

操作系统实验 2

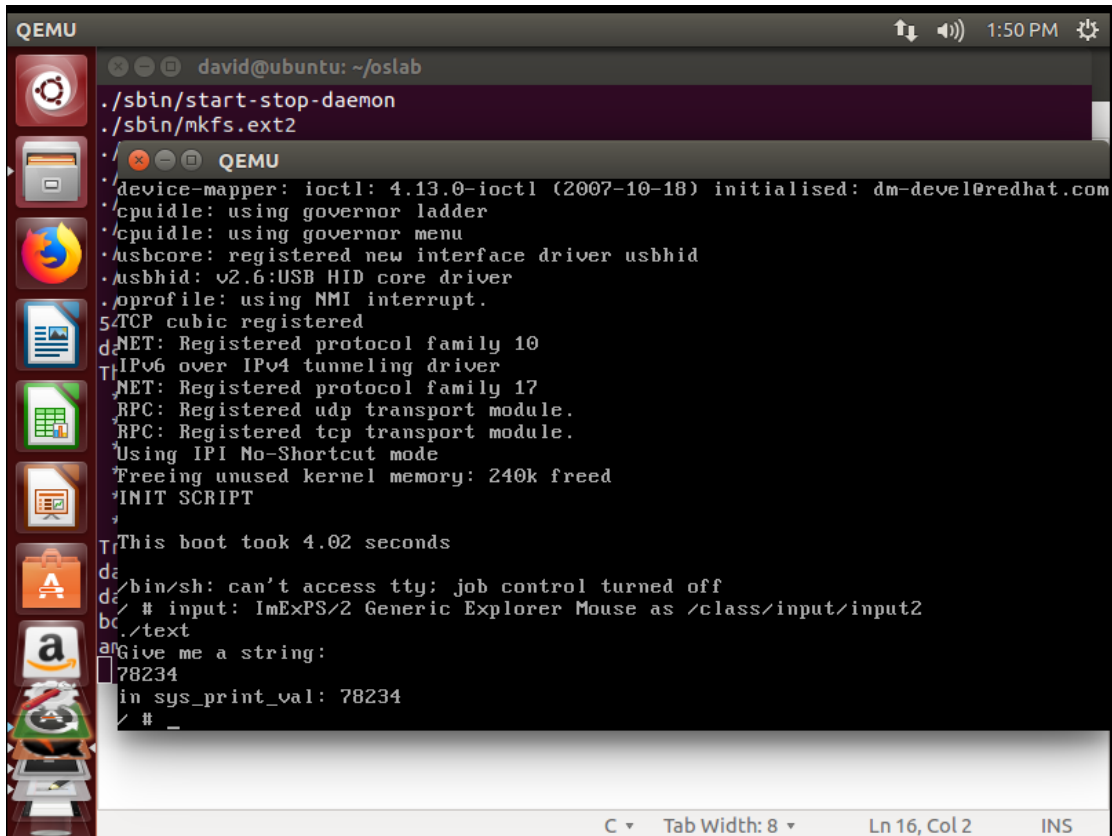
添加 Linux 系统调用及熟悉常见系统调用

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1. 主要步骤

- (1) 添加 Linux 系统调用，添加 `print_val` 和 `str2num` 这两个系统调用，分别执行打印一个整数和将一个字符串转换成一个十进制整数的操作。在修改了调用头文件后，在 `sys.c` 文件中实现函数，并写一个测试程序来在 shell 中执行
- (2) 写一个 shell 程序并调用 `system popen` 系统调用

2. 运行结果截图



```
QEMU
david@ubuntu: ~/oslab
./sbin/start-stop-daemon
./sbin/mkfs.ext2
QEMU
device-mapper: ioctl: 4.13.0-ioctl (2007-10-18) initialised: dm-devel@redhat.com
cpuidle: using governor ladder
cpuidle: using governor menu
usbcore: registered new interface driver usbhid
usbhid: v2.6:USB HID core driver
oprofile: using NMI interrupt.
TCP cubic registered
NET: Registered protocol family 10
IPv6 over IPv4 tunneling driver
NET: Registered protocol family 17
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
Using IPI No-Shortcut mode
Freeing unused kernel memory: 240k freed
INIT SCRIPT
This boot took 4.02 seconds
/bin/sh: can't access tty: job control turned off
# input: ImExPS/2 Generic Explorer Mouse as /class/input/input2
./text
Give me a string:
78234
in sys_print_val: 78234
# _
```

字符串转整数(1)

```
david@ubuntu: ~/oslab
./sbin/tunctl
./sbin/fstrim
./
QEMU
device-mapper: ioctl: 4.13.0-ioctl (2007-10-18) initialised: dm-devel@redhat.com
cpuidle: using governor ladder
cpuidle: using governor menu
usbcore: registered new interface driver usbhid
usbhid: v2.6:USB HID core driver
Tlprofile: using NMI interrupt.
TCP cubic registered
NET: Registered protocol family 10
IPv6 over IPv4 tunneling driver
NET: Registered protocol family 17
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
Using IPI No-Shortcut mode
Freeing unused kernel memory: 240k freed
INIT SCRIPT
This boot took 4.02 seconds
/bin/sh: can't access tty; job control turned off
# input: ImExPS/2 Generic Explorer Mouse as /class/input/input2
./test
Give me a string:
jas45
in sys_print_val: 635745
#
```

字符串转整数(2)

```
QEMU
NET: Registered protocol family 17
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
Using IPI No-Shortcut mode
Freeing unused kernel memory: 240k freed
INIT SCRIPT
This boot took 4.21 seconds
/bin/sh: can't access tty; job control turned off
# .input: ImExPS/2 Generic Explorer Mouse as /class/input/input2
./test
OSLab2->touch 1.txt
OSLab2->echo asdfdwdf >1.txt
OSLab2->cat 1.txt
asdfdwdf
OSLab2->echo abcd;date;uname -r
abcd
Mon Apr 29 14:39:20 UTC 2019
2.6.26
OSLab2->cat 1.txt ; asd
sh: asd: not found
OSLab2->cat 1.txt ; grep asd
asdfdwdf
OSLab2->
```

Shell 中实现进程和管程的系统调用

3. 实验过程中遇到的技术问题和解决方法

在读取字符串时, 由于 `scanf("%s", cmdline)` 无法读取空格, 于是对此进行了修改, 改做 `scanf("%[^\n]", cmdline)`, 当读到回车时停止, 成功将一行输入字符串都读了进去。

在指令分离时, 由于久疏 C 语言代码, 产生了一些语法上的 bug, 更改了很久才解

决。

4. 实验总结

本次试验作为第二次操作系统实验，对系统调用进行了一些较深层次的理解与探索。理清了管程的实现机制，同时回顾了 C 语言的语法，对用户空间和内核空间的函数区别有了一定的了解。