

# Operating Systems

## Assignment 4

- Dewangee Agrawal (2016034)
- Suraj Prathik Kumar (2016101)

We compiled our linux kernel once and then created two modules :

### Encryption :

- We created the encryption device encdev using mknod. We made sure that the major number is not registered before hand.
- We then created the device driver encdev.c for the same.
- In the device we created 4 functions -
  - open() - Opens the device.
  - close() - Closes the device and deletes all temporary data structures.
  - read() - Reads the file till an EOF byte is obtained.
  - write() - The write function generates random keys and then encrypts the file input by the user and outputs it to the encrypted.txt file.
- The EOF byte used is 'A'.
- We use an encrypt() function to encrypt the file bytes ( 6 bytes at a time) through XOR with a random generated key.
- The init\_module and cleanup\_module functions are used to load and unload the module. This registers and unregisters the major number, class name and device name to ensure that the major number is not already taken.

### Decryption :

- We created the decryption device decdev using mknod. We made sure that the major number is not registered before hand.
- We then created the device driver decdev.c for the same.
- In the device we created 4 functions -
  - open() - Opens the device.

- close() - Closes the device and deletes all temporary data structures.
- read() - Reads the file till an EOF byte is obtained.
- write() - The write function decrypts the contents of the encrypted.txt file and writes it to the decrypted.txt file. The contents of this file are the same as the contents of the input.txt file.
- The EOF byte used is 'A'.
- We use an decrypt() function to decrypt the file bytes ( 6 bytes at a time) through XOR.
- The init\_module and cleanup\_module functions are used to load and unload the module. This registers and unregisters the major number, class name and device name to ensure that the major number is not already taken.

### **Input -**

The user inputs the filename and path of the input file to be encrypted and decrypted.

### **Output -**

We output the encrypted file as the output of the first device and the decrypted file as the output of the second device.

### **Errors :**

- File reading and writing error
- Major number not registered error
- Read / Write error