COMP304 Project 1

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Part1:

In this section we used the execv command. This command takes two arguments, the first argument is the path to the command that we want to run and the second argument is the parameters that we want to pass to that function. Since the path to the executables begin with /usr/bin, we concatenated the command name (command->name) we get from the terminal with the parameters (command->args) and passed it to the execv function along with NULL as the last parameter.

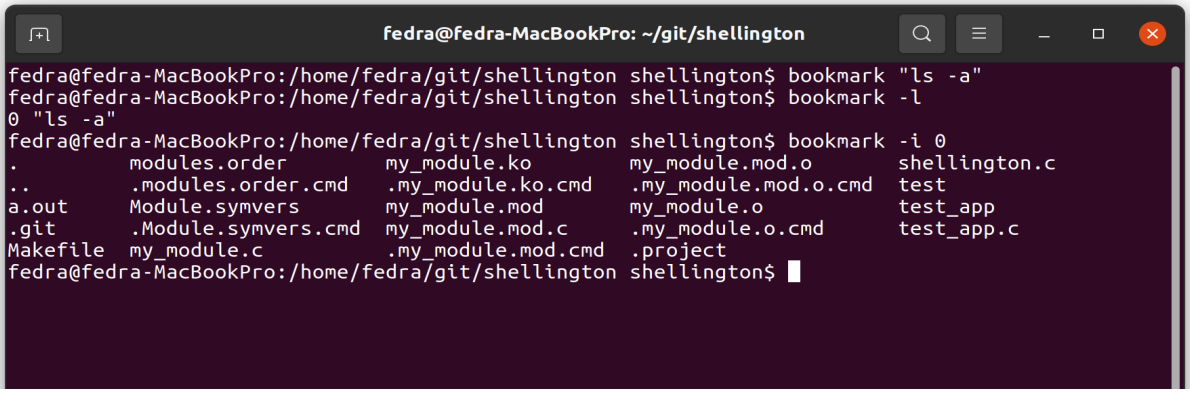
Part 2:

1) short

   We used two files to keep track of both names and paths so that our command would work even the terminal session is terminated. When set executed, we add name to names.txt file and path to paths.txt file. When jump executed, we first search for name in names.txt file and use and run cd command on path at the very index.

2) Bookmark

   First we check for the arguments written along with the bookmark command and divide the tasks into different parts depending on them. To store the bookmark command, we created a 2 dimensional array and stored the command using command->args. For deleting a bookmarked command, we deleted it with the given index and shifted the whole array. To list the bookmarks, we traversed the array and printed the strings. To run the bookmark command, we passed the command to parse_command and then process_comand functions.



3) remindme
   This command takes in a time in format hour.minute and a string to be shown. We used notify-send to show the alert and crontab -l to schedule the command in the given time. We used sprintf to modify the text string and the following command in using sh -c. The following is the example code:
   Crontab -l | { cat; echo * * * * * XDG_RUNTIME_DIR=/run/user/$(id -u) /usr/bin/notify-send message'; } | crontab -

4) cwallpaper:
   cwallpaper is one of our custom commands which will change desktop wallpaper. It uses the Unsplash random image generator and downloads the picture, stores it and later sets it as the desktop background using wget -) and gsettings commands along with parameters that make it possible to access and modify the wallpapers. They commands are first created in temporary arrays and then executed using execv command.
   To use this functionality, use cwallpaper.

5) todo:
   Todo command is our second custom command. This command takes in add parameter and a string and adds the task to a file which is later stored in a txt file. To mark a task as done, execute todo done idx, where idx is the index of the tast that is finished. The todo -l will list all of the tasks in the list.
   Possible commands:
   todo add sleep //adds sleeping task

todo -l //lists all tasks
todo done 5 //labels 5th task as done!
todo clear //clears the list

Part 3:

Important note: You should run shellington.o as sudo user to use these functions.

a) Pstraverse: We wrote a kernel module and implemented both DFS and BFS. We used ioctl to communicate between userspace and kernel space. Our module had the necessary functions so we directly called those functions and passed a PID as an argument. We iterated over child processes with respective order for -d and -b options. When exit command is given, my_module.ko is removed from the modules list.

References:

1. https://www.wikihow.com/Change-Your-Desktop-Wallpaper-on-Linux-Mint
2. http://derekmolloy.ie/writing-a-linux-kernel-module-part-2-a-character-device/
3. https://www.geeksforgeeks.org/crontab-in-linux-with-examples/