

INTERNAL COMMANDS:

- **cd:**
 - This command is used to help the user change the directory from inside the terminal.
 - I have implemented options here: `cd`, `cd ..`, `cd <directory name>`
 - Used the `chdir` function to handle this part of the code.
 - Used `if/else` to handle and throw errors
 - Here I have handled errors like:
 - `cd <file_name that does not exist>`: my code throws an error in a situation like this, "Error: cd, no such file or directory: file_name"
 - Further, the code also throws errors if more than one argument is passed. Exampled: `cd <file1> <file2>`.
- **pwd:**
 - This command prints the present working directory.
 - I have implemented the options of `pwd`, `pwd -l`, `pwd -p`
 - I get the output that tells me the present or current working directory.
 - Here I have handled errors like:
 - If the user tried to input more arguments after the letter `pwd`, for example `pwd -l lk`, the I raise an error that says: "Error: invalid command for pwd".
 - Further, if the user tries to input a wrong letter as argument after `pwd`, example: `pwd -z`, an error is raised that specifies: "Error: -z is an invalid argument for pwd".
- **echo**
 - In `echo` I have implemented `echo`, `echo -n`, `echo --help`
 - Here in `echo -n`, I print out the arguments of `echo`'s function onto the terminal without a trailing `\n`
 - Further, `help` is like a function that tells the user about the options I have created in `echo`, it provides the user with information about the `echo` internal command.

EXTERNAL COMMANDS

- **mkdir**
 - The use of this command is to create a directory inside the current path of the user.
 - I have implemented it as: `mkdir`, `mkdir -v`, `mkdir -pv`
 - `mkdir`: it creates the directory inside the current path, but throws an error if the file already exists or if for some reason, it cannot be created in the current directory.
 - Further, `mkdir -v`: gives the verbose information to the user, it tells the user about the successful creation of the directory, it throws an error in case of insufficient arguments, example: if a user has input "`mkdir -v`", that is insufficient arguments

for us to make the directory, hence, I raise an error, as we need at least one file name.

- Another error I have handled is if the user tries to input only “mkdir”, that is an insufficient command and it throws an error.
- For mkdir -pv, I am able to create a nested directory when I pass args in form dir1/dir2/dir3, I have used recursion to achieve this.
- If &t is at the end of the command, then we use systems and thread to implement the functionality.
- Else we use execl and fork to do the same.

- date

- A simple function that outputs the date and time as demanded by the user.
- I have implemented the functions date, date -r, date -u
- date -u: gives me the UTC date and time output
- date -r: tells me about the date when the file was last modified
- Error: if we miss a file argument, then it throws an error
- If we provide too many invalid arguments, it throws an error
- If &t is at the end of the command, then we use systems and thread to implement the functionality.
- Else we use execl and fork to do the same.

- ls

- Tells us about the contents of the directory
- ls -l : prints the Inode numbers corresponding
- ls -la: also includes directory ids that start with a dot
- I have handled errors where the user is notified if the arguments given to ls are invalid or incorrect
- If &t is at the end of the command, then we use systems and thread to implement the functionality.
- Else we use execl and fork to do the same.

- rm

- Used to remove files and directories from the directory.
- rm -v gives a verbose explanation of the directory deleted and informs the user about the success of the process
- rm -d allows the user to remove the directories
- Error thrown if user tries to remove a non-existent directory or file
- Error thrown if user tries to remove a directory from rm, instead of rm -d
- Error thrown if user tries to input just rm, we tell him we need more arguments or file names
- If &t is at the end of the command, then we use systems and thread to implement the functionality.
- Else we use execl and fork to do the same.

- cat

- cat, cat -n, cat -b implemented
- If user tries to input cat -b with an invalid file or directory name an error is thrown

- We number all lines, including blank ones when we handle cat -n
- Don't number the blank lines in cat -b
- Further cat, just prints out the entire file for the user
- We can also operate cat and the options without a file name, there it lets user input words and lines and performs function accordingly.
- If &t is at the end of the command, then we use systems and thread to implement the functionality.
- Else we use execl and fork to do the same.

TEST CASE AS ON TERMINAL

```

SHELL
USER: medhahira
medhahira@Custom-Device shell % ls
cat fork pthread.c ls.c testingwopath.c mk.c check.c fork.c date rm.c cat.c mkdir.c input.c a.out mkdir date.c l.c ls check rm p
medhahira@Custom-Device shell % ls -a &t
... cat fork pthread.c .DS_Store ls.c testingwopath.c mk.c check.c fork.c date rm.c cat.c mkdir.c input.c a.out mkdir date.c l.c ls chec
medhahira@Custom-Device shell % mkdir -v medha &t
Directory named 'medha' created
medhahira@Custom-Device shell % ls
cat fork medha pthread.c ls.c testingwopath.c mk.c check.c fork.c date rm.c cat.c mkdir.c input.c a.out mkdir date.c l.c ls check rm p
medhahira@Custom-Device shell % rm medha
Error: cannot remove medha, it is a directory
medhahira@Custom-Device shell % rm -d medha &t
medhahira@Custom-Device shell % ls
cat fork pthread.c ls.c testingwopath.c mk.c check.c fork.c date rm.c cat.c mkdir.c input.c a.out mkdir date.c l.c ls check rm p
medhahira@Custom-Device shell % date -r
Error: missing file argument
medhahira@Custom-Device shell % date -u
UTC Fri Oct 14 18:14:22 2022

medhahira@Custom-Device shell % date -r mk.c
IST : Thu Oct 13 14:37:29 2022

medhahira@Custom-Device shell % cd
medhahira@Custom-Device shell % pwd
Current working directory: /Users/medhahira
medhahira@Custom-Device shell % cd Desktop
medhahira@Custom-Device shell % pwd
Current working directory: /Users/medhahira/Desktop
medhahira@Custom-Device shell % cat -n
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