专题3-LED驱动程序

led.h:

```
#define GPMCON        0x7f008820
#define GPMDAT        0x7f008824

unsigned int *led_config;
unsigned int *led_data;

#define LED_MAGIC    'l'
#define LED_ON        _IO(LED_MAGIC, 0)
#define LED_OFF       _IO(LED_MAGIC, 1)
```

led.c:

```
#include <linux/module.h>
#include <linux/init.h>
#include <linux/cdev.h>
#include <linux/fs.h>
#include <linux/io.h>
#include <linux/device.h>

#include "led.h"

struct cdev led_dev;
dev_t devno;

int led_open (struct inode * node, struct file *filp)
{
   led_config = ioremap(GPMCON,4);
   writel(0x00001111,led_config);

   led_data = ioremap(GPMDAT,4);
   return 0;
}

long led_ioctl (struct file *filp, unsigned int cmd, unsigned long arg)
{
   switch (cmd) {
      case LED_ON:
         writel(0xf0,led_data);
         return 0;

      case LED_OFF:
         writel(0xff,led_data);
         return 0;

      default:
         return -EINVAL;
   }
}

static struct file_operations led_fops =
{
   .open = led_open,
   .unlocked_ioctl = led_ioctl,
};

static int led_init(void)
{
   struct class *led_class;

   cdev_init(&led_dev, &led_fops);

   alloc_chrdev_region(&devno, 0, 1, "myled");
```

```
    cdev_add(&led_dev, devno, 1);

    led_class = class_create(THIS_MODULE, "led_class");
    device_create(led_class, NULL, devno, NULL,"myled");

    return 0;
}


static void led_exit(void)
{
    cdev_del(&led_dev);
    unregister_chrdev_region(devno, 1);
}

module_init(led_init);
module_exit(led_exit);

MODULE_AUTHOR("JOHNSON");
MODULE_LICENSE("Dual BSD/GPL");
```

led_app.c:

```
#include <stdio.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <sys/ioctl.h>
#include "led.h"

int main(int argc, char *argv[])
{
    int fd;
    int cmd;

    if (argc < 2) {
        printf("please enter the second parameter!\n");
        return 0;
    }

    cmd = atoi(argv[1]);

    fd = open("/dev/myled", O_RDWR);

    if (cmd == 1)
        ioctl(fd, LED_ON);
    else
        ioctl(fd, LED_OFF);

    return 0;
}
```

Makefile:

```
obj-m := led.o

KDIR := /home/S5-driver/lesson7/linux-ok6410

build: all led_app

all:
    make -C $(KDIR) M=$(PWD) modules CROSS_COMPILE=arm-linux- ARCH=arm

led_app:
    arm-linux-gcc -static -o led_app led_app.c

clean:
    rm -f *.order *.symvers *.mod.o *.o *.ko *.mod.c led_app
```