操作系统LAB4

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功能实现

1. 系统调用输出

使用系统调用printf作输出。在vsprintf里添加了对%c的解析,可以实现printf("%c Is Reading", name)的输出

```
case 'c':
// 解析一个char字符
   *p++ = *((char *)p_next_arg);
   p_next_arg += 4;
   break;
```

2. sleep

给每个PROCESS进程添加一个blocked和sleep_ticks属性,如果进程在睡眠就不会被调度

```
PUBLIC int sys_sleep(int milli_seconds) {
    // 设置进程睡眠
    p_proc_ready->sleep_ticks = milli_seconds;
    schedule();
    return 0;
}
```

3. PV信号量

为系统增加PV信号量

```
PUBLIC int sys_P_process(SEMAPHORE* s) {
   disable_int();
   s->value--;
   if (s->value < 0) {
       p_proc_ready->blocked = True;
       s->process_list[s->tail] = p_proc_ready;
       s->tail = (s->tail + 1) % PROCESS_LIST_SIZE;
       schedule();
   enable_int();
}
PUBLIC int sys_V_process(SEMAPHORE* s) {
   disable_int();
   s->value++;
   if (s->value <= 0) {
       // 释放队列头的进程
       PROCESS* proc = s->process_list[s->head];
       proc->blocked = False;
       // 队列数组移动
```

```
s->head = (s->head + 1) % PROCESS_LIST_SIZE;
}
enable_int();
}
```

4. 修改系统栈

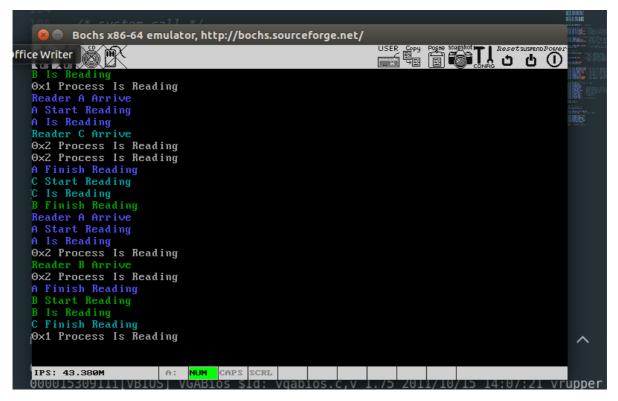
由于所有的输出都在tty0里,所以在sys_call里去掉了p_proc_ready参数的压栈

```
sys_call:
        call
                save
    ; push dword [p_proc_ready]
        sti
    push
            ecx
    push
            ebx
    call
            [sys\_call\_table + eax * 4]
    add esp, 4 * 2
                [esi + EAXREG - P_STACKBASE], eax
        mov
        c1i
        ret
```

实验结果

通过修改const.h中,READER_SAME_TIME,READER_FIRST,FAIR_READ的属性,来选择同时可以读的用户数量,读优先、写优先、读写公平的方式。

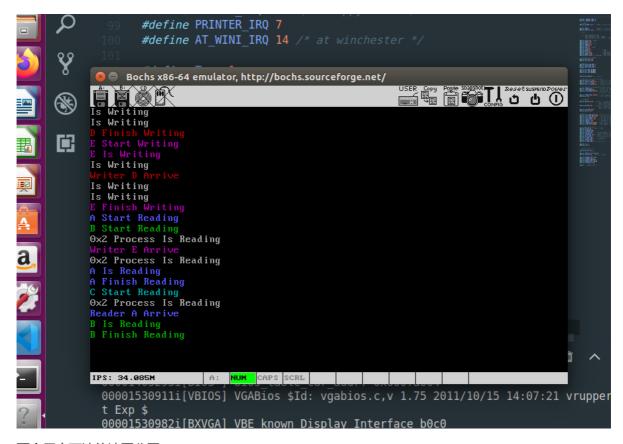
1. 读优先



两个用户可读的读优先

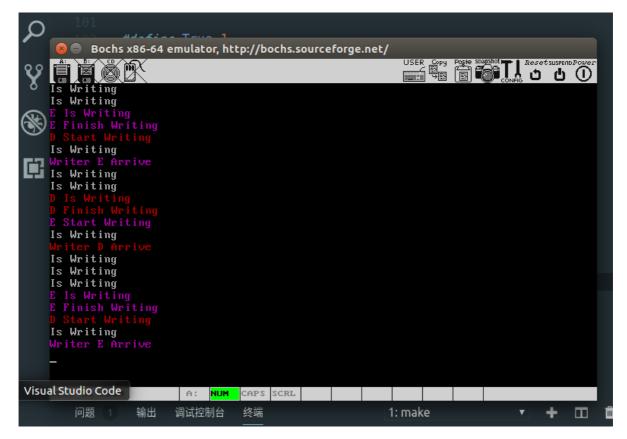
```
Bochs x86-64 emulator, http://bochs.sourceforge.net/
USER Copy Poste Supplied T Resetsuspend Power
     Reader A Arrive
A Start Reading
     Reader B Arrive
     Reader C Arrive
0×1 Process Is Reading
buntu Software ss Is Reading
Reading
     B Is Reading
     0×1 Process Is Reading
     Reader A Arrive
     0x1 Process Is Reading
0x1 Process Is Reading
     C Start Reading
       Is Reading
     0x1 Process Is Reading
     IPS: 29.134M
                             A: NUM CAPS SCRL
        t Exp $
```

2. 读写公平



两个用户可读的读写公平

3. 写优先



两个用户可读的写优先

修改过的文件

文件夹	文件
include	console.h global.h proc.h proto.h
kernel	console.c global.c main.c proc.c vsprint.c kernel.asm syscall.asm