CSE3211: Operating System Assignment 0

Sakib Hasan
Roll : 149

Afia Anjum
Roll: 09

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1 Introduction

Question 1 . What is the vm system called that is configured for assignment 0?
Answer: dumbvm

Question 2 . Which register number is used for the stack pointer (sp) in OS/161?
Answer: 29

Question 3 . What bus/busses does OS/161 support?
Answer: The only bus supported is LAMEbus

Question 4 . What is the difference between splhigh and spl0?
Answer: spl0() sets priority level to 0, enabling all interrupts. splhigh() sets prority to the highest value, disabling all interrupts.

Question 5 . Why do we use typedefs like u_int32_t instead of simply saying "int"?
Answer: we use u_int32_t to get a 32-bit unsigned integer . Unsigned int is platform dependent, so it is not declared "int".

Question 6 . What must be the first thing in the process control block?
Answer:

Question 7 . What does splx return?
Answer: splx returns old spl level

Question 8 . What is the highest interrupt level?
Answer: Highest interrupt level is 1

Question 9 . What function is called when user-level code generates a fatal fault?
Answer: kill_curthread() is called which is a static function defined in kern/arch/mips/locore/trap.c

Question 10 . How frequently are hardclock interrupts generated?
Answer: 100 hardclocks are generated per second. It is defined as HZ in kern/include/clock.h

Question 11 . What functions comprise the standard interface to a VFS device?
Answer: devop_eachopen, devop_io, devop_ioctl defined in kern/include/device.h

Question 12 . How many characters are allowed in a volume name?
Answer: 32 characters. It is defined as SFS_VOLNAME_SIZE in kern/include/kern/sfs.h

Question 13 . How many direct blocks does an SFS file have?
Answer: 15. It is defined as SFS_NDIRECT in kern/include/kern/sfs.h

Question 14 . What is the standard interface to a file system i. e., what functions must you implement to implement a new file system)?
Answer: The functions are - 1. fsop_sync - flush all dirty buffers to disk, 2. fsop_getvolname - return volume name of filesystem, 3. fsop_getroot - return root vnode of filesystem and 4. fsop_unmount - attempt unmount of filesystem

Question 15 . What function puts a thread to sleep?
Answer: The static fuction thread_switch(threadstate_t newstate, struct wchan *wc, struct spinlock *lk) puts a thread to sleep when called with newstate parameter equal to S_SLEEP, this function also calls wchan_sleep function. defined in kern/thread/thread.c

Question 16 . How large are OS/161 pids?
Answer: 32 bits, defined as __pid_t in kern/include/kern/types.h

Question 17 . What operations can you do on a vnode?
Answer: The operations are eachopen, reclaim, read, readlink, getdirentry, write, ioctl, stat, gettype, fsync, mmap, truncate, namefile, create, symlink, mkdir, link, remove, rmdir, rename, lookup, lookparent.

Question 18 . What is the maximum path length in OS/161?
Answer: 1024 bytes. It is defined in kern/include/kern/limits.h

Question 19 . What is the system call number for a reboot?
Answer: System call number is 119, defined as SYS_reboot in /kern/include/kern/syscall.h

Question 20 . Where is STDIN_ FILENO defined?
Answer: kern/include/kern/unistd.h

Question 21 . What does kmain() do?
Answer: kmain() functions purpose is- 1. boot up , 2. fork the menu thread, 3. wait for a reboot request and finally 4.shut down. As part of the assignment, complex_hello function call is placed inside this function.

Question 22 . Is it OK to initialize the thread system before the scheduler? Why (not)?
Answer: Yes . Scheduler creates current CPU's run queue by job priority so initializing thread system before the scheduler is all right.

Question 23 . What is a zombie?
Answer: Threads that have exited but still need to have thread_destroy called on them for cleanup are referred to as 'zombie'.

Question 24 . How large is the initial run queue?
Answer: runqueue = q_create(32) – from kern/thread/scheduler.c

Question 25 . What does a device name in OS/161 look like?
Answer: The name of a device is always just "device:". The VFS layer puts in the device name for us. Found in /kern/vfs/device.c, line 281

Question 26 . What does a raw device name in OS/161 look like?
Answer: Raw device name have "raw" concatenated after the name (eg, "lhd0raw")

Question 27 . What lock protects the vnode reference count?
Answer: vn_countlock.

Question 28 . What device types are currently supported?
Answer: Block devices and character devices.

2 conclusion

Some of the files are not available in the given os161 source code, so we have not been able to find answers to question 6 and 24.