

CS 134:
Operating Systems
More Synchronization

2013-05-19 CS34

CS 134:
Operating Systems
More Synchronization

Homework Discussion

Questions About Unix

We should have talked about this last Thursday:

1. What does `getpid` do?
2. What does `stime` do?
3. What is interesting about `readdir`?
4. How many system calls does Linux have?
5. What did you run `strace` on, and what did you learn?

2013-05-19

CS34

└─ Homework Discussion

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2013-05-19
CS34
└─ Homework Discussion
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2013-05-19

CS34

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“This is not the function you are interested in.”
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2013-05-19

CS34

└ Homework Discussion

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... nor is `getdents`.
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2013-05-19

CS34

└ Homework Discussion

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About 440.
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2013-05-19

CS34

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About 440.
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Written Answers (1)

1. The kernel for this assignment is configured to use a particular VM system. What is this VM system called?
2. Which register number is used for the stack pointer (sp) in OS/161?
3. What bus/busses does OS/161 support?

2013-05-19

CS34

└ Homework Discussion

└ Written Answers (1)

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Written Answers (1)

1. The kernel for this assignment is configured to use a particular VM system. What is this VM system called?
dumbvm *from* kern/arch/mips/conf/conf.arch
2. Which register number is used for the stack pointer (*sp*) in OS/161?
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2013-05-19

CS34

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1. The kernel for this assignment is configured to use a particular VM system. What is this VM system called?

```
dumbvm      from kern/arch/mips/conf/conf.arch
```

2. Which register number is used for the stack pointer (sp) in OS/161?

```
#define sp $29 /* stack pointer */
      from kern/arch/mips/include/asmdefs.h
```

3. What bus/busses does OS/161 support?

2013-05-19

CS34

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dumbvm from kern/arch/mips/conf/conf.arch
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#define sp \$29 /* stack pointer */
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```
LAMEbus     from kern/arch/mips/include/bus.h
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2013-05-19

CS34

Homework Discussion

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LAMEbus from kern/arch/mips/include/bus.h

Written Answers (2)

4. What is the difference between `splhigh` and `sp10`?
5. Why do we use typedefs like `u_int32_t` instead of simply saying `int`?
6. What must be the first thing in the process control block?

2013-05-19

CS34

└ Homework Discussion

└ Written Answers (2)

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4. What is the difference between `sp10_t` and `sp10`?
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Written Answers (2)

4. What is the difference between `splhigh` and `spl0`?

`splhigh()` sets `spl` to the highest value, disabling all interrupts

`spl0()` sets `spl` to 0, enabling all interrupts

from `kern/arch/mips/include/spl.h`

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2013-05-19

CS34

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5. Why do we use typedefs like `u_int32_t` instead of simply saying `int`?

To make sure that we really get a 32-bit unsigned integer (unsigned `int` depends on the platform)

related to `kern/arch/mips/include/types.h`

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2013-05-19

CS34

Homework Discussion

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“Note that `pcb_switchstack` MUST BE THE FIRST THING IN THE PCB or `switch.S` will have a coronary.”

from `kern/arch/mips/include/pcb.h`

2013-05-19

CS34

Homework Discussion

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4. What is the difference between `sp10high` and `sp10`?
`sp10high()` sets `sp10` to the highest value, disabling all interrupts
`sp10()` sets `sp10` to 0, enabling all interrupts
from `kern/arch/mips/include/sp10.h`
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 To make sure that we really get a 32-bit unsigned integer (unsigned `int` depends on the platform)
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 “Note that `pcb_switchstack` MUST BE THE FIRST THING IN THE PCB or `switch.S` will have a coronary”
from `kern/arch/mips/include/pcb.h`

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7. What does `sp1x` return?
8. What is the highest interrupt level?
9. What function is called when user-level code generates a fatal fault?
10. How frequently are “hardclock” interrupts generated?

2013-05-19

CS34

└ Homework Discussion

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The old interrupt state

from `kern/arch/mips/mips/spl.c`

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2013-05-19

CS34

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```
#define SPL_HIGH 15
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2013-05-19

CS34

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`kill_curthread` *from* `kern/arch/mips/mips/trap.c`

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2013-05-19

CS34

└ Homework Discussion

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```
#define HZ 100
```

i.e., 100 times a second `from kern/include/clock.h`

2013-05-19

CS34

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12. How many characters are allowed in an SFS volume name?
13. What is the standard interface to a file system (i.e., what functions must you implement to implement a new file system)?

2013-05-19

CS34

└ Homework Discussion

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`d_open, d_close, d_io, d_ioctl`

from `kern/include/dev.h`

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2013-05-19

CS34

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`#define SFS_VOLNAME_SIZE 32 /* max length of
volume name */` *from* `kern/include/kern/sfs.h`

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2013-05-19

CS34

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13. What is the standard interface to a file system (i.e., what functions must you implement to implement a new file system)?

```
fs_sync, fs_getvolname, fs_getroot, fs_umount
from kern/include/fs.h
```

2013-05-19

CS34

Homework Discussion

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fs_sync, fs_getvolname, fs_getroot, fs_umount
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Written Answers (5)

14. What function puts a thread to sleep?
15. How large are OS/161 pids?
16. What operations can you perform on a `vnode`?

2013-05-19

CS34
└─ Homework Discussion

└─ Written Answers (5)

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Written Answers (5)

14. What function puts a thread to sleep?

```
void thread_sleep(const void *addr);  
    from kern/include/thread.h
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2013-05-19

CS34

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    from kern/include/thread.h
```

15. How large are OS/161 pids?

```
typedef int32_t pid_t; /* Process ID */
    32 bits / 4 bytes    from kern/include/kern/types.h
```

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2013-05-19

CS34

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16. What operations can you perform on a vnode?

```
open, close, reclaim, read, readlink, getdirentry,
write, ioctl, stat, gettype, tryseek, fsync, mmap,
truncate, namefile, creat, symlink, mkdir, link,
remove, rmdir, rename, lookup, lookparent
    from kern/include/vnode.h
```

2013-05-19

CS34

Homework Discussion

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Written Answers (6)

17. What is the maximum path length in OS/161?
18. What is the system call number for a reboot?
19. Where is `STDIN_FILENO` defined?

2013-05-19

CS34

└ Homework Discussion

└ Written Answers (6)

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Written Answers (6)

17. What is the maximum path length in OS/161?

```
/* Longest full path name */  
#define PATH_MAX 1024  
    from kern/include/kern/limits.h
```

18. What is the system call number for a reboot?

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2013-05-19

CS34

└ Homework Discussion

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#define SYS_reboot 8 /* Reboot system */
    from kern/include/kern/callno.h
(c.f., RB_REBOOT in kern/include/kern/unistd.h)
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2013-05-19

CS34

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```
#define STDIN_FILENO 0 /* Standard input */
    from kern/include/kern/unistd.h
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2013-05-19

CS34

Homework Discussion

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2013-05-19

CS34

└ Homework Discussion

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2013-05-19

CS34

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2013-05-19

CS34

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2013-05-19

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2013-05-19

CS34

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26. What does a raw device name in OS/161 look like?
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2013-05-19

CS34

└ Homework Discussion

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2013-05-19

CS34

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CS34

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CS34

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CS34

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2013-05-19

CS34

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