deadpool L52 2017-08-07 01:29:53 地址映射与共享

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“操作系统原理与实践”实验报告

地址映射与共享

我感觉本次实验的精华全部都在前面跟踪地址映射过程。实验文档写的很详细了，大家一定要跟着做一下。 本次跟上次的套路几乎一样。 刚好还要用到上次的信号量，辛亏我没有删除本地的。 先进行ubuntu本地测试。 producer.c

实验数据

学习时间 210分钟

操作时间 57分钟

按键次数 1143次

实验次数 5次

报告字数 6613字

是否完成 完成

评分

未评分

下一篇

篇

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```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <semaphore.h>
#include <sys/wait.h>
#include <sys/shm.h>
#include <sys/ipc.h>
#include <fcntl.h>

#define PRODUCE_NUM 800
#define BUFF_SIZE 10
#define SHM_KEY 12345

void die(const char *p)
{
    puts(p);
    exit(1);
}

void producer(sem_t * Empty, sem_t * Full,sem_t * Mutex, int shm_id)
{
    int *p;
    int i,location=0;
    if((p = (int * )shmat(shm_id, NULL, 0)) == -1)
        die("link error!");
    for(i=0; i<PRODUCE_NUM; i++)
    {
        sem_wait(Empty);
        sem_wait(Mutex);
        p[location] = i;
        sem_post(Full);
        sem_post(Mutex);
        location  = (location+1)%10;
    }
    if(shmdt(p) == -1)
        die("reless shm error");
    return;
}



int main(int argn, char* argc[])
{
    sem_t *semEmpty,*semFull,*semMutex;
    int i;
    int shm_id;

    sem_unlink("Mutex");
    sem_unlink("Full");
    sem_unlink("Empty");

    semEmpty = sem_open("Empty",O_CREAT|O_EXCL,0600,BUFF_SIZE);
    semFull = sem_open("Full", O_CREAT|O_EXCL,0600, 0);
    semMutex = sem_open("Mutex",O_CREAT|O_EXCL,0600, 1);


    if((shm_id = shmget(SHM_KEY, BUFF_SIZE*sizeof(int), IPC_CREAT|0666)) == -1)
        die("shmget failed!");
    printf("create a shared memory segment sucessfully:%d\n",shm_id);
    producer(semEmpty,semFull, semMutex, shm_id);
    return 0;
}
```

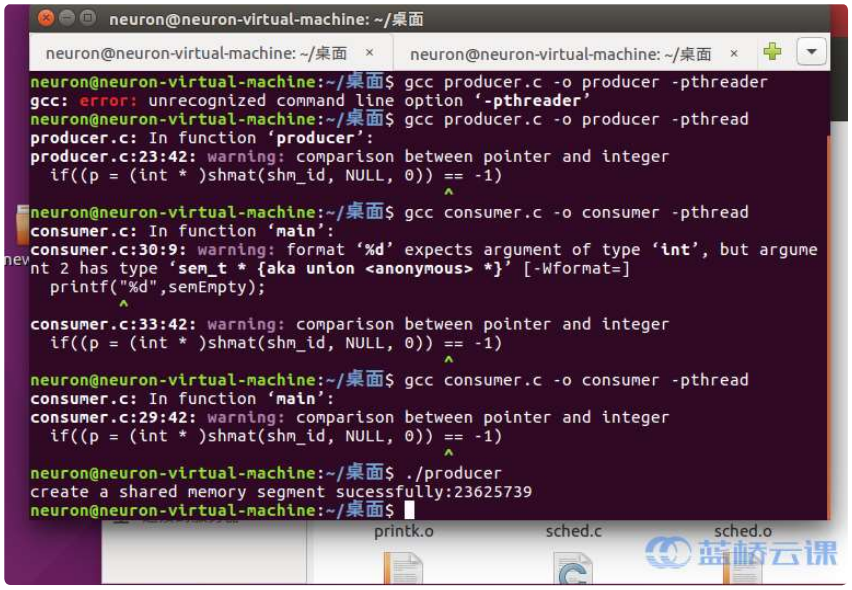
consumer.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <semaphore.h>
#include <sys/wait.h>
#include <sys/shm.h>
#include <sys/ipc.h>
#include <fcntl.h>

#define PRODUCE_NUM 800
#define BUFF_SIZE 10
#define SHM_KEY 12345

void die(const char *p)
{
    puts(p);
    exit(1);
}

int main(int argn, char* argc[])
{
    sem_t *semEmpty,*semFull,*semMutex;
    int shm_id,location = 0, pid;
    int *p,i;
    semEmpty = sem_open("Empty",0,0600,BUFF_SIZE);
    semFull = sem_open("Full", 0,0600, 0);
    semMutex = sem_open("Mutex",0,0600, 1);
    if((shm_id = shmget(SHM_KEY, BUFF_SIZE*sizeof(int), IPC_CREAT|0666)) == -1)
        die("shmget failed!");
    printf("%d",shm_id);
    if((p = (int * )shmat(shm_id, NULL, 0)) == -1)
        die("link error!");
    for(i=0; i<PRODUCE_NUM; i++)
    {
        sem_wait(semFull);
        sem_wait(semMutex);
        printf("%d:%d\n", pid, p[location]);
        sem_post(semEmpty);
        sem_post(semMutex);
        location  = (location+1)%10;
    }
    if(shmdt(p) == -1)
        die("reless shm error");
    if(shmctl(shm_id,IPC_RMID,NULL) == -1)
        die("remove shm error");
    printf("close succeed\n");
    sem_unlink("Mutex");
    sem_unlink("Full");
    sem_unlink("Empty");
    return 0;
}
```



图片中./consumer有数字不用加这是我测试截的图 然后是系统调用 shm.h

```
#define __LIBRARY__
#include <unistd.h>
#include <linux/kernel.h>
#include <linux/sched.h>
#include <linux/mm.h>
#include <errno.h>

#define SHM_SIZE 20

typedef struct
{
    unsigned int key;
    unsigned int size;
    unsigned long page;
}shm_ds;

_syscall1(int, shmat, int, shmid);
_syscall2(int, shmget, unsigned int, key, size_t, size);
```

shm.c

```c
#include <shm.h>

static shm_ds shm_ds_list[SHM_SIZE] = {0};

int sys_shmget(unsigned int key, size_t size)
{
    int i;
    void *page;
    if(size > PAGE_SIZE)
        return -EINVAL;
    page = get_free_page();
    if(!page)
        return -ENOMEM;
    for(i=0; i<SHM_SIZE; i++)
    {
        if(shm_ds_list[i].key == key)
            return i;
    }
    for(i=0; i<SHM_SIZE; i++)
    {
        if(shm_ds_list[i].key == 0)
        {
        shm_ds_list[i].page = page;
            shm_ds_list[i].key = key;
            shm_ds_list[i].size = size;
            return i;
        }
    }
    return -1;
}

void *sys_shmat(int shmid)
{
    int i;
    void * loc;
    if(0 < shmid || SHM_SIZE <= shmid)
        return -EINVAL;
    loc = current->brk + get_base(current->ldt[1]);
    current->brk += PAGE_SIZE;
    for(i=0; i<SHM_SIZE; i++)
    {
        if(shm_ds_list[shmid].key != 0)
        {
            put_page(shm_ds_list[shmid].page,loc);
            return current->brk - PAGE_SIZE;
        }
    }
    return -1;
}
```

我只按照老师的标准做了两个，没有做释放和删除的函数。你可以加上，也不复杂。其实这最麻烦的地方我觉得在于put_page，但是可以直接点用，想来直接写也是可以的。 下面修改相应的producer.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <semaphore.h>
#include <sys/wait.h>
#include <sys/shm.h>
#include <fcntl.h>

#define PRODUCE_NUM 800
#define BUFF_SIZE 10
#define SHM_KEY 12345

void die(const char *p)
{
    puts(p);
    exit(1);
}

void producer(sem_t * Empty, sem_t * Full,sem_t * Mutex, int shm_id)
{
    int *p;
    int i,location=0;
    if((p = (int * )shmat(shm_id)) == -1)
        die("link error!");
    for(i=0; i<PRODUCE_NUM; i++)
    {
        sem_wait(Empty);
        sem_wait(Mutex);
        p[location] = i;
        sem_post(Full);
        sem_post(Mutex);
        location  = (location+1)%10;
    }
    /*if(shmdt(p) == -1)
        die("reless shm error");
    */
    return;
}



int main(int argn, char* argc[])
{
    sem_t *semEmpty,*semFull,*semMutex;
    int i;
    int shm_id;

    sem_unlink("Mutex");
    sem_unlink("Full");
    sem_unlink("Empty");

    semEmpty = sem_open("Empty",BUFF_SIZE);
    semFull = sem_open("Full", 0);
    semMutex = sem_open("Mutex",1);


    if((shm_id = shmget(SHM_KEY, BUFF_SIZE*sizeof(int))) == -1)
        die("shmget failed!");
    printf("create a shared memory segment sucessfully:%d\n",shm_id);
    producer(semEmpty,semFull, semMutex, shm_id);
    return 0;
}
```

consumer.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <semaphore.h>
#include <sys/wait.h>
#include <sys/shm.h>
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void die(const char *p)
{
    puts(p);
    exit(1);
}

int main(int argn, char* argc[])
{
    sem_t *semEmpty,*semFull,*semMutex;
    int shm_id,location = 0, pid;
    int *p,i;
    semEmpty = sem_open("Empty",BUFF_SIZE);
    semFull = sem_open("Full", 0);
    semMutex = sem_open("Mutex",1);
    if((shm_id = shmget(SHM_KEY, BUFF_SIZE*sizeof(int))) == -1)
        die("shmget failed!");
    if((p = (int * )shmat(shm_id)) == -1)
        die("link error!");
    for(i=0; i<PRODUCE_NUM; i++)
    {
        sem_wait(semFull);
        sem_wait(semMutex);
        printf("%d:%d\n", pid, p[location]);
        sem_post(semEmpty);
        sem_post(semMutex);
        location  = (location+1)%10;
    }
    /*if(shmdt(p) == -1)
        die("reless shm error");
    if(shmctl(shm_id,IPC_RMID,NULL) == -1)
        die("remove shm error");
    */
    printf("close succeed\n");
    sem_unlink("Mutex");
    sem_unlink("Full");
    sem_unlink("Empty");
    return 0;
}
```
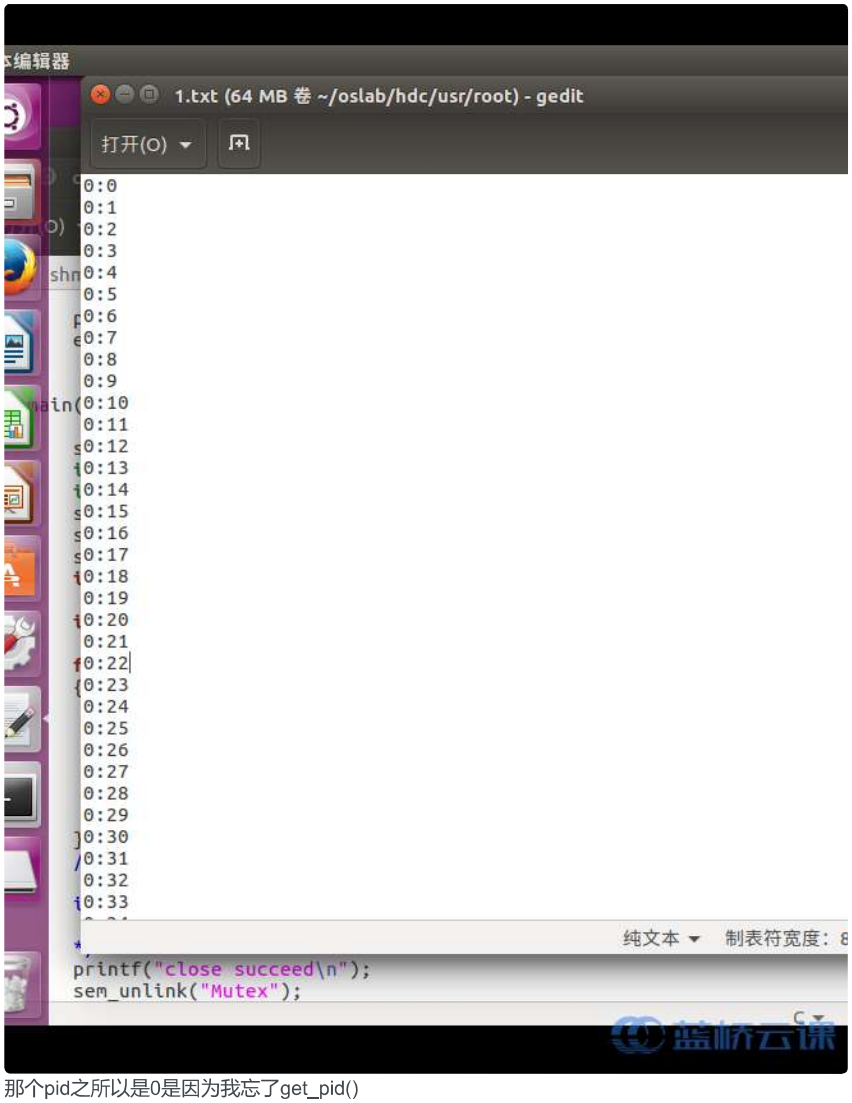

运行结果



那个pid之所以是0是因为我忘了get_pid()

看得出来代码的结构有些不合理。我是直接修改上一次实验用过的。 实验之后发现的问题比解决的要多得多。绝知此事要躬行。

哎刚交的女朋友没俩星期就分手了。好伤心。完全没心情学习。程序员找个女盆友好难啊。

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Markdown 语法

请输入想说的话

0 / 2000

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