April 14th, 2018

CSE344 – System Programming - Homework #3

Submission deadline: 23:55, April 29th, 2018

The objective is to develop your own shell that takes input from standard input. Your shell must support the following commands which you will code:
- **ls**; which will list file type, access rights, file size and file name of all files in the present working directory
- **pwd**; which will print the present working directory
- **cd**; which will change the present working directory to the location provided as argument
- **help**; which will print the list of supported commands
- **cat**; which will print on standard output the contents of the file provided to it as argument
- **wc**; which will print on standard output the number of lines in the file provided to it as argument
- **exit**; which will exit the shell

*** ls, cat and wc commands must be coded and executed in a separate process using fork+exec. These must not be embedded in shell code. Your single makefile will compile each of these commands code and your shell code separately.**

Your shell must have the following features:
- **it must enable the user to access directly the n-th previously typed command**
- the **up arrow key** must enable us to access previously typed commands
- the vertical bar character '|' must enable constructing **a pipe** between commands
- must **support redirecting** standard input and output of commands to files through the '<' and '>' characters.
- in case of SIGTERM, your shell must exit properly (e.g. by printing a message on screen).
- You may upgrade your homework in future so design your program keeping that in mind.

Rules
a) You must implement all the commands supported by your shell; **you cannot use the "system()" system call. You must use fork+exec for process spawning.**
b) Your program must handle eventual errors gracefully according to the POSIX traditions.
c) Use POSIX and Standard C libraries. You can write your program using C11 standards.
d) Valgrind rule from previous homework still holds and will be hold on every homework.
e) *Your program MUST not give "segmentation fault" or any other fault that causes your program to end in a bad way. It is better for you to send a little part of the homework with clean and executing code instead of full homework with faults like this.*
f) **Provide a makefile to compile your homework. Do not run your program inside makefile. Just compile it.**
) Test your homework using the Virtual Machine given to you.
k) No late submissions.
f) **Do not send any additional files like screenshots. Just send the makefile and source files.**
g) Taking any code from internet will result getting a grade of -100. Do no put links or references to internet, you don't need code from internet to do this homework. Man pages and your book is well enough.

Homework format:
StudentID_HW2_CSE344.tar.gz
|→ Makefile
|→ StudentID_main.c
|→ … (Any other source **files**, not directories!)

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Good luck.