Project 2

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History Manager

HistoryManager Keeps a history of all the directories that the user accesses. Its header file HistoryManager.h contains all methods and data related to HIstoryManager.cpp. This class contains the functionality for the methods found in the header file. The history manager works with the display handler and CommandCD to display directories. The main issue was not getting the correct directory location to store the traveled directories. This would also affect the getting of the directories as the file did not exist, so no list to get.

ModeHandler

interactiveMode: indicates whether the mode is interactive
Private methods:
	parseCommand: takes a string representing the command input, uses istringstream to split the command line into tokens based on whitespace
	executeCommand: takes a vector of strings and decides how to execute the command. If the command is cd, it delegates to a commandCD object to handle the change directory operation. For other commands, it prepares arguments for execvp and uses fork to create a child process where the command is executed. Parent process waits for the child's completion using waitpid.
	join: utility function to concatenate elements of a vector into a single string.

Public Methods:
	Constructor: initializes the ModeHandler with a boolean indicating if it's in interactive mode
	run:takes command line input as a string and executes the command.

Most of the code went without a hitch. A single problem of not handling the arguments correctly, resulting in no command being executed, was fixed and the code for this worked as it should.

DisplayHandler

DisplayHandler.h is a header file including necessary data members and functions for DispalyHandler.cpp. This class is designed to display simple help messages and full help messages onto the terminal. Specifically, the messages will be displayed when the user types “cd-h” or “cd-H”. In addition, this class also has a function to get the current working directory.

CommandCD

CommandCD class is designed to handle the “cd” command in a terminal-like environment. It calls functions from History Manager class and Display Handler class. It includes methods to parse the command and determine the arguments of the input command. It will determine the type of the “cd” command based on the second input argument. Every cd command starts with “cd” therefore the only thing that matters is what comes after “cd”. An emunation is used to specify the different types of arguments used with “cd”. This class includes a function to correctly extract the arguments from the parsed input. For the “cd-l” command, we check whether “-l” is followed by an optional number, indicating to display the last N directories from history. In addition, it also makes sure that the data within memory is removed after parsing the command. The rest of the class is the actual implementation of “cd” after parsing the input and correctly identifying the argument type. The implementation uses two other classes: DisplayHandler and HistoryManager. Here’s how it uses them: The CommandCD class usesDisplayHandler: This class is used to handle the display of information onto the terminal. It is used in the implementCommand() method of the CommandCD class. Depending on the argument type (argType), different messages are displayed to the terminal. For example:

IfargType is h, the getSimpleHelpMessage() method of the DisplayHandler class is called to display a simple help message.

IfargType is H, the getFullHelpMessage() method of the DisplayHandler class is called to display a full help message.

HistoryManager: This class is used to manage the directory history. Depending on the argument type, different operations are performed on the directory history. For example:

IfargType is l, the getHistory() method of the HistoryManager class is called to get and display the directory history.

IfargType is lN (cd-l {n}), the getHistory(int n) method of the HistoryManager class is called to get and display the last n directories from the history.

IfargType is c, the clear() method of the HistoryManager class is called to clear the directory history.

And so on for every argument type.

Main

This class intakes the arguments (or lack thereof) and translates it into a string object. The first item checked is whether the program is exiting or not, then if the internal command given is handled before finally being sent to the **ModeHandler** for running the command. While

this class wasn’t the hardest, the issue was not realizing that the initial commands inputted were over-written and ignore. A simple fix was to apply a If-check statement for any inputted args or empty arguments.

Code:

```
josmoor@tesla:~/SP24/Operating_Systems/Project_2$ make

g++ -c DisplayHandler.cpp

g++ -c HistoryManager.cpp

g++ -c CommandCD.cpp

g++ -c ModeHandler.cpp

g++ main.cpp -o beta

josmoor@tesla:~/SP24/Operating_Systems/Project_2$ ./beta

Entering interactive mode...

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd ../../

/home/josmoor/SP24 $ cd

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd
../../Operating_Systems

/home/josmoor/SP24/Operating_Systems $ cd -l

List of Directories:

/home/josmoor/SP24

/home/josmoor/SP24/Operating_Systems/Project_2

/home/josmoor/SP24/Operating_Systems


/home/josmoor/SP24/Operating_Systems $ cd -l 3

List of Directories:
```

```
/home/josmoor/SP24/Operating_Systems

/home/josmoor/SP24/Operating_Systems $ cd
/home/josmoor/SP24/Operating_Systems/Project_2 $ cd
/home/josmoor/SP24/Operating_Systems/Project_2 $ cd
/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -l
List of Directories:
/home/josmoor/SP24
/home/josmoor/SP24/Operating_Systems/Project_2
/home/josmoor/SP24/Operating_Systems
/home/josmoor/SP24/Operating_Systems/Project_2
/home/josmoor/SP24/Operating_Systems/Project_2
/home/josmoor/SP24/Operating_Systems/Project_2

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -s
Directory History Suppressed
/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -l
List of Directories:
/home/josmoor/SP24
/home/josmoor/SP24/Operating_Systems
/home/josmoor/SP24/Operating_Systems/Project_2

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -h
Usage: cd [-h] [-H] [-l [{n}]] [-{n}] [-c] [-s] (DIR)
Change the current directory to DIR.

Options:
-h          Display simple help message.
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-H Display full help message.

-l [{n}] Display the history list of the current directories with serial numbers. With the optional N, it displays only the last N entries.

-{n} Change the current directory to the n-th entry in the history list.

-c Clean the directory history.

-s Suppress the directory history by eliminating duplicated directories. The order of the history must be maintained. The latest entry must be kept for same directories.

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -H

Description: The cd command is used to change the current working directory in a shell environment. It allows for flexible navigation within the file system and includes additional features

beyond the typical cd commands found in Windows Command Prompt or Linux shells.

Usage: cd [-h] [-H] [-l [{n}]] [-{n}] [-c] [-s] (DIR)

Change the current directory to DIR. The default DIR is the current directory so that it is identical to the pwd command in typical Linux shells.

Options:

-h, --help:

Display a simple help message describing the basic usage of the cd command.

-H, --full-help

Display a detailed help message explaining all available options and usage scenarios for the cd command.

-l [{n}], --list [{n}]

Display the history list of the current directories with serial numbers.

If the optional N is provided, it displays only the last N entries from the history list.

For example: Display the last 5 entries from the directory history: cd -l 5

- {n} -- Go to nth directory

Change the current directory to the n-th entry in the history list.

For example: Change to the directory listed as the 3rd entry in the history: cd -3

-c, --clean-history

Clean the directory history, removing all entries from the history list.

-s, --suppress-duplicates

Suppress the directory history by eliminating duplicated directories.

The order of the history must be maintained, and only the latest entry must be kept for the same directories.

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -c

Directory History Cleared

/home/josmoor/SP24/Operating_Systems/Project_2 $ cd -l

List of Directories:

/home/josmoor/SP24/Operating_Systems/Project_2 $ exit

josmoor@tesla:~/SP24/Operating_Systems/Project_2$