Operating Systems: Assignment 0

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1 Shell Description

- Input is taken via gets() and is split by spaces. Command and parameters are then stored separately.

- Five internal commands are implemented:

    > cd

    > pwd

    > echo

    > history

    > exit

    Each of these are handled directly via functions by the shell.

- Five external commands are implemented:

    > ls

    > cat

    > date

    > mkdir

    > rm

    For each of these, individual C programs are written and are handled by the shell using fork() and execve() commands. Also, two options are implemented per command:

    > ls −a, ls −r

    > cat −n, cat −E

    > date −I, date −R

    > mkdir −v, mkdir −m

    > rm −d, rm −v

- Two options are also implemented for echo: echo −n, echo −E

- echo also supports strings containing quotes ",' and backslash /

- cd varients executed: cd, cd ., cd .., cd ∼, cd −, cd <path>

- For each command, the combination of the options is also supported. For eg: ls −a, ls −r, ls −ar, ls −ra, ls −a −r are all handled.

- Multiple files are also handled. For eg: cat a.txt b.txt will open both files.

- History is appended into a file each time. So, the history command displays entire history of the commands typed on the shell.

2   Errors Handled

- If a command other than the ten mentioned above is entered, an error is displayed: "<command entered>: command not found"

- In all commands, requesting an option not supported displays the error: "<command name>: invalid option"

- ls

  - if directory does not exist, an error: "ls: cannot access '<directory entered>': No such file or directory" is displayed

- cat

  - If there are less than 2 arguments then an error: "Mismatched argument" is displayed.

  - If the file to be read does not exit, the error: "cat: <filename entered>: No such file or directory" is displayed.

  - If an attempt to read a directory is made, an error: "cat: <directory entered>: Is a directory" is printed.

- date

  - If multiple options are tried to be applied, (eg: −IR or −RI or −R −I), an error: "date: multiple output formats specified" is printed.

  - If date is followed by a non option (eg: date xyz), the error: "date: invalid date" is shown.

- mkdir

  - If there are less than 2 arguments then an error: "Mismatched argument" is displayed.

  - If directory already exists, an error: "mkdir: cannot create directory '<directory name>': File exists" is displayed.

- rm

  - If there are less than 2 arguments then an error: "Mismatched argument" is displayed.

  - If the file to be deleted does not exit, the error: "rm: cannot remove '<filename entered>': No such file or directory" is displayed.

  - If an attempt is made to remove a directory, the error: "rm: cannot remove '<directory name>': Is a directory" is shown.

  - If an attempt is made to remove a directory with the −d option but the directory is non empty, then an error: "rm: cannot remove '<directory name>': Directory not empty" is shown.

- cd

  - If directory does not exist and at attempt to change into that directory is made, an error: "cd: <directory entered>: No such file or directory" is printed.

  - If a cd − is attempted before the previous directory is set, the error: "cd: OLDPWD not set" is displayed.

- echo

  - If quotes are unbalanced, "Error" is printed.

3   Assumptions Made

- It is assumed that the options are entered before the files. For eg: the format is assumed to be:
  <command name> <options> <filename>

- The home directory for the shell is assumed to be the directory where the shell executable file is located.