Name : Himal Basnet (1001659428), Sailesh Thapa (1001659442)

Professor Jia Rao

CSE 3320-002-Operating System

Project 4 – The /Proc File Systems and mmap

May 8, 2020

The purpose of the project was to practice writing Linux kernel modules to create a new device file and an entry in the proc file system.

In this project there were three objectives. They are as follows:

1. To write a helloworld Linux kernel module.
2. To create a new device in Linux
3. And to add a new entry in the proc file system

The following steps was applied to run the project:

1. A first three c files were made for three assignment which are new\_module1.c, final3\_my\_proc.c and myproc\_new.c and Makefile was created in following fashion.

A screenshot of a cell phone

Description automatically generated

1. After make is run. The executable files were created including ko files. In the attached picture below the module is inserted for first assignment into the Linux kernel. We can also verify it observing the list of modules.

A screenshot of a cell phone

Description automatically generated

1. We can see hello world is printed when dmesg was run. It proves module is loaded.

A picture containing food

Description automatically generated

1. Then the module has been removed and it doesn’t appear in the module list anymore.

A screenshot of a cell phone

Description automatically generated

1. And Goodbye, world is printed when dmesg is run after unload of module.

A picture containing food

Description automatically generated

1. Similarly module of second assignment was loaded.

A picture containing food

Description automatically generated

1. Cat and echo commands were used to verify and change the content of new entry.

A picture containing food

Description automatically generated

1. Following was printed when dmesg was run.

A picture containing screen, holding

Description automatically generated

1. Similarly the module for third assignment was loaded.

A close up of a piece of paper

Description automatically generated

1. We can see it is loaded successfully in dmesg.

A picture containing food

Description automatically generated

1. Finally test file was created in the user mode and run. It prints the data in the array of the kernel module. Mmap made it easier, don’t have to read and write which creates a heavy overhead.

A close up of a logo

Description automatically generated

1. Myproc\_new module is removed using rmmod command.

A screenshot of a cell phone

Description automatically generated

1. Following was observed in dmesg.

A screenshot of a cell phone

Description automatically generated

The wasn’t much problem working on this project only some had to learn how to load kernel modules because it was the first time. But we did learn a lot from this project. Now we know that kernel module is the way to install device drivers for hardware devices in OS. Life has been very easier that kernel modules can be loaded and unloaded without rebooting the kernel. It was fascinating to learn how mmap is used to address the space allocated in the kernel space to user space so, one doesn’t have to call system call.