CS307 - System Practicum

Assignment 1

Course Instructor : Aditya Nigam

25 September 2020

Instructions

- Plagiarism is strictly prohibited. In case of violation, a zero will be awarded for this assignment as a warning and a quick F grade if repeated later.

- Students need to create 5 minute demo video and upload it on youtube with unlisted settings. 5 minute restriction is strict and demo will not be evaluated if it is more than 5 minutes.

- In moodle students need to submit 3 things:

  - The link of youtube video demo as online text.

  - A README.MD file which provides the youtube link of demo and the instructions for running your codes in detail including the versions of programming language and all the modules that have been used.

  - The code of the assignment. The readme and code will be submitted separably.

- Students using Windows or any other OS, are requested to make sure that their code runs perfectly on Linux as mentioned in each problem. Your evaluation will be done on computers having Ubuntu 16.04.

- The deadline for submission is **Friday, 03rd October, 2020, 2355 HRS**. No late submissions will be entertained.

- Contact Ranjeet Ranjan Jha or Daksh Thapar for any queries.

1 Understanding Some basic system tools

1. ps

2. kill

3. vmstat

4. netstat

5. tcpdump

6. ping

7. traceroute

Note: Just play around with them. Understand how they are working. Explore what are the possible ways one can use them. Read their manual pages and try to get hold of these commands.

2 Creating a Shell

The Shell or Command Line Interpreter is a fundamental User Interface to an Operating System. In this assignment you have to write a simple shell that has the following properties.
   The shell must support the following internal commands:

1. **cd** <**directory**> - Change the current default directory to <**directory**>. If the <**directory**> argument is not present, report the current directory. If the directory doesn't exist an appropriate error should be reported. This command should change the PWD environment variable. **(1 mark)**

2. **clr** - Clear the screen. **(1 mark)**

3. **dir** <**directory**> - List the contents of directory <**directory**>. **(1 mark)**

4. **environ** - List all the environment strings of the curretn shell and bash shell.. **(1 mark)**

5. **echo** <**comment**> - Display <**comment**> on the display followed by a new line. (Multiple spaces/tabs may be reduced to a single space). **(1 mark)**

6. **pause** - Pause Operation of shell until 'Enter' is pressed. **(1 mark)**

7. **help** - Display User Manual. **(1 mark)**

8. **quit** - Quit the shell. **(1 mark)**

9. **history** - Display a list of previously executed commands. **(1 mark)**

10. The shell environment should contain **shell**=<**pathname**> /**myshell** where <**pathname**> /**myshell** is full path for the shell executable (not a hardwired path back to your directory, but the one from which it was executed). **(2 marks)**

11. The shell must be able to take its command line input from a file. That is, if the command line is invoked with a command line argument: **myshell batchfile** then **batchfile** is assumed to contain a set of command lines for the shell to process. When the endoffile is reached, the shell should exit. Obviously, if the shell is invoked without a command line argument, it solicits input from the user via prompt on the display. **(3 marks)**

Note: Do not use any Wrapper Function. Avoid using direct system calls to implement the commands.

Bonus: Add any new command that is defined by you.