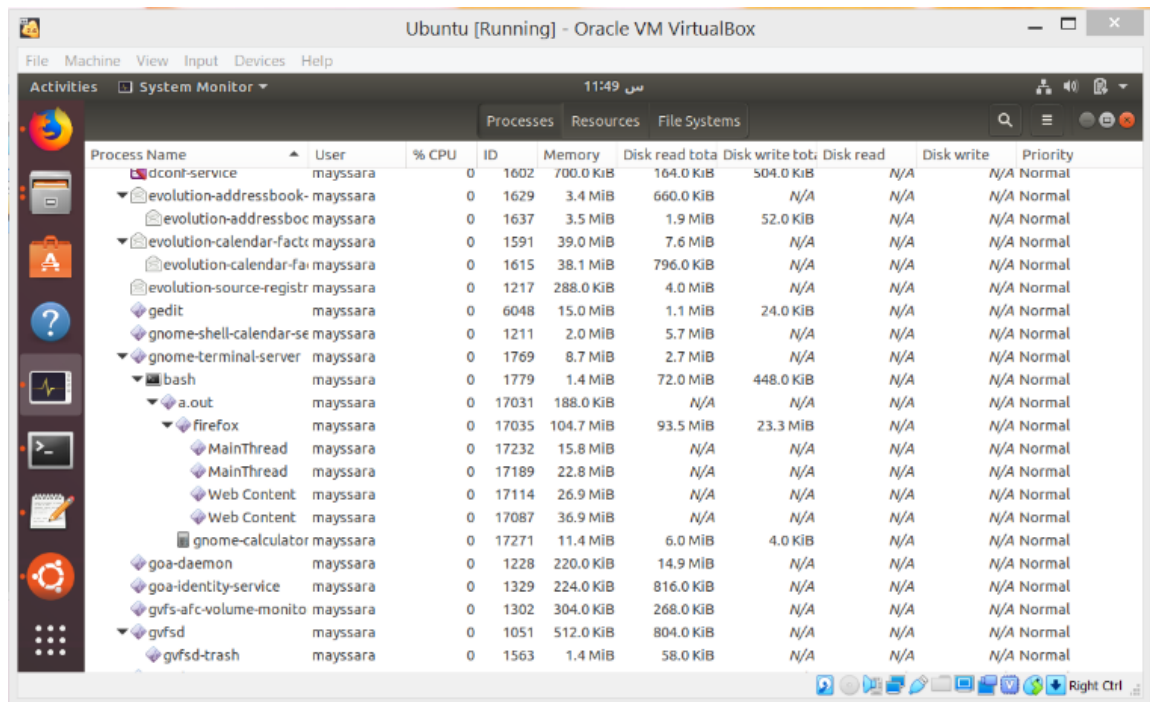


Process Name	User	% CPU	ID	Memory	Disk read tota	Disk write tota	Disk read	Disk write	Priority
evolution-addressbook- mayssara	mayssara	0	1629	3.4 MiB	532.0 KiB	N/A	N/A	N/A	Normal
evolution-addressboc mayssara	mayssara	0	1637	3.5 MiB	1.9 MiB	52.0 KiB	N/A	N/A	Normal
evolution-calendar-factx mayssara	mayssara	0	1591	39.0 MiB	7.5 MiB	N/A	N/A	N/A	Normal
evolution-calendar-fai mayssara	mayssara	0	1615	38.1 MiB	128.0 KiB	N/A	N/A	N/A	Normal
evolution-source-registr mayssara	mayssara	0	1217	4.0 MiB	3.6 MiB	N/A	N/A	N/A	Normal
gnome-shell-calendar-se mayssara	mayssara	0	1211	4.2 MiB	3.9 MiB	N/A	N/A	N/A	Normal
gnome-terminal-server mayssara	mayssara	0	1769	8.7 MiB	1.8 MiB	N/A	N/A	N/A	Normal
bash mayssara	mayssara	0	1779	1.4 MiB	31.3 MiB	420.0 KiB	N/A	N/A	Normal
a.out mayssara	mayssara	0	4131	144.0 KiB	N/A	N/A	N/A	N/A	Normal
desktop-launch mayssara	mayssara	0	4681	11.4 MiB	13.0 KiB	4.0 KiB	N/A	N/A	Normal
gedit mayssara	mayssara	0	4895	15.0 MiB	3.5 MiB	N/A	N/A	N/A	Normal
goa-daemon mayssara	mayssara	0	1228	5.3 MiB	14.7 MiB	N/A	N/A	N/A	Normal
goa-identity-service mayssara	mayssara	0	1329	1.1 MiB	420.0 KiB	N/A	N/A	N/A	Normal
gvfs-afc-volume-monito mayssara	mayssara	0	1302	876.0 KiB	128.0 KiB	N/A	N/A	N/A	Normal
gvfsd mayssara	mayssara	0	1051	960.0 KiB	612.0 KiB	N/A	N/A	N/A	Normal
gvfsd-trash mayssara	mayssara	0	1563	1.4 MiB	58.0 KiB	N/A	N/A	N/A	Normal
gvfsd-fuse mayssara	mayssara	0	1056	908.0 KiB	320.0 KiB	N/A	N/A	N/A	Normal
gvfsd-metadata mayssara	mayssara	0	2053	588.0 KiB	164.0 KiB	44.0 KiB	N/A	N/A	Normal
gvfs-goa-volume-monitc mayssara	mayssara	0	1315	580.0 KiB	104.0 KiB	N/A	N/A	N/A	Normal
gvfs-gphoto2-volume-m mayssara	mayssara	0	1337	588.0 KiB	560.0 KiB	N/A	N/A	N/A	Normal
gvfs-mtp-volume-monit mayssara	mayssara	0	1308	472.0 KiB	100.0 KiB	N/A	N/A	N/A	Normal
gvfs-udisks2-volume-mc mayssara	mayssara	0	1289	1.6 MiB	176.0 KiB	N/A	N/A	N/A	Normal
ibus-portal mayssara	mayssara	0	1199	860.0 KiB	84.0 KiB	N/A	N/A	N/A	Normal



Commands

- firefox &
- gnome-calculator &



Process Name	User	% CPU	ID	Memory	Disk read tota	Disk write tota	Disk read	Disk write	Priority
dccont-service	mayssara	0	1602	700.0 KiB	164.0 KiB	504.0 KiB	N/A	N/A	Normal
evolution-addressbook	mayssara	0	1629	3.4 MiB	660.0 KiB	N/A	N/A	N/A	Normal
evolution-addressboc	mayssara	0	1637	3.5 MiB	1.9 MiB	52.0 KiB	N/A	N/A	Normal
evolution-calendar-fact	mayssara	0	1591	39.0 MiB	7.6 MiB	N/A	N/A	N/A	Normal
evolution-calendar-fa	mayssara	0	1615	38.1 MiB	796.0 KiB	N/A	N/A	N/A	Normal
evolution-source-registr	mayssara	0	1217	288.0 KiB	4.0 MiB	N/A	N/A	N/A	Normal
gedit	mayssara	0	6048	15.0 MiB	1.1 MiB	24.0 KiB	N/A	N/A	Normal
gnome-shell-calendar-se	mayssara	0	1211	2.0 MiB	5.7 MiB	N/A	N/A	N/A	Normal
gnome-terminal-server	mayssara	0	1769	8.7 MiB	2.7 MiB	N/A	N/A	N/A	Normal
bash	mayssara	0	1779	1.4 MiB	72.0 MiB	448.0 KiB	N/A	N/A	Normal
a.out	mayssara	0	17031	188.0 KiB	N/A	N/A	N/A	N/A	Normal
firefox	mayssara	0	17035	104.7 MiB	93.5 MiB	23.3 MiB	N/A	N/A	Normal
MainThread	mayssara	0	17232	15.8 MiB	N/A	N/A	N/A	N/A	Normal
MainThread	mayssara	0	17189	22.8 MiB	N/A	N/A	N/A	N/A	Normal
Web Content	mayssara	0	17114	26.9 MiB	N/A	N/A	N/A	N/A	Normal
Web Content	mayssara	0	17087	36.9 MiB	N/A	N/A	N/A	N/A	Normal
gnome-calculator	mayssara	0	17271	11.4 MiB	6.0 MiB	4.0 KiB	N/A	N/A	Normal
goa-daemon	mayssara	0	1228	220.0 KiB	14.9 MiB	N/A	N/A	N/A	Normal
goa-identity-service	mayssara	0	1329	224.0 KiB	816.0 KiB	N/A	N/A	N/A	Normal
gvfsd	mayssara	0	1302	304.0 KiB	268.0 KiB	N/A	N/A	N/A	Normal
gvfsd-trash	mayssara	0	1051	512.0 KiB	804.0 KiB	N/A	N/A	N/A	Normal
gvfsd-trash	mayssara	0	1563	1.4 MiB	58.0 KiB	N/A	N/A	N/A	Normal

