### 实验报告：

### 一、实验目的

在Linux下编写简单的字符设备驱动程序，并测试其在目标板的运行情况

### 二、实验器材与原料

210目标板、Linux系统笔记本电脑、串口连接线x2、台式机

### 三、实验原理

替换字符驱动程序实现输入数字回显

### 四、实验步骤

1、编写驱动程序源码

2、编译生成驱动程序

3、用insmod命令加载驱动程序

4、编写调用程序向设备文件写入

5、运行调用程序测试字符驱动程序

### 五、实验数据记录（或调试好的程序包括流程图）

//testDrv.c

#include <linux/module.h>

#include <linux/init.h>

#include <linux/fs.h>

#include <asm/uaccess.h>

#define DEV\_NAME "GlobalChar"

static ssize\_t GlobalRead(struct file \*, char \*, size\_t, loff\_t \*);

static ssize\_t GlobalWrite(struct file \*, const char \*, size\_t, loff\_t \* );

static int char\_major = 0;

static int GlobalData = 0;

struct file\_operations globalchar\_fops =

{

.read = GlobalRead,

.write = GlobalWrite

};

static int \_\_init GlobalChar\_init(void)

{

int ret;

ret = register\_chrdev(char\_major, DEV\_NAME, &globalchar\_fops);

if (ret < 0)

{

printk(KERN\_ALERT "GlobalChar Reg Fail!\n");

}

else

{

printk(KERN\_ALERT "GlobalChar Reg Success!\n");

char\_major = ret;

printk(KERN\_ALERT "Major = %d\n", char\_major);

}

return ret;

}

static void \_\_exit GlobalChar\_exit(void)

{

unregister\_chrdev(char\_major, DEV\_NAME);

return ;

}

static ssize\_t GlobalRead(struct file \*filp, char \*buf, size\_t len, loff\_t \*off)

{

if (copy\_to\_user(buf, &GlobalData, sizeof(int)))

{

return -EFAULT;

}

return sizeof(int);

}

static ssize\_t GlobalWrite(struct file \*filp, const char \*buf, size\_t len, loff\_t \*off)

{

if (copy\_from\_user(GlobalData, buf, sizeof(int)))

{

return -EFAULT;

}

return sizeof(int);

}

module\_init(GlobalChar\_init);

module\_exit(GlobalChar\_exit);

//testCall.c

#include <sys/types.h>

#include <sys/stat.h>

#include <stdio.h>

#include <fcntl.h>

#include <unistd.h>

#define DEV\_NAME "/dev/GlobalChar"

int main(void)

{

int fd, num;

fd = open(DEV\_NAME, O\_RDWR, S\_IRUSR | S\_IWUSR);

if (fd < 0)

{

printf("Open Device fail!\n");

return -1;

}

read(fd, &num, sizeof(int));

printf("The GlobalChar is %d\n", num);

printf("Please input a number written to GlobalChar:");

scanf("%d", &num);

write(fd, &num, sizeof(int));

read(fd, &num, sizeof(int));

printf("The GlobalChar is %d\n", num);

close(fd);

return 0;

}

### 六、结论

复现了课本上的字符设备驱动程序