Overview:

Our implementation of the XCFS was strongly derived from the ecryptfs file system, with some portions coming from the wrapfs section. The only bug we found was that the writepage function was not being called, and therefor was not pushing the page cache back to disk, but we were unable to determine what was causing this bug. We tested this using a combination of mmap and msync in a custom c program.

Files:

The files included in this project are as follows:

- dentry.c – code related to the dentry structs and their related functions. This code was copied from wrapfs with minimal modifications.
- file.c – code related to file structs and their related functions. This code was copied from wrapfs with some changes to make its behavior closer to that of ecryptfs.
- inode.c – code related to inodes and their related functions. This code was copied from wrapfs with minimal modifications.
- lookup.c – code related to looking through directories. This code was copied from wrapfs with minimal modifications.
- main.c – initialization functions
- mmap.c – code revolving memory mapping. Most of this originated from ecryptfs and was modified to suit our purposes.
- super.c – code revolving superblocks. This was copied from wrapfs with minimal modifications.
- xcfs.h – header file with function declarations, global variables, and #defines

Testing:

First, insert the module and mount the filesystem.

```
root@KITT-QEMU:~# insmod xcfs.ko
root@KITT-QEMU:~# mount -t xcfs test test-xcfs/
root@KITT-QEMU:~# ls
123      a.out      test    testmmap.c  test-xcfs
123xcfs  hello.txt  test.c  test.sh     xcfs.ko
root@KITT-QEMU:~# ls test
normal-file
root@KITT-QEMU:~# ls test-xcfs/
normal-file
root@KITT-QEMU:~#
```

Now copy a test.c file over to the filesystem:

```
root@KITT-QEMU:~# cp test.c test-xcfs/
root@KITT-QEMU:~# cat test-xcfs/test.c
#include <stdio.h>

int main(int argc, char **argv) {
        printf("Hello world\n");
        return 0;
}
root@KITT-QEMU:~# cat test/test.c
$jodmvef!=tuejp/i?

                  jou!nbjo)jou!bshd-!dibs!++bshw*!|

qsjoug)#Ifmmp!xpsme]o#*<

sfuvso!1<
         ~
          root@KITT-QEMU:~#
```

Compile the program and run it:

```
root@KITT-QEMU:~/test-xcfs# gcc test.c
root@KITT-QEMU:~/test-xcfs# ./a.out
Hello world
root@KITT-QEMU:~/test-xcfs#
```