Johnny Li

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COP4600: Operating System

P0: My\_First\_Kernel\_Mod

P0 Report

Synopsis:

The goal of project 0 was to print a boot debug message in the kernel boot after the “Freeing unused kernel image memory” messages. Before the start of the project, a “clean” snapshot of the kernel from 5.0.21+ codebase was built by following the troubleshooting directions. After modifying the kernel, the kernel was re-build and a screenshot of the message was taken. The final task is to create a unified patch file and test it against the clean snapshot to ensure that its function correctly, the message reappears after the patch.

Description:

The goal was achieved by searching for the hinted term “rcu\_end\_inkernel\_boot()” using the grep command in ubuntu kernel source (grep -ir "rcu\_end\_inkernel\_boot()"). It was discovered that it was only being actively used in the main.c file at /home/reptilian/src/linux-hwe-5.0.0/init with no other files to choose from. After accessing the main.c for editing in nano, the hinted term was searched using cltr-W. Then the boot message was coded with one new line above and below after the hinted term line. This is seen below:

pr\_info(" ");

pr\_info("#### Johnny Li (UFID: 9699-4228) How I figured this out is a miracle. #####");

pr\_info(" ");

The function pr\_info was used to print the message as printf and printk gave me an error, noted in source [1]. After restarting ubuntu and confirming that the debug boot message did appear with the virtual box screen capturing software, the command make && sudo make install && sudo make modules\_install was called in the /home/reptilian/linux-hwe-5.0.0 to ensure the changes were made.

To create the patch, then I followed the given code in the project document:

cd /usr/rep/src/linux-hwe-5.0.0

git add -u

git add '\*.c' '\*.h' '\*Makefile\*' '\*.tbl'

git diff master > p0.diff

Note that the path remotes/origin/master did not work for me therefore I got around it with only the master.

Then the patch was downloaded to my local storage by command prompt sftp [2] with the command sftp -P 9474 reptilian@localhost to access the kernel. I navigated to the directory with the patch and used command “get p0.diff” to retrieve the patch. To test the patch, ubuntu was reverted to its clean snapshot and the local patch was uploaded to the kernel by command prompt sftp again but with the command “put p0.diff”. I followed the rest given code in the project document to install the patch with and rebooted in debug mode to confirm that the boot message appeared again. The main portion of the project is therefore completed.

Source Links:

[1] https://stackoverflow.com/questions/42243185/difference-between-printk-and-pr-info

[2] https://docs.oracle.com/cd/E26502\_01/html/E29001/remotehowtoaccess-14.html

Video Link:

https://youtu.be/UrYvnA32MI4

If it doesn’t work use this one:

https://www.youtube.com/watch?v=UrYvnA32MI4&feature=youtu.be