week4-2026-10-23

logistics

we are done grading lab 0—will publish grades soon
lab 1 due **midnight next Monday Oct. 26**

kthreads api review

`P_kt_sem` decrements then blocks curr thread if negative
`V_kt_sem` increments then unblocks 1 thread if <= 0

write syscall

semaphore stuff

`writeok`:
After a `console_write()`, you may not do another `console_write()` until the console fires a `ConsoleWriteInt` telling KOS that it is ready again
Intuition: **`writeok` is a way for `do_write()` to block until the console has completed the previous character**
P() `writeok` *after* every `console_write()`
interruptHandler() (ConsoleWriteInt) will call V() on writeok
should be initialized to 0

`writers`:
Intuition: protects against **interleaved output from multiple processes calling `write()` at the same time**
P() writers before your loop and V() afterwards
should be initialized to 1

error handling:

`ebadf` if fd is not 1 or 2
`efault` if buffer address < 0 or buf + nbytes > memory size
`einval` if nbytes < 0

read syscall

The console read buffer

`ConsoleReadThread` populates the console buffer with characters from `console_read()`
`do_read` reads characters from the console buffer

semaphores

`consoleWait`:
Intuition: **`consoleWait` is a way for `ConsoleReadThread` to block until the user types something into the console**
`ConsoleReadThread` calls P() before doing a `console_read`
`interruptHandler` calls V() when it gets a `ConsoleReadInt` interrupt

`nelem`:
Intuition: **`nelem` is a way for `do_read` to block if the console buffer is empty**
initialized to 0 in KOS()
do_read() calls P() before removing a character from the buffer
ConsoleReadThread calls V() on nelem after adding a character to the buffer

`nslots`:
Intuition: **`nslots` is a way for `ConsoleReadThread` to block when the buffer is full**
initialized to number of slots in ring buffer
ConsoleReadThread calls P() on nslots before it adds a character to the buffer
do_read needs to call V() on nslots when it removes a character from the buffer

error handling
`ebadf`: if the file descriptor is anything but 0
`efault`: if the address of the buffer is less than 0
`einval`: if nbyte < 0 or > memory size

fake tty edge case
edge case: piping input from a file and calling read() in a loop
boolean flag to check if the console is closed
set the flag when you encounter EOF
if the flag is set, SysCallReturn(0)