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# Assignment 6 – Coding A device driver

### **Description**:

This assignment is to write a device driver that has the capability to encrypt and decrypt a s string passed into it. It reads and writes based in Linux file concepts. It also includes to write a sample application to test the driver.

#### Approach / What I Did:

- 1. After analyzing Professor Bierman's code for the Null Driver, I understood and added the code to initialize the driver for my driver.
- 2. First step was to write the open function, which allocates the kernel buffer using vmalloc. It allocates a space of 4096 bytes.
- 3. Then I initialize and allocate a private data structure that stores the key for encryption.
- 4. Next in the close function, I free up space for the kernelBuffer and private data structure.
- 5. Then I then checked this page <a href="https://www.unix.com/linux/127883-linux-device-driver-avoid-mem-copy-user-kernel-space.html">https://www.unix.com/linux/127883-linux-device-driver-avoid-mem-copy-user-kernel-space.html</a>, to understand copying at the kernel level.
- 6. Since I cannot used the c library function, I used copy\_to\_user to implement the myRead and myWrite functions.
- 7. MyRead copies from the kernelBuffer into the user passed buffer. It also has an offset that keeps track of how much of the kernel has been already read.
- 8. MyWrite copies from the userBuffer into the kernel buffer. It also has an offset that keeps track of how much of the kernel has been written to.
- 9. Then for the ioctl function I performed Caesar cipher encryption and decryption based on what command is passed to the function.
- 10. The cleanup module function was inspired by Professor Bierman.

#### **Issues and Resolutions:**

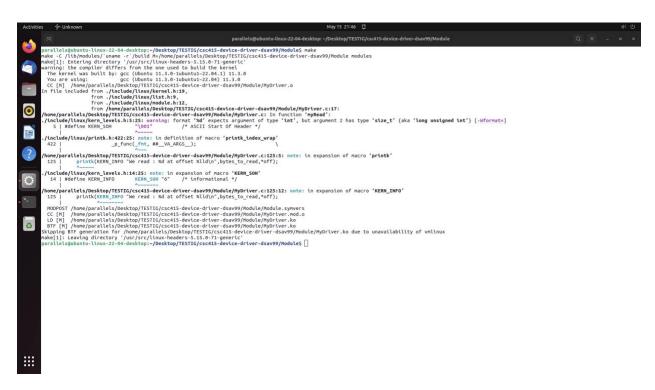
My first issue was the seg fault. I removed it by closely examining professor Biermans code and the reading more about device drivers.

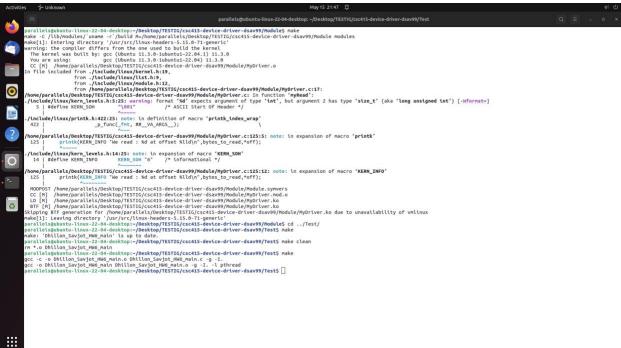
My second issue was the cyclicity of the cipher. I had to get the relative position of the alphabet from the first or last one in the series.

My last issue is even though I was able to complete the cipher, it did not work when I was committing, it was working perfectly fine.

Analysis: (If required for the assignment)

## Screen shot of compilation:





Screen shot(s) of the execution of the program:

Show all necessary screen shots (some assignments require more than one). These should be in the Linux Terminal window and not visual studio.

