Project 4 File system

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Target

Source

- Inode.c/Makefile (kernel source of romfs)

- Test.img (a romfs image, you can mount it to a dir with 'mount –o loop test.img xxx)

- Say test.img is mounted in t, 'find t' output
  – aa
  – bb
  – ft
  – fo
  – fo/aa

Practice 1

- Change romfs code to hide a file/dir with special name
- Test & result
    ○ insmod romfs hided_file_name="aa"
    ○ Mount –o loop test.img t
    ○ then ls t, ls t/fo, no "aa" and "fo/aa". found
    ○ ls t/aa, or ls fo/aa, no found
    ○ Without the code change, above two operations can find file 'aa'

Practice 2

- change the code of romfs to correctly read info of an 'encrypted' romfs
- Test & result
  – insmod romfs hided_file_name="bb"
  – Mount –o loop test.img t
  – Say bb's original content is 'bbbbbbb'
  – With the change, cat t/bb output 'ccccccccc'

Practice 3

- change the code of romfs to add 'x' (execution) bit for a specific file
- Test & result
  - insmod romfs hided_file_name="bb"
  - Mount –o loop test.img t
  - Without code changes 'ls –l t', output is '-rw-r–r–'
  - With the change, output is '-rwxr-xr-x'

Modify romfs module

We need to modify the original module of romfs, which is written in `super.c`

1. Add accepted paras

```
//Add module parameters
static char *hided_file_name="null";
static char *encrypted_file_name="null";
static char *exec_file_name="null";
module_param(hided_file_name,charp,S_IRUGO);
module_param(encrypted_file_name,charp,S_IRUGO);
module_param(exec_file_name,charp,S_IRUGO);
```

2. Deal with hidden file

```
//*If the file name matches hided_file_name, skip it
if(strcmp(fsname, hided_file_name)==0){
    offset = nextfh & ROMFH_MASK;
    continue;
}
```

3. Deal with encrypted file

```
//Encryption. Replace all the character by *
if(strcmp(fname, encrypted_file_name)==0){
    for(i = 0; i < fillsize; i++)
        *((char *)buf + i) = '*';
}
```

Test

Generate image

```
genromfs -V "vromfs" -f test.img -d test
```

Create test script

```sh
#!/bin/sh
make
genromfs -V "vromfs" -f test.img -d img
sudo mount -o loop -t romfs test.img test

echo "[hidden file]"

select yn in "Yes" "No"; do
    case $yn in
        Yes ) break;;
        No ) exit;;
    esac
done

sudo umount test
sudo rmmod romfs
sudo insmod romfs.ko hided_file_name=aa
sudo mount -o loop -t romfs test.img test

echo "[Encrypt file]"

select yn in "Yes" "No"; do
    case $yn in
        Yes ) break;;
        No ) exit;;
    esac
done

sudo umount test
sudo rmmod romfs
sudo insmod romfs.ko encrypted_file_name=aa
sudo mount -o loop -t romfs test.img test

echo "[Add exec file]"

select yn in "Yes" "No"; do
    case $yn in
        Yes ) break;;
        No ) exit;;
    esac
done

sudo umount test
sudo rmmod romfs
sudo insmod romfs.ko exec_file_name=aa
sudo mount -o loop -t romfs test.img test
```

```
echo "[clean files]"

select yn in "Yes" "No"; do
    case $yn in
        Yes ) break;;
        No ) exit;;
    esac
done

sudo umount test
sudo rmmod romfs
make clean
rm test.img
```

```
$ sudo chmod +x test.sh
$ ./test.sh
```