Report homework 4
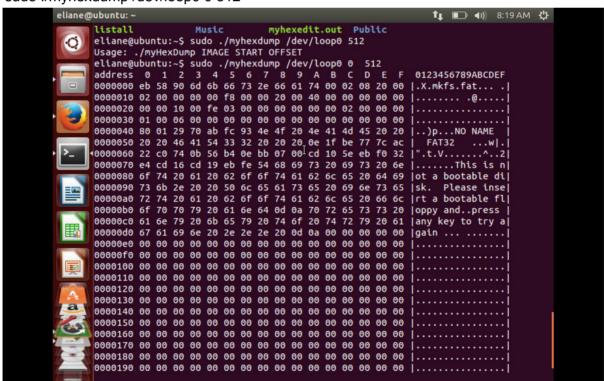
myhexdump:
for implementing hexdump ,
1) call system call   sync(); and system("echo 3 > /proc/sys/vm/drop_caches"); through
function that I have implemented.
2) call the myhexdumpfunctin with argument that the user enter /dev/loop0.
Iin this function I open the image
fd=open(img.c_str(), O_RDONLY | O_NONBLOCK);
and I read for from fd into buffer:
 read(fd, buffer, size);
        hexdump(buffer, start, end);
3) in the function hexdump we read from buffer and printed on the scream

```
for(unsigned int i=0;i<size;i+=0x10){
        printf("%07x", start);
        for(int j=0;j<16;j++)
        printf(" %02x", buf[i + j]);
        printf(" |");
        for(int j=0;j<16;j++)
        if(0x20 <= buf[i + j] && buf[i + j] <= 0x7E)
                printf("%c", (char)buf[i + j]);
        else
                printf(".");
        printf("|");
        start += 16;
        puts("");
        }
```

myhexedit:
1) I have used mysyncfunc(); to call system call, sync(); and system("echo 3 >
   /proc/sys/vm/drop_caches");
2) call myhexeditfunc(argv[1], buffer, start, size); with arguments that user enter
   to open the image file   open(img.c_str(), O_WRONLY | O_NONBLOCK); for write
and closed after writing

        3) call system call sync(); and system("echo 3 > /proc/sys/vm/drop_caches");
with mysyncfunc(); again

RECOVERY:
I read the cluster chain from the imag block
and recover the cluster chain
I first recover the
string lfn_filename = "";
        int fd = open(img.c_str(), O_RDWR);
        if(fd <= 0){

```
        perror("open failed");
        return -1;
        }
        if(myread_BS(fd) < 0){
        return -1;
        }
        if(myread_fat(fd) < 0){
        return -1;
        }
        myread_cluster_chain(fd, root_cluster_32, "./");
        for(auto dir_table: recovery_file){
        printf("waiting for recovery: %s %u %u\n", dir_table->filename,
myfirst_cluster(dir_table), dir_table->size_of_file);
        }
        myrecovery_cluster_chain(fd);
        close(fd);
```
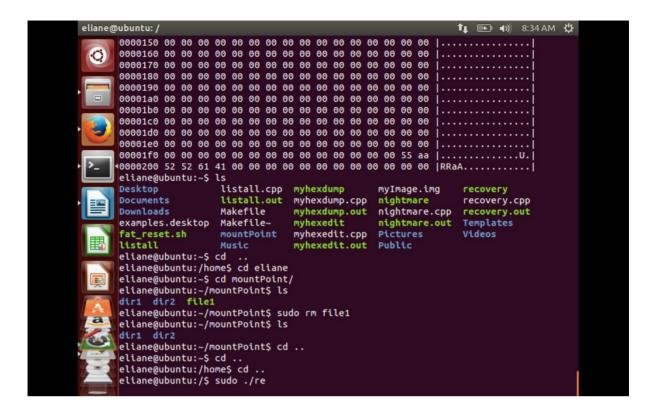
result after test:
 sudo ./myhexdump /dev/loop0 0 512

sudo ./myhexedit /dev/loop0 0 235 254 144

```
00001b0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
00001c0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
00001d0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
00001e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
00001f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 55 aa  |..............U.|
0000200  52 52 61 41 00 00 00 00 00 00 00 00 00 00 00 00  |RRaA............|
eliane@ubuntu:~$ sudo ./myhexedit /dev/loop0 0   235   254 144
eliane@ubuntu:~$ sudo ./myhexdump /dev/loop0 0   512
address  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F  0123456789ABCDEF
0000000  eb fe 90 6d 6b 66 73 2e 66 61 74 00 02 08 20 00  |...mkfs.fat... .|
0000010  02 00 00 00 00 f8 00 00 20 00 40 00 00 00 00 00  |........ .@.....|
0000020  00 00 10 00 fe 03 00 00 00 00 00 00 02 00 00 00  |................|
0000030  01 00 06 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000040  80 01 29 70 ab fc 93 4e 4f 20 4e 41 4d 45 20 20  |..)p...NO NAME  |
0000050  20 20 46 41 54 33 32 20 20 20 0e 1f be 77 7c ac  |  FAT32    ...w|.|
0000060  22 c0 74 0b 56 b4 0e bb 07 00 cd 10 5e eb f0 32  |".t.V.......^..2|
0000070  e4 cd 16 cd 19 eb fe 54 68 69 73 20 69 73 20 6e  |.......This is n|
0000080  6f 74 20 61 20 62 6f 6f 74 61 62 6c 65 20 64 69  |ot a bootable di|
0000090  73 6b 2e 20 20 50 6c 65 61 73 65 20 69 6e 73 65  |sk.  Please inse|
00000a0  72 74 20 61 20 62 6f 6f 74 61 62 6c 65 20 66 6c  |rt a bootable fl|
00000b0  6f 70 70 79 20 61 6e 64 0d 0a 70 72 65 73 73 20  |oppy and..press |
00000c0  61 6e 79 20 6b 65 79 20 74 6f 20 74 72 79 20 61  |any key to try a|
00000d0  67 61 69 6e 20 2e 2e 2e 20 0d 0a 00 00 00 00 00  |gain ... .......|
00000e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
00000f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000100  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000110  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000120  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000130  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000140  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
0000150  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  |................|
```

sudo ./listall /dev/loop0


```
eliane@ubuntu:~/mountPoint/dir1/dir1$ sudo touch file1
eliane@ubuntu:~/mountPoint/dir1/dir1$ sudo touch file2
eliane@ubuntu:~/mountPoint/dir1/dir1$ sudo touch longlonglonglonglonglonglonglong
longlonglonglonglonglonglong
eliane@ubuntu:~/mountPoint/dir1/dir1$ sudo touch longlonglonglonglonglonglonglong
longlonglonglonglonglongfile
eliane@ubuntu:~/mountPoint/dir1/dir1$ cd ..
eliane@ubuntu:~/mountPoint/dir1$ cd ..
eliane@ubuntu:~/mountPoint$ cd ..
eliane@ubuntu:~$ pwd
/home/eliane
eliane@ubuntu:~$ cp listall ../../
cp: cannot create regular file '../../listall': Permission denied
eliane@ubuntu:~$ sudo cp listall ../../
eliane@ubuntu:~$ cd ..
eliane@ubuntu:/home$ cd ..
eliane@ubuntu:/$ ls
bin     dev    initrd.img  listall      mnt    root  srv  usr
boot    etc    lib         lost+found   opt    run   sys  var
cdrom   home   lib64       media        proc   sbin  tmp  vmlinuz
eliane@ubuntu:/$ sudo ./listall /dev/loop0
./dir1/
./dir1/dir1/
./dir1/dir1/file1
./dir1/dir1/file2
./dir1/dir1/longlonglonglonglonglonglonglonglonglonglonglonglonglonglong
./dir1/dir1/longlonglonglonglonglonglonglonglonglonglonglonglonglonglongfile
./dir1/file1
./file1
./dir2/
eliane@ubuntu:/$ 
```

before recovery we have deleted file inside :

After recovery
sudo ./recovery /dev/loop0

```
fat_reset.sh        mountPoint      myhexedit.cpp    Pictures        Videos
listall             Music           myhexedit.out    Public
eliane@ubuntu:~$ sudo cp recovery ../../
eliane@ubuntu:~$ cd ..
eliane@ubuntu:/home$ cd ..
eliane@ubuntu:/$ ls
bin     dev     initrd.img   listall      mnt        proc      run    sys   var
boot    etc     lib          lost+found   nightmare  recovery  sbin   tmp   vmlinuz
cdrom   home    lib64        media        opt        root      srv    usr
eliane@ubuntu:/$ sudo ./recovery /dev/loop0
./dir1/
./dir1/dir1/
./dir1/dir1/file1
./dir1/dir1/file2
./dir1/dir1/longlonglonglonglonglonglonglonglonglonglonglonglonglonglong
./dir1/dir1/longlonglonglonglonglonglonglonglonglonglonglonglonglonglongfile
./dir1/file1
./file1
./dir2/
waiting for recovery: FILE1      0 0
waiting for recovery: FILE2      0 0
waiting for recovery: LONGLO~1   0 0
waiting for recovery: LONGLO~2   0 0
waiting for recovery: FILE1      0 0
waiting for recovery: FILE1      0 0
eliane@ubuntu:/$ cd home/
eliane@ubuntu:/home$ cd eliane
eliane@ubuntu:~$ cd mountPoint/
eliane@ubuntu:~/mountPoint$ ls
dir1  dir2  file1
eliane@ubuntu:~/mountPoint$
```