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Lab 1: Simple Shell (Multi-Processing)

Overall Code Organization:

The code defines a simple shell that allows the user to execute commands and built-in shell functions. The code is well-organized and follows good programming practices such as using functions to separate concerns and keeping code simple and easy to read.

The program starts by defining some global variables, including a debug mode flag and a function to write messages to a log file. It then defines several functions to execute commands and built-in shell functions, such as changing directories or exporting environment variables.

The shell function defines a loop that reads user input and evaluates it by calling the appropriate function to execute the command. The main function initializes the shell environment, sets up signal handling, and starts the shell loop.

Overall, the code is well-organized, easy to read, and follows good programming practices. However, some improvements could be made, such as adding error handling and improving the way the program handles user input.

Sample Runs:

```
mahmoud@mahmoud-virtual-machine:~/Desktop/Projects/1-Simple-Shell$ ./script
[2023-03-09 07:55:17] Shell started
$ ls
log.txt  script  script.c  test
$ ls -l
total 32
-rw-rw-r-- 1 mahmoud mahmoud   183 رأم  9 07:55 log.txt
-rwxrwxr-x 1 mahmoud mahmoud 17152 رأم  9 07:42 script
-rw-rw-r-- 1 mahmoud mahmoud  3822 رأم  9 07:42 script.c
drwxrwxr-x 2 mahmoud mahmoud  4096 رأم  9 07:50 test
$ 
```

```
mahmoud@mahmoud-virtual-machine:~/Desktop/Projects/1-Simple-Shell$ ./script
[2023-03-09 07:55:40] Shell started
$ pwd
/home/mahmoud/Desktop/Projects/1-Simple-Shell
$ cd ..
[2023-03-09 07:55:45] Changed directory
$ pwd
/home/mahmoud/Desktop/Projects
$ cd ~
[2023-03-09 07:55:50] Changed directory
$ pwd
/home/mahmoud
$ 
```

Process Hierarchy: