Computer Assignment #1

Due date of assignments: Monday 1385/8/29

Note:

- All of assignments should be done in two-person groups!
- All programs must be written in C/C++ (under Linux operating system of course!)
- You must use make (a tool for controlling the process of building and rebuilding software) to build your programs. You can find information about make utility, in course homepage.
- And of course you must not use ps, ls, fork or any other built-in available commands in your programs! Instead use C basic functions and libraries.
- There are some e-books on Linux programming that you can find in homepage.
- Please send your CA source code to ce424a@gmail.com before delivering it.

The Shell or Command Line Interpreter is the fundamental User Interface to an Operating System. Each shell has internal and external commands. Your first assignment is to write a simple shell with Internal commands - myshell - that has the following properties:

The shell must support the following internal commands:

i. cd <directory> - change the current default directory to <directory>. If the <directory> argument is not present, report the current directory. If the directory does not exist an appropriate error should be reported.

ii. pstree - Write program to show the system processes tree. Every process is created by another process called the parent process and every process has a process ID (pid). In Linux, init process is the parent of all other processes running in the system and has no parent. Ideally your program output would be like the output of Linux 'pstree' command. But a list of process and his parent is sufficient.

iii. ls <directory> - list the contents of directory <directory>. Your program must show the first and last columns of 'ls -al' command. It must also at least support '-R' switch to list files in subdirectories recursively.

iv. environ - list all the environment variables of the primary shell and their value

v. sysinfo - show the following information about main memory: (total amount and percentage of memory usage) and show the following information about cpu:
   Cpu model name, Cpu MHz and Cpu cache size.

vi. quit - quit the shell

The command line prompt must contain the pathname of the current directory.

StartPoint that prints the <pathname> on the standard output is the full path of the directory that the shell executed from there (not a hardwired path back to your directory, but the one from which it is executed).
**Aim:** Introducing how to use *proc* pseudo-file system to get system information and to become familiar with the Linux environment and usable functions.

**Hint:** See *proc* pseudo-file system. You must search the Internet and man instruction of the Linux *yourself* to find the required functions for implementing your shell; But about the ‘vi’ property you can take a look at the environment variables for finding a proper one.