Project 1: Familiarity with UNIX/Linux

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CST-315: Operating Systems Lecture and Lab

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**Part 1**

|  |  |  |
| --- | --- | --- |
| Number | Feature | How it works |
| 1 | Changing Directory (cd) | When you use the cd command, the computer looks through the directory it’s currently in for the file name you give (e.g. cd Desktop) and sees if the directory exists. It then checks if the user calling the command has permission to access the file. If the user has sufficient permission, it changes directory by passing the instruction down through the Linux ‘onion’, from the shell to the kernel and so on until it reaches hardware. |
| 2 | Listing files (ls) | When using ls, the computer browses the current directory the terminal is in for all the folders/files that are contained within it. It then outputs the names of all the files it found for the user to see in their console. |
| 3 | Making a directory (mkdir) | If the user calls mkdir and gives the name of the file they want to create, the computer will check to see if the user has sufficient permission to create a file in the current directory. If they do, the computer will create a new file with the user’s chosen name and file type. This is, however, only used for directories, for actual folders it would be better to use a command like ‘touch’. |
| 4 | Find file (find) | This command finds a file within a certain directory that matches the specified search criteria given by the user. When the command is used, the computer takes the directory provided and the search criteria and if the file is found, it returns its location and name to the user. |
| 5 | Remove (rm) | Removes a file or multiple files specified by the user. When called, this command first checks the permission of the user and whether it is sufficient to delete the given files. If the user has permission, it will then delete all selected files from the file management system, however if these files are stored on the hard drive, I think they will still technically exist until overwritten with new data. If the file being removed is a directory, it will return an error unless the -r option is specified. |

*Using cd to change from the CST315 directory to its subdirectory Assignment1*

A black screen with white text

AI-generated content may be incorrect.

*Using ls to list the files in the Assignment1 directory*

A screenshot of a computer

AI-generated content may be incorrect.

*Using mkdir to create an empty directory called ‘folder’ and displaying it with ls*

A screenshot of a computer

AI-generated content may be incorrect.

*Using find to find files in the Assignment1 directory that have a filename that starts with “hello”, thus returning the helloWorld executable file that was found*

A black screen with white text

AI-generated content may be incorrect.

*Deleting the previously created directory ‘folder’ using rm with the -r option specified since ‘folder’ is a directory*

A screen shot of a computer

AI-generated content may be incorrect.

*Displaying that I am using a Darwin kernel, which is UNIX-based, and I am also using a bash shell, which is UNIX-based.*

A screenshot of a computer

AI-generated content may be incorrect.

*Successful compilation and execution of HelloWorld.c program*

A screen shot of a computer

AI-generated content may be incorrect.

**Part 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Commands Tested | whoami | users | ls | chmod |
| echo | grep | sort | man |

*Using whoami to display ownership*

A screenshot of a computer

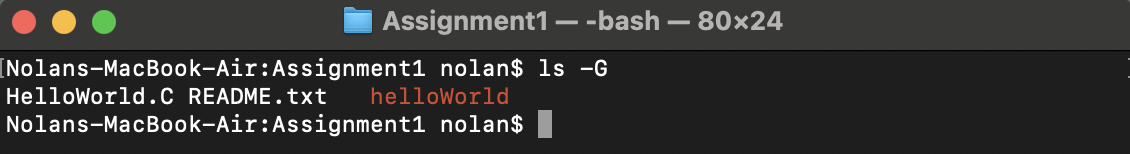
AI-generated content may be incorrect.

*Using the users command to display who is using the computer*

A screenshot of a computer

AI-generated content may be incorrect.

*Using ls to list directory with the -G option selected to enable colorized output*



*Using ls*A screenshot of a computer program

AI-generated content may be incorrect. *with the -1 option selected to force 1 output per line*

*Using ls with the -t option to sort in descending order by time modified*

A screenshot of a computer program

AI-generated content may be incorrect.

*Uses chmod to remove the permission from the user to execute the helloWorld file and to add permission for the user to read and write to the helloWorld file.*

A black and white screen with white text

AI-generated content may be incorrect.

*Using the echo command to check the value of the shell, home, and user variables*

A screenshot of a computer

AI-generated content may be incorrect.

*Using the grep command to search for the string ‘main’ in a c++ file, which returns the match it found in the main function declaration. Returns the entire line where the match was found.*

A screenshot of a computer

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*Using grep with -r specified to search recursively through all subdirectories for strings matching ‘hello’, uses a pipe (* | *) which sends the results to sort so it can sort the results that are outputted alphabetically by filename*

A screenshot of a computer

AI-generated content may be incorrect.

The superuser account can be used by specifying ‘sudo’ before using a command, which can be very useful if quick permissions are needed to execute something such as updating packages on the system. It’s very common to see commands like ‘sudo apt-update’ on tutorials to ensure that all packages being utilized are up to date, but this permission is also very dangerous. For example, when using rm, very important system files can be deleted with superuser permission. Deleting files that are essential for the computer to function can ‘brick’ the machine and cause the computer to lose all functionality.

*Using the look command to search for lines starting with the prefix ‘enum’ in this directory.*

A screenshot of a computer

AI-generated content may be incorrect.

*Using GetFileInfo to get information about a c++ file.*

A screenshot of a computer

AI-generated content may be incorrect.

*Using the unset command to unset a local variable set to “hello” and using echo to display that it loses its assigned string.*

A screenshot of a computer

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*Using the pwd command to print the current directory.*

A screenshot of a computer

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*Using the awk command to search through the specified file (README.txt) and has a BEGIN option set to print a message when it starts searching and an END option for when it stops. Prints the first and second words of each line, specified by $1 and $2.*

A screen shot of a computer

AI-generated content may be incorrect.

*Running test.sh script*

**A screen shot of a computer

AI-generated content may be incorrect.**

**Source Code**

#!/bin/bash

awk 'BEGIN {print "Files in directory: " } { print FILENAME} END {print "Current directory: "}' ./\*

pwd

echo "Info about directory: "

pwd | xargs GetFileInfo

echo "Current user browsing this directory: "

whoami

echo "Current shell being used: "

echo $SHELL

**Reference:**

Apple Inc. (2023). Darwin [Kernel]. Retrieved from <https://opensource.apple.com/>