

Documentation

Program name: os_assignment1.c

General Logic : The program accepts a Shell command as input, calls the interpret function to convert the input into tokens and calls the implement function to execute the command using `execvp()`.

Function main:

The main function accepts a Shell command as input, calls the interpret function to convert the input into tokens and calls the implement function to execute the command using `execvp()`. It also checks if the input is typed as "exit", if that is the case, it terminates the program. The global variable TRUE is declared as 1. So the while loop containing the display prompt will run as long as exit isn't called.

Function interpret:

This functions accepts an input line and converts it to tokens. First, it replaces all white spaces with zeros and when it hits a non-white space character, the address is saved to `argv[]`, indicated as the beginning of an argument. Then it skips all non-white spaces which forms the argument.

Function implement:

This function receives the argument and calls `fork ()` to create a child process. If the `fork ()` fails, it exits. Once the `fork` call executes, the child process will always be created with a pid of zero. So the function first checks if pid is not zero, meaning it is in parent process. Since it is parent process, it waits for the child process to complete its execution by using `waitpid()`. If the pid is zero, it will execute the child process and then proceed to run the parent process.

Compile and execution:

Extract the contents of the zip/RAR file onto a folder. Open a terminal and go to the destination folder using 'cd' command. Then compile and execute the above file using the commands:

```
gcc os_assignment1.c
./a.out
```

The input can be any of the Shell commands:

whoami - who you are logged in as

date - shows current date/time

uptime - show uptime

du - show directory space usage

df - show disk usage

ping hostname - eg: ping google.com

Finally, type “exit” to terminate

Output Snapshot:

```
C — zsh — 191x43

Last login: Thu Apr 22 15:11:42 on ttys000
arthikundadka@Arthis-MacBook-Air ~ % cd documents
arthikundadka@Arthis-MacBook-Air documents % cd c
arthikundadka@Arthis-MacBook-Air c % gcc os_assignment1.c
os_assignment1.c:18:14: warning: expression which evaluates to zero treated as a
null pointer constant of type 'char *' [-Wnon-literal-null-conversion]
    *argv = '\0';          /* mark the end of argument list */
               ^
1 warning generated.
arthikundadka@Arthis-MacBook-Air c % ./a.out
warning: this program uses gets(), which is unsafe.
Enter your Shell command here: whoami

arthikundadka
Waited for 2177
Enter your Shell command here: date

Thu Apr 22 15:13:32 PDT 2021
Waited for 2179
Enter your Shell command here: uptime

15:13 up 6:08, 2 users, load averages: 1.70 1.73 1.67
Waited for 2180
Enter your Shell command here: du

504
.
Waited for 2181
Enter your Shell command here: df

Filesystem                512-blocks    Used Available Capacity iused      ifree %iused  Mounted on
/dev/disk1s1s1            976490576 29395816 846648552      4%  568975 4881883905      0%  /
devfs                     373         373      0    100%    646      0    100%  /dev
/dev/disk1s5              976490576      40 846648552      1%      0 4882452880      0%  /System/Volumes/VM
/dev/disk1s3              976490576 576040 846648552      1%    796 4882452084      0%  /System/Volumes/Preboot
/dev/disk1s6              976490576    1384 846648552      1%     13 4882452867      0%  /System/Volumes/Update
/dev/disk1s2              976490576 98359952 846648552     11% 1003796 4881449084      0%  /System/Volumes/Data
map auto_home              0         0      0    100%      0      0    100%  /System/Volumes/Data/home
/Users/arthikundadka/Downloads/Visual Studio Code.app 976490576 98244912 846763592     11% 1001595 4881451285      0%  /private/var/folders/ms/xsg38mq96rd2ldksk7w9_82c0000gn/T/AppTranslocation
/8738975F-06A5-49E7-ABEE-CC6DC95CE6A4
Waited for 2182
Enter your Shell command here: exit

arthikundadka@Arthis-MacBook-Air c %
```