**Week 1 - Supplementary Materials**

**The Command Line Interface (CLI) and Filesystems**

A command line interface accepts text commands and executes programs.

Using a CLI was once the only way a person could operate a computer. Today, most users interact with a graphical user interface (GUI) that allows you, for example, to click an icon on your desktop with a mouse or tap on a smartphone touchscreen.

This week we focus on using a CLI to interact with and navigate a filesystem. This is a basic skill required for hackers.

**Try a CLI in your browser:**

* [BROWSER CLI](https://bellard.org/jslinux/vm.html?url=alpine-x86.cfg&mem=192)

**Videos:**

* Filesystems [MP4](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/01_Filesystems.mp4) | [WEBM](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/01_Filesystems.webm)
* Navigating Directories [MP4](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/02_Navigating_Directories.mp4) | [WEBM](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/02_Navigating_Directories.webm)
* Manipulating Files [MP4](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/03_Manipulating_Files.mp4) | [WEBM](https://raw.githubusercontent.com/lawfareblog/hacking-cybersecurity/main/week01/videos/03_Manipulating_Files.webm)

**Basic Commands**

**pwd - print working directory**

Use the pwd command to see what directory you are currently in.

On most systems, users start a session in their home directory, which is the directory set by the system administrator for that user. Your home directory is usually /home/user where "user" is your account's username. For the administrative superuser named "root", a concept we will explore later, the home directory is /root

**cd - change directory**

To navigate to a specific directory use the cd command. The cd command takes a path as an argument such as cd /usr/bin and moves you into that directory.

If you would like to navigate up the directory tree, use cd .. If you are in /usr/bin then the cd .. command will bring you to /usr/bin If you try cd .. again, it will bring you to / which is the absolute top of the directory tree. This is often called the "directory root", not to be confused with the administrative superuser named "root".

To navigate back to your home directory, use the cd command with no arguments or cd ~ where ~ means your home directory.

**ls - list**

ls without any arguments will list all the files and directories within the directory you are currently in.

Pass a specific directory as an argument to ls to see the contents of that directory. For example, ls /usr/bin will list the contents of /usr/bin

If you use the -l option or "switch" with ls, you will see much more detail about the directory contents. Try: ls -l /usr/bin

To make directory listings easier to read, you can "pipe" the output to less such as ls -l /usr/bin | less We will talk about pipes and input/output in more detail in later classes.

If you try ls --help you can see all options available for ls and most other commands.

**clear - clear screen**

You may find that your CLI has become cluttered. To clear your screen use clear.

To clear your total terminal / CLI history, try history -c

**man - manual**

The man command will open the usage manual, if one exists, for the command that you pass to it as an argument. For example, man ls will open the manual for the ls command. You can quit this manual view by typing q

Hackers use the slang [RTFM](https://en.wikipedia.org/wiki/RTFM) to refer to the tendency for users to ignore manuals.

Often, you can view a shorter version of the options for a command that is similar to the manual with the --help or -h switches, such as ls --help or nano -h

**mkdir - make directory**

To create a new directory, use the mkdir command. You can only create a directory where you have permission to do so. Permissions are a concept we will cover in class later. For now, try creating the directory catphotos in your home directory: mkdir ~/cats

**touch - create an empty file**

The touch command creates a new, empty file such as touch ~/cats/awesome-cat-names.txt

**nano - simple text editor**

Nano is one of many text editors that can be loaded with the CLI, but is probably the simplest. It will load a file in a separate view that can be exited with CTRL+X and you will see this at the bottom of the screen represented as ^X For more information, [read this tutorial](https://www.howtogeek.com/howto/42980/the-beginners-guide-to-nano-the-linux-command-line-text-editor/).

Create your own list of awesome cat names with nano ~/cats/awesome-cat-names.txt

Traditionally, the two text editors that hackers use are vi or emacs There is a tongue-in-cheek ["editor war"](https://en.wikipedia.org/wiki/Editor_war) between these two editors.

**mv - move a file**

mv can move a file or directory somewhere else on the filesystem but **is also used to rename files**. This is because renaming a file is just creating a new entry for the file, the same operation as moving it to another directory, as far as the filesystem is concerned.

Use the mv command and pass two arguments, the first being the current filename and the second being the new name: mv awesome-cat-names.txt cool-cat-names.txt

Use mv -R to move a directory and its contents.

Be careful! If there is already a file with the same name, you will overwrite that file.

**cp - copy**

To copy a file use the cp command: cp cool-cat-names.txt cool-cat-names2.txt

Use cp -R to copy a directory and its contents.

**rm - remove**

Delete a file: rm cool-cat-names2.txt

Use rm -R to delete a directory and its contents.

Be careful! There are jokes on the Internet that hackers like to test on new users, or "n00bs", such as rm -Rf / that can be very dangerous. Luckily, you usually have to be the administrative superuser "root" to do serious damage to your filesystem.