Ali Mostafa Elsayed Elneklawy

19016024

section: 4

communications

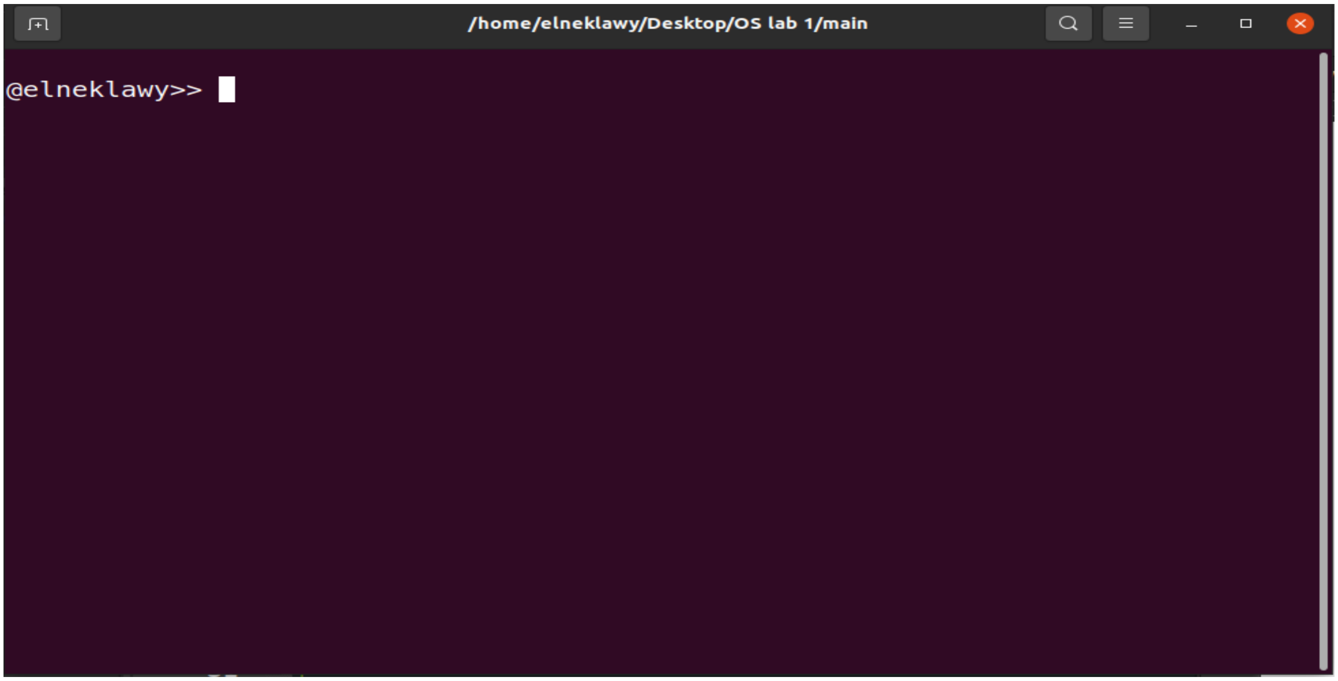
OVERVIEW

In the first lab, we were able to implement a simple shell in C language. The shell can perform commands like “echo, export, pwd, cd, ls, …”. The code used to build the shell consists of 10 main functions:

1- parent_main(): the main process
2- proc_exit(): SIGCHLD interrupt handler
3- setup_environment(): initialize the environment and the log file.
4- shell(): the main loop in which the code runs.
5- chck_shll_comm(): used to check for shell built-in commands
6- get_cmnd(): parse the user input.
7- xprt(): getting and setting environment variables.
8- chck_env_val(): check whether the user requests to print an environment variable or not (used with echo).
9- execute_shell_bultin(): used to execute shell built-in commands.
10- execute_command(): execute commands that are not built-in into the shell using “execvp()”

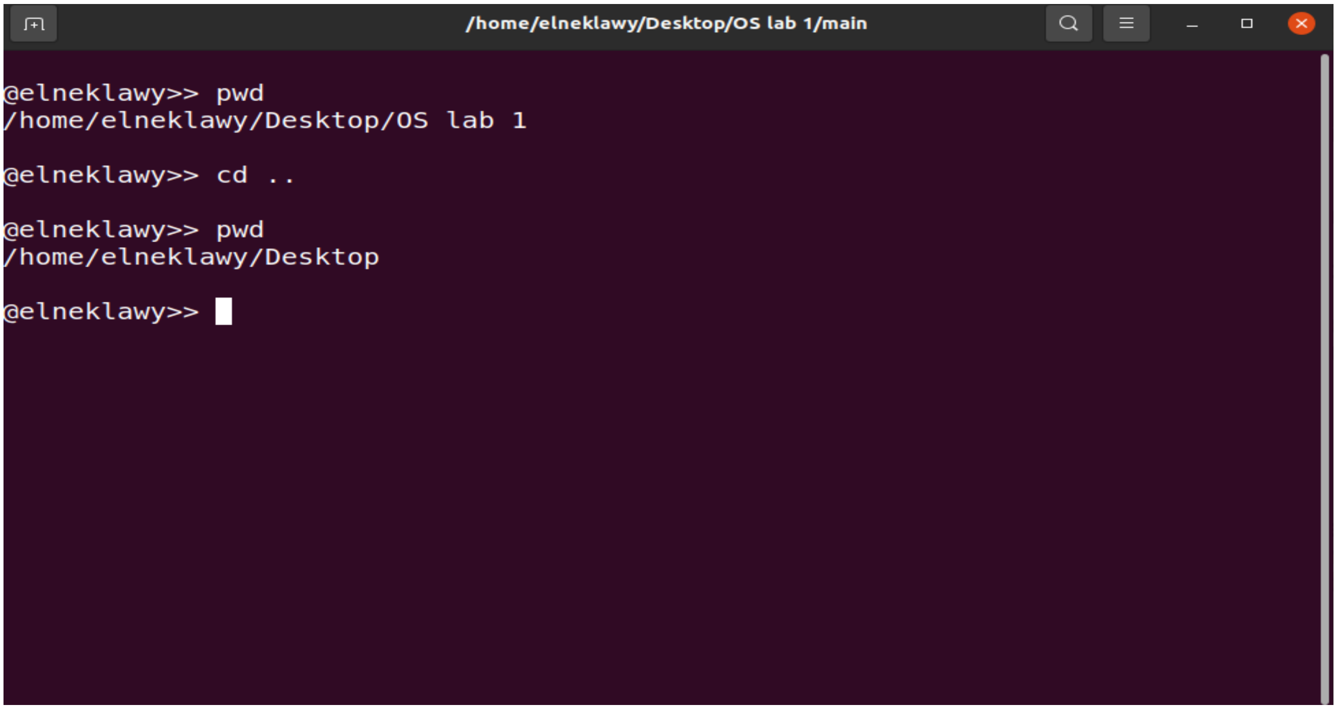
SAMPLE RUNS

Figure 1 shows the terminal when the code is first run. Figure 2 shows the result of the execution of the “pwd” command which prints the working directory. The command is followed by a “cd” command, then “pwd” again.



```
@elneklawy>>
```

Figure 1

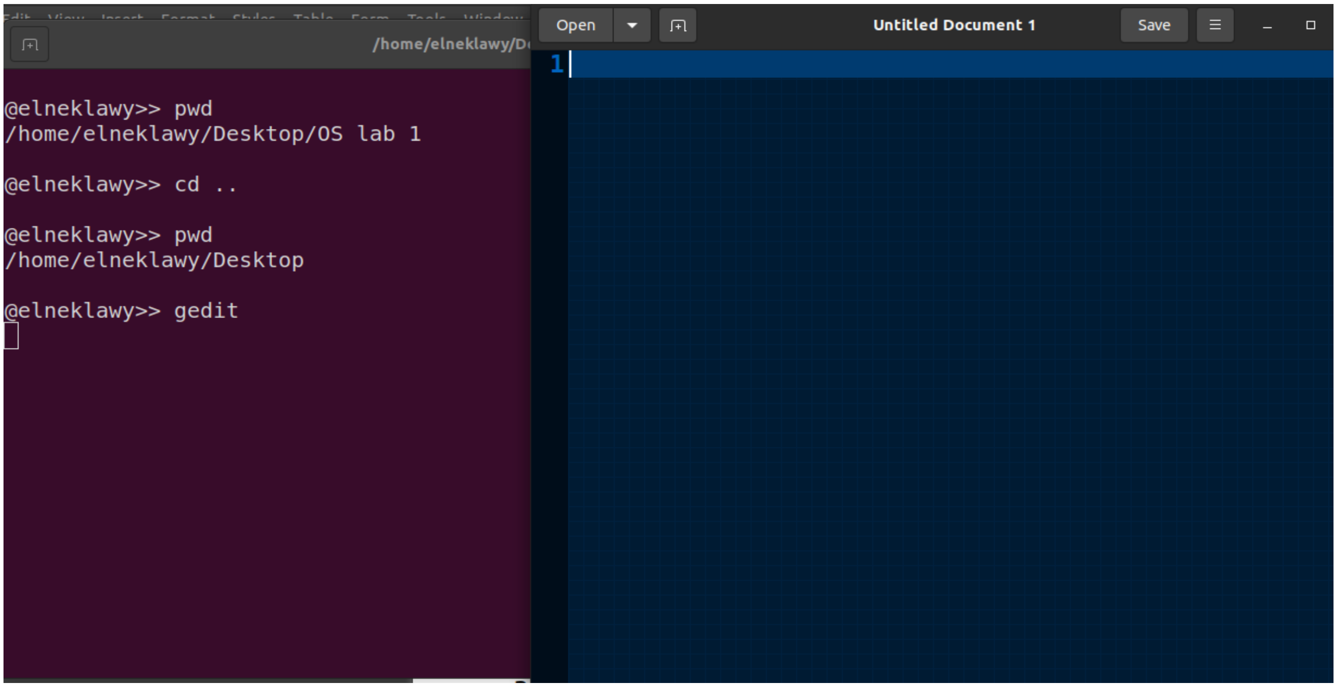


```
@elneklawy>> pwd
/home/elneklawy/Desktop/OS lab 1

@elneklawy>> cd ..

@elneklawy>> pwd
/home/elneklawy/Desktop

@elneklawy>>
```

Figure 2

The shell is also capable of running applications like firefox and the text editor. Each of which can be run as a background of a foreground process (the command

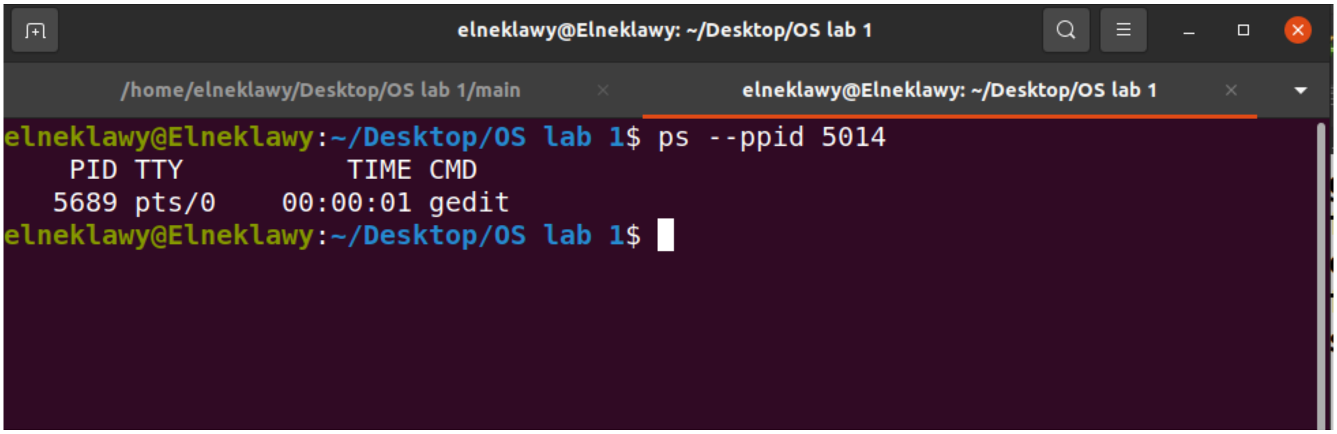
followed by “&”). This is shown in figure 3. figure 3 also shows that the terminal becomes stuck if we don’t add “&” after the command.



```
@elneklawy>> pwd
/home/elneklawy/Desktop/OS lab 1

@elneklawy>> cd ..

@elneklawy>> pwd
/home/elneklawy/Desktop

@elneklawy>> gedit
```

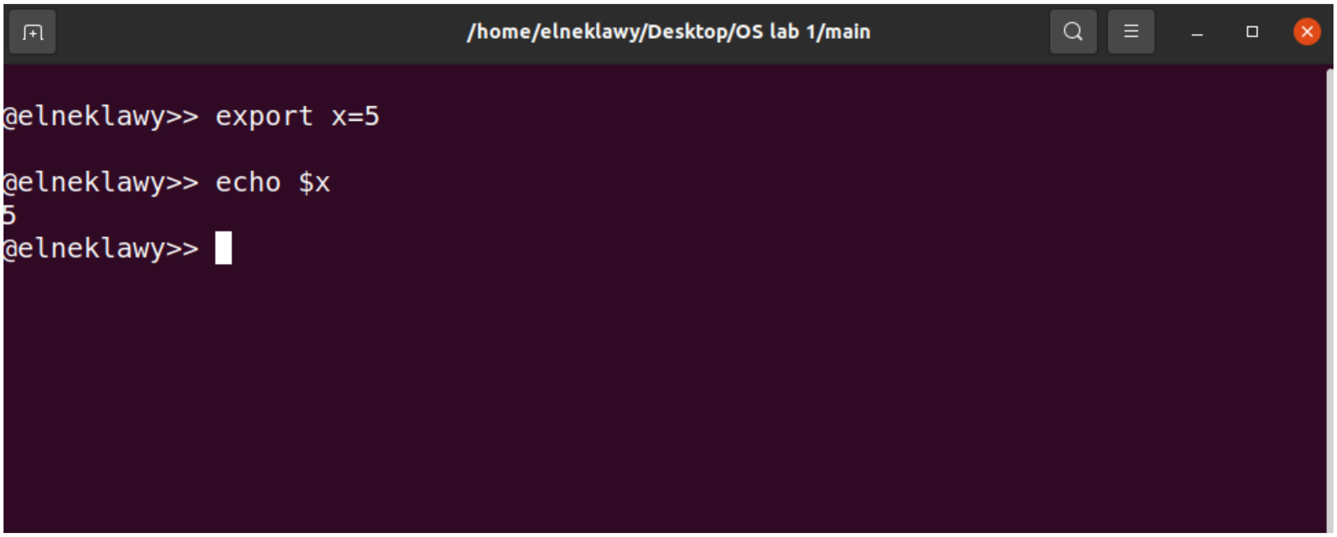
Figure 3

Figure 4 shows the processes hierarchy after executing “gedit”. In my case, the parent process is called “main” with the ID 5014 (taken from the system monitor). The hierarchy can be shown using the following command: “ps --ppid <pid of the parent>”. It’s shown in figure 4 that the parent process (main) with the ID 5014 has a child process (gedit) with the ID 5689. In figure 5, a sample run of the “export” command is illustrated.


elneklawy@Elneklawy: ~/Desktop/OS lab 1
/home/elneklawy/Desktop/OS lab 1/main
elneklawy@Elneklawy: ~/Desktop/OS lab 1

```
elneklawy@Elneklawy:~/Desktop/OS lab 1$ ps --ppid 5014
    PID TTY          TIME CMD
   5689 pts/0    00:00:01 gedit
elneklawy@Elneklawy:~/Desktop/OS lab 1$ 
```

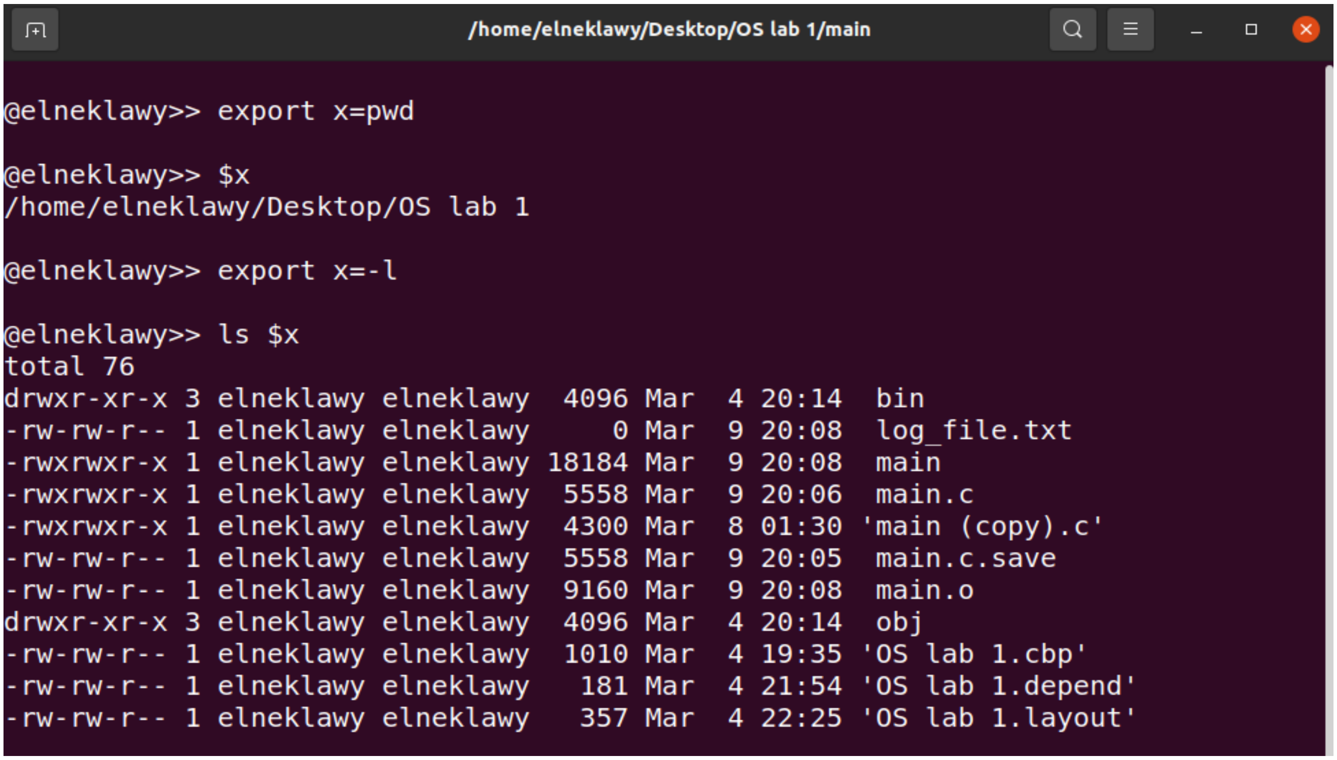
Figure 4



```
@elneklawy>> export x=5

@elneklawy>> echo $x
5
@elneklawy>> 
```

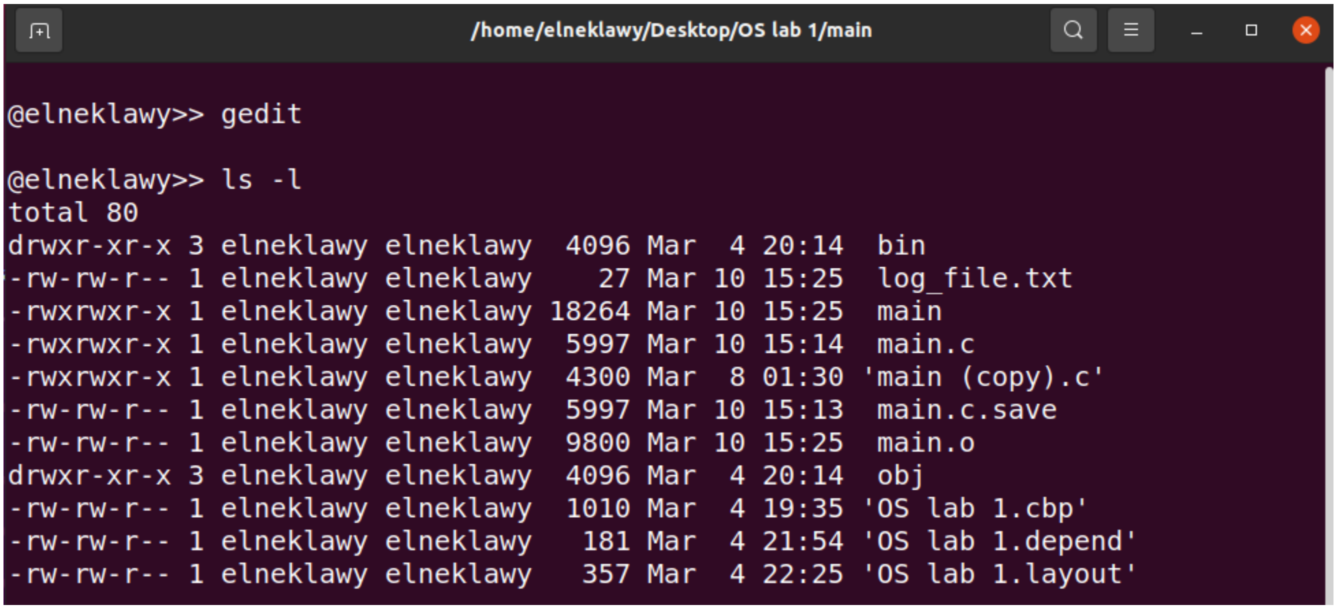
Figure 5

More examples on environment variables are illustrated in figure 6. Figure 8 shows the log_file after running the commands in figure 7.



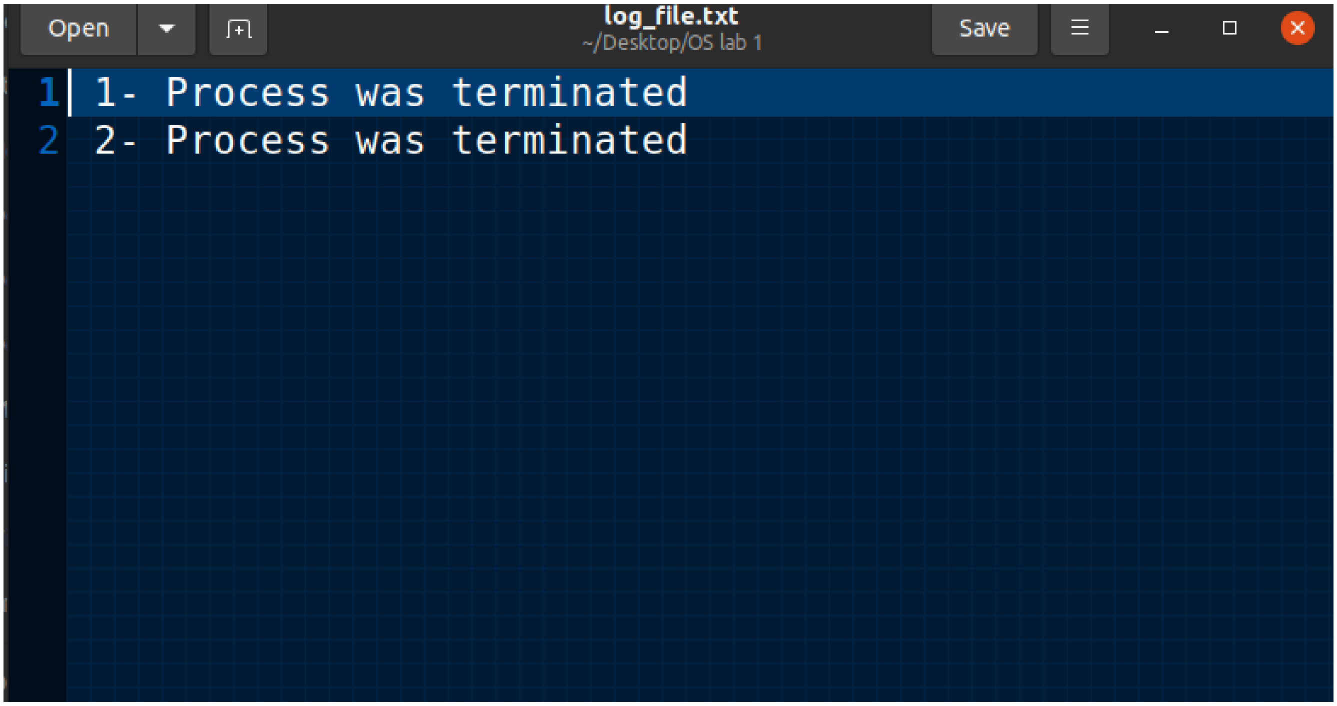
```
@elneklawy>> export x=pwd

@elneklawy>> $x
/home/elneklawy/Desktop/OS lab 1

@elneklawy>> export x=-l

@elneklawy>> ls $x
total 76
drwxr-xr-x 3 elneklawy elneklawy  4096 Mar  4 20:14  bin
-rw-rw-r-- 1 elneklawy elneklawy     0 Mar  9 20:08  log_file.txt
-rwxrwxr-x 1 elneklawy elneklawy 18184 Mar  9 20:08  main
-rwxrwxr-x 1 elneklawy elneklawy  5558 Mar  9 20:06  main.c
-rwxrwxr-x 1 elneklawy elneklawy  4300 Mar  8 01:30 'main (copy).c'
-rw-rw-r-- 1 elneklawy elneklawy  5558 Mar  9 20:05  main.c.save
-rw-rw-r-- 1 elneklawy elneklawy  9160 Mar  9 20:08  main.o
drwxr-xr-x 3 elneklawy elneklawy  4096 Mar  4 20:14  obj
-rw-rw-r-- 1 elneklawy elneklawy  1010 Mar  4 19:35 'OS lab 1.cbp'
-rw-rw-r-- 1 elneklawy elneklawy   181 Mar  4 21:54 'OS lab 1.depend'
-rw-rw-r-- 1 elneklawy elneklawy   357 Mar  4 22:25 'OS lab 1.layout'
```

Figure 6



```
@elneklawy>> gedit

@elneklawy>> ls -l
total 80
drwxr-xr-x 3 elneklawy elneklawy  4096 Mar  4 20:14  bin
-rw-rw-r-- 1 elneklawy elneklawy    27 Mar 10 15:25  log_file.txt
-rwxrwxr-x 1 elneklawy elneklawy 18264 Mar 10 15:25  main
-rwxrwxr-x 1 elneklawy elneklawy  5997 Mar 10 15:14  main.c
-rwxrwxr-x 1 elneklawy elneklawy  4300 Mar  8 01:30 'main (copy).c'
-rw-rw-r-- 1 elneklawy elneklawy  5997 Mar 10 15:13  main.c.save
-rw-rw-r-- 1 elneklawy elneklawy  9800 Mar 10 15:25  main.o
drwxr-xr-x 3 elneklawy elneklawy  4096 Mar  4 20:14  obj
-rw-rw-r-- 1 elneklawy elneklawy  1010 Mar  4 19:35 'OS lab 1.cbp'
-rw-rw-r-- 1 elneklawy elneklawy   181 Mar  4 21:54 'OS lab 1.depend'
-rw-rw-r-- 1 elneklawy elneklawy   357 Mar  4 22:25 'OS lab 1.layout'
```

Figure 7



```
1- Process was terminated
2- Process was terminated
```

Figure 8