Linux Kernel Programming

Interrupted Interrupts Handlers & Shared Data

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- In these slides, **handler == interrupt handler == top-half == ISR**

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Outline

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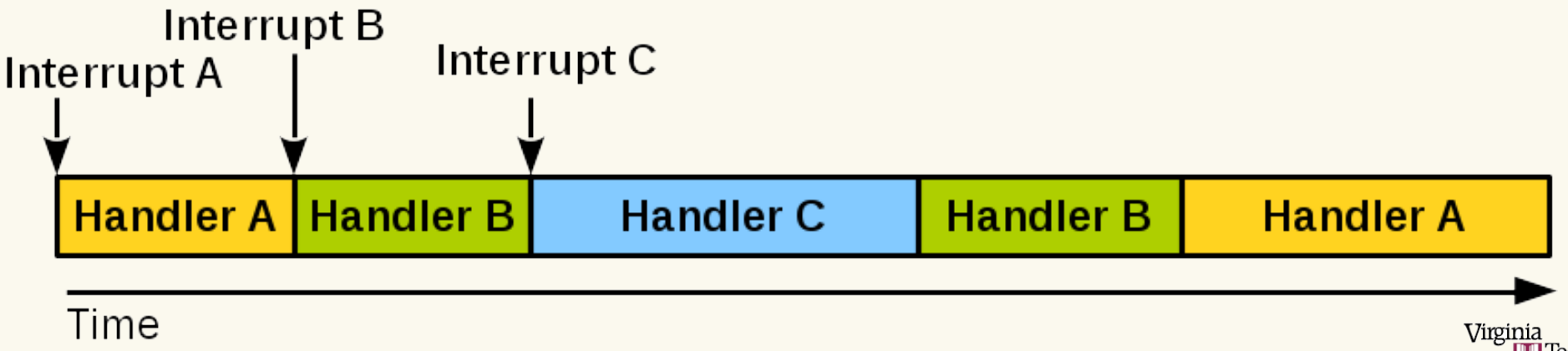
What can interrupt an interrupt handler?

- **What can interrupt an interrupt handler?**
  - Kernel **Preemption *cannot*** interrupt a handler
  - The interrupt (number) the handler is processing cannot interrupt it
    - This interrupt is disabled while its handler executes
- **Another interrupt can interrupt the currently executing handler**
  - (If this handler is configured to run with other interrupts enabled, which is generally the case)



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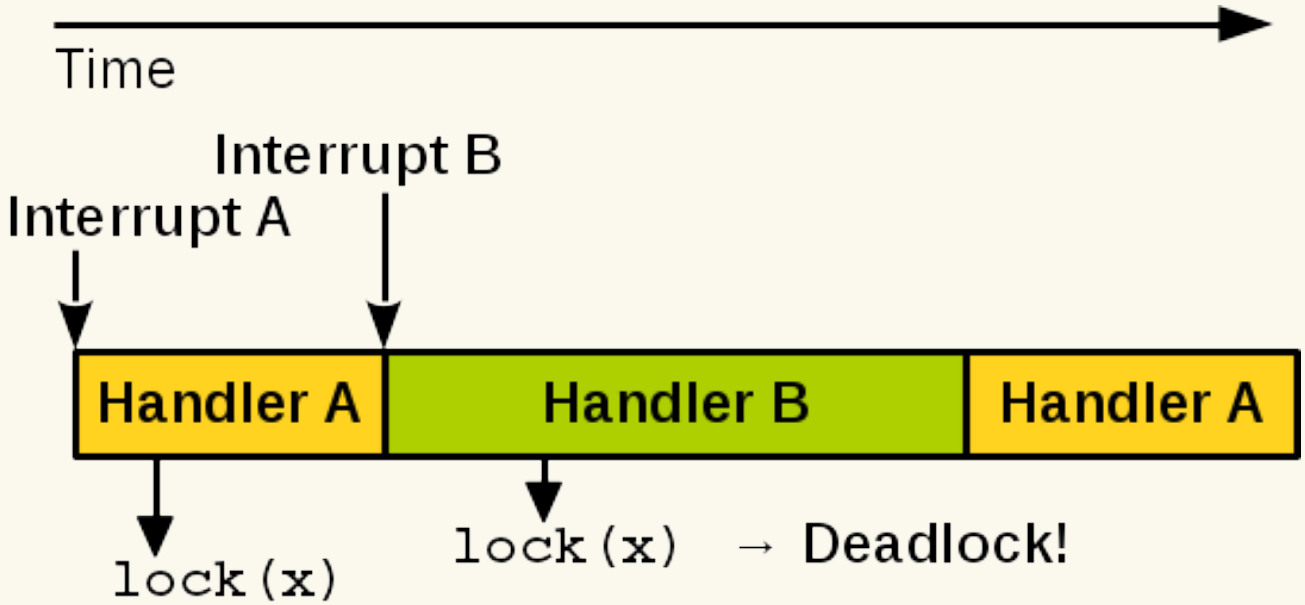
Handlers sharing data

- **If data is shared between two handlers, there is a risk of deadlock:**



- Solution: disabling interrupts before lock acquisition
  - We will see in the slides on synchronization the function `spin_lock_irqsave(lock, flags)`
    - As opposed to `spin_lock(lock)`

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What about multicores?

- **An interrupt handler does not have to be thread-safe**
  - The corresponding interrupt is masked on all cores while the handler executes
- **Shared data protection against concurrent accesses**:
  - If data is shared *with another interrupt handler*, **use a lock** (and also disable interrupts on the local core, see previous slide example)
  - If data is shared with *another entity* (ex a kernel thread), just **use a lock**

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