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Question: 1. Which register number is used for the stack pointer (sp) in OS/161 and in which file did you find this information?

Register $29 is the stack pointer (sp)
Found in kern/arch/mips/include/kern/regdefs.h

Question: 2. What bus/busses does OS/161 support?

The only bus on System/161 is LAMEbus.
Found in kern/arc/sys161/include/bus.h

Question: 3. What is the maximum number of CPUs that can be configured in SYS/161?

For System/161, the limit is 32.
Found in kern/arch/sys161/include/maxcpus.h

Question: 4. How many times per second is the kernel's hardclock() function invoked when executing a kernel compiled for ASST1? Hint: You may need some information from some of the files in kern/compile/ASST1 and kern/conf.

It runs at 10000 hardclocks per second. In the the file
kern/compile/ASST1/opt-synchprobs.h OPT_SYNCHPROBS is set to true or 1.
Found in /kern/include/clock.h

Question: 5. How many times per second is the kernel's hardclock() function invoked when executing a kernel compiled for assignments other than ASST1?

It runs at 100 hardclocks per second.
Found in /kern/include/clock.h

Question: 6. Explain how you can control whether or not OS/161 debugging statements are printed. When referring to files give the path name starting with kern.

You can use DEBUG() defined in kern/include/lib.h for conditionally printing debug messages to the console. You can toggle whether these messages are printed or not at runtime by setting the value of dbflags with the debugger which can be found in kern/lib/kprintf.c

Question: 7. Explain how you would add the ability to add and control your own new set of debugging statements (using DB_CATMOUSE).

We need to define a new debug bit flag for DEBUG() called DB_CATMOUSE and then we can pass this into the DEBUG function call
#define DB_CATMOUSE 0x1000

Question: 8. Give an example of using the OS/161 debugging statement to print "Hello World\n" in conjunction with DB_CATMOUSE.

DEBUG(DB_CATMOUSE, "Hello World \n”);

Question: 9. Describe how would you enable the debugging statements that use DB_CATMOUSE or DB_THREADS and only those debugging statements.

We can pass in the bitwise or of them to DEBUG(). Like so DB_CATMOUSE | DB_CATMOUSE

Question: 10. Explain why you can use neither the debugging statements provided by OS/161 nor kprintf inside of lock acquire. in the later part of this assignment.

kprintf calls lock_acquire, if we we’re to use kprintf inside lock_acquire then we would go into an infinite loop.

Question: 11. Explain what a bitmap is and give an example of how and why it might be used.

Its a fixed-size array of bits. It would be used for storage management for example the file system. Its simple and efficient (from textbook).
Found in kern/lib/bitmap.c

Question: 12. What are the possible states that a thread can be in?

A thread can be in four states: running, ready to run, sleeping, zombie.
Found in kern/include/thread.h

Question: 13. When do “zombie” threads finally get cleaned up?

A zombie thread gets cleaned up on thread_switch and thread_startup by calling the exorcise function.
Found in kern/thread/thread.c

Question: 14. Which function is used to put a thread to sleep?

wchan_sleep is called
Found in kern/thread/thread.c

Question: 15. What is the purpose of the kernel’s curthread global variable?

A global variable that contains the currently running thread on the current CPU.

Question: 16. : Explain what uw-locktest1 does.

It adds to the test_value an number of times while subtracting test_value a number of times.
Found in kern/test/uw-tests.c

Question: 17. : Run the following command five times. What is getting printed for the value of test_value each time?

Done. Various values. When locks are implemented the value is 0.

Question: 18. : Why is this test failing?

The test fails because locks have not been implemented yet, so unpredictable.
Found in kern/test/uw-tests.c

Question: 19. What is getting printed for the value of test_value each time?

Done. Various values. When locks are implemented the value is 0.

Question 20. What happens to the final value of test value when you change the number of

Its closer to 0 without locks. Still 0 with locks implemented.