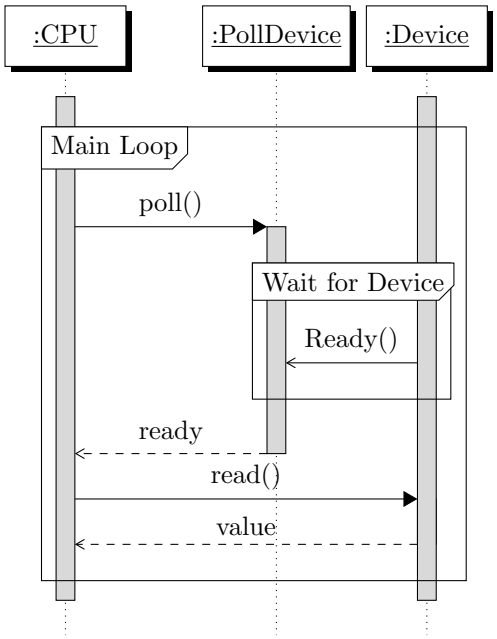
Assignment # 7: Problem Set 4, Problem 2

Brian Arnberg

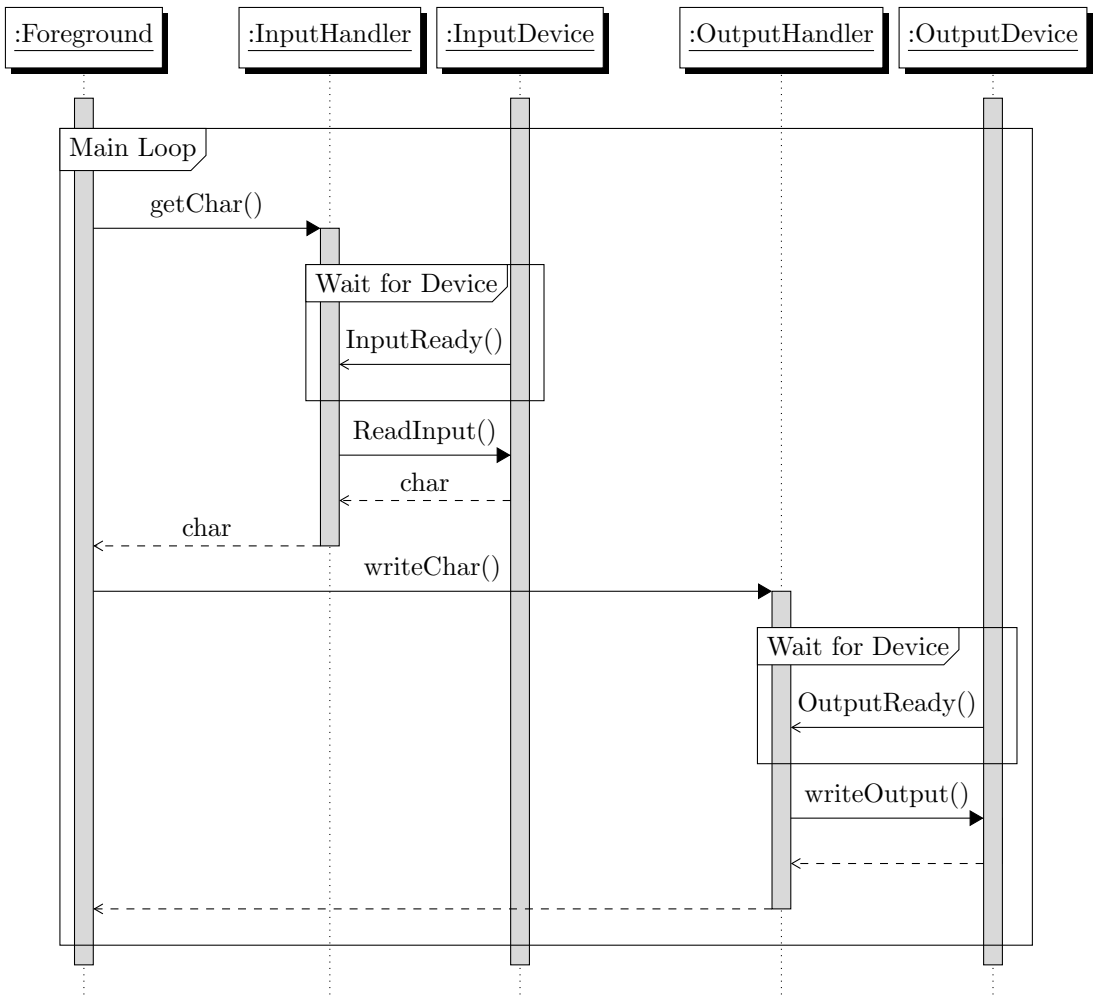
2/15/2013

At the end of Chapter 3, answer/work the following, which deal with input/output operations:
Q3-6, Q3-8, Q3-9, Q3-12, Q3-12, Q3-13, Q3-15, Q3-16, Q3-19.

Q3 - 6: Draw a UML sequence diagram for a busy-wait read of a device. The diagram should include the program running on the CPU and the device.

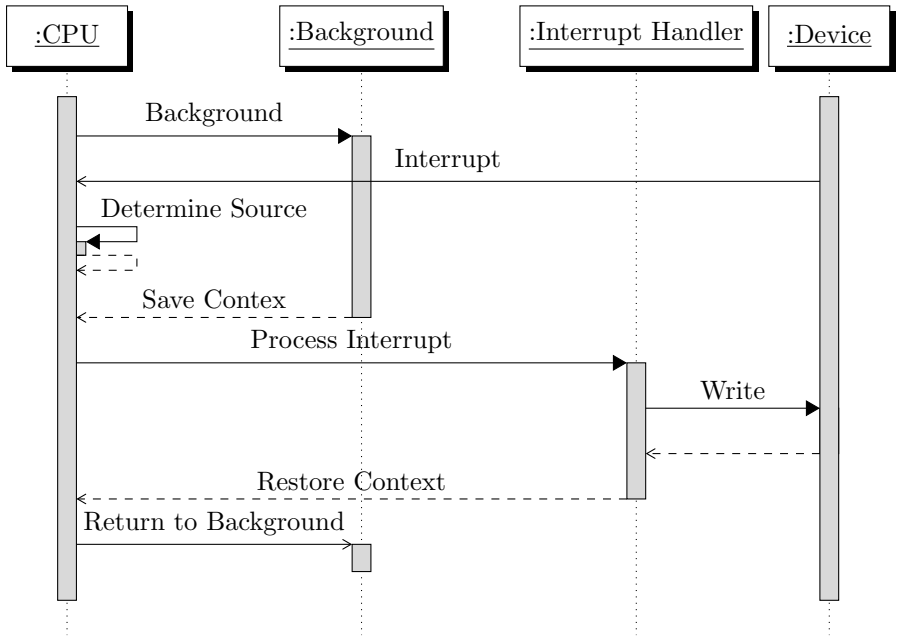


Q3 - 8: Draw a UML sequence diagram for copying characters from an input to an output device using busy-wait I/O. The diagram should include the two devices and the two busy-wait I/O handlers.

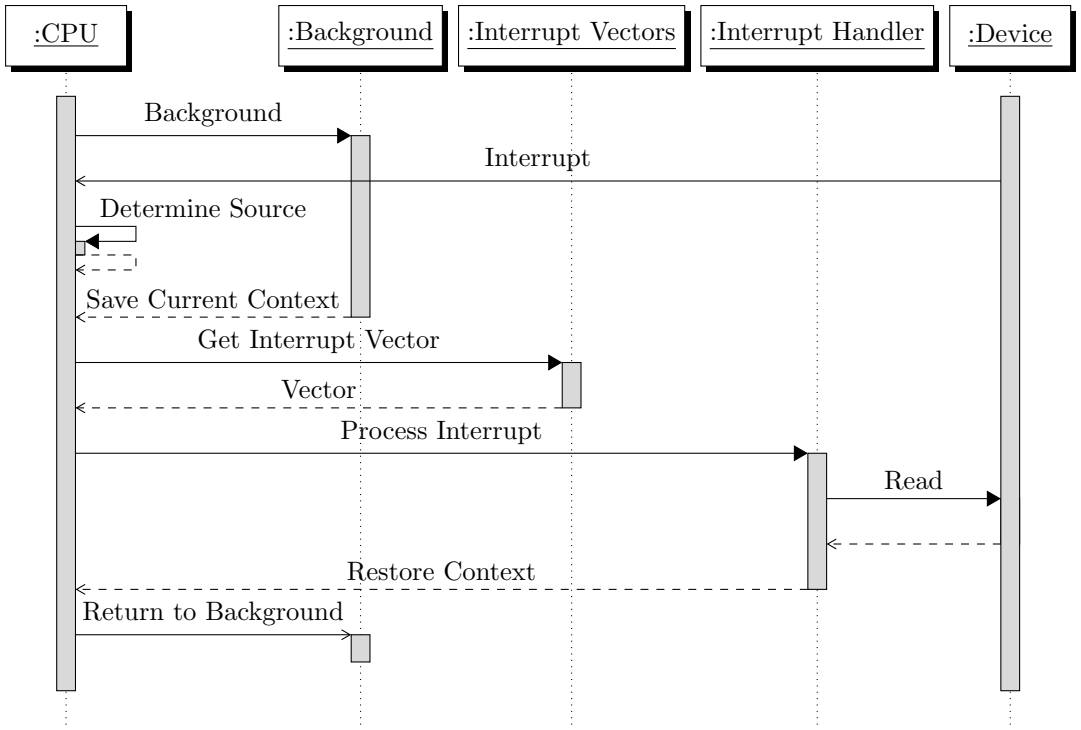


Q3 - 9: When would you prefer to use busy-wait I/O over interrupt driven I/O?
Answer: One would prefer busy-wait I/O over interrupt driven I/O in situations wherein the main program cannot function until a device is ready to service. For instance, a calculator should wait for user input before it does anything, and once it has calculated (and displayed) the output, it should wait for more user input.

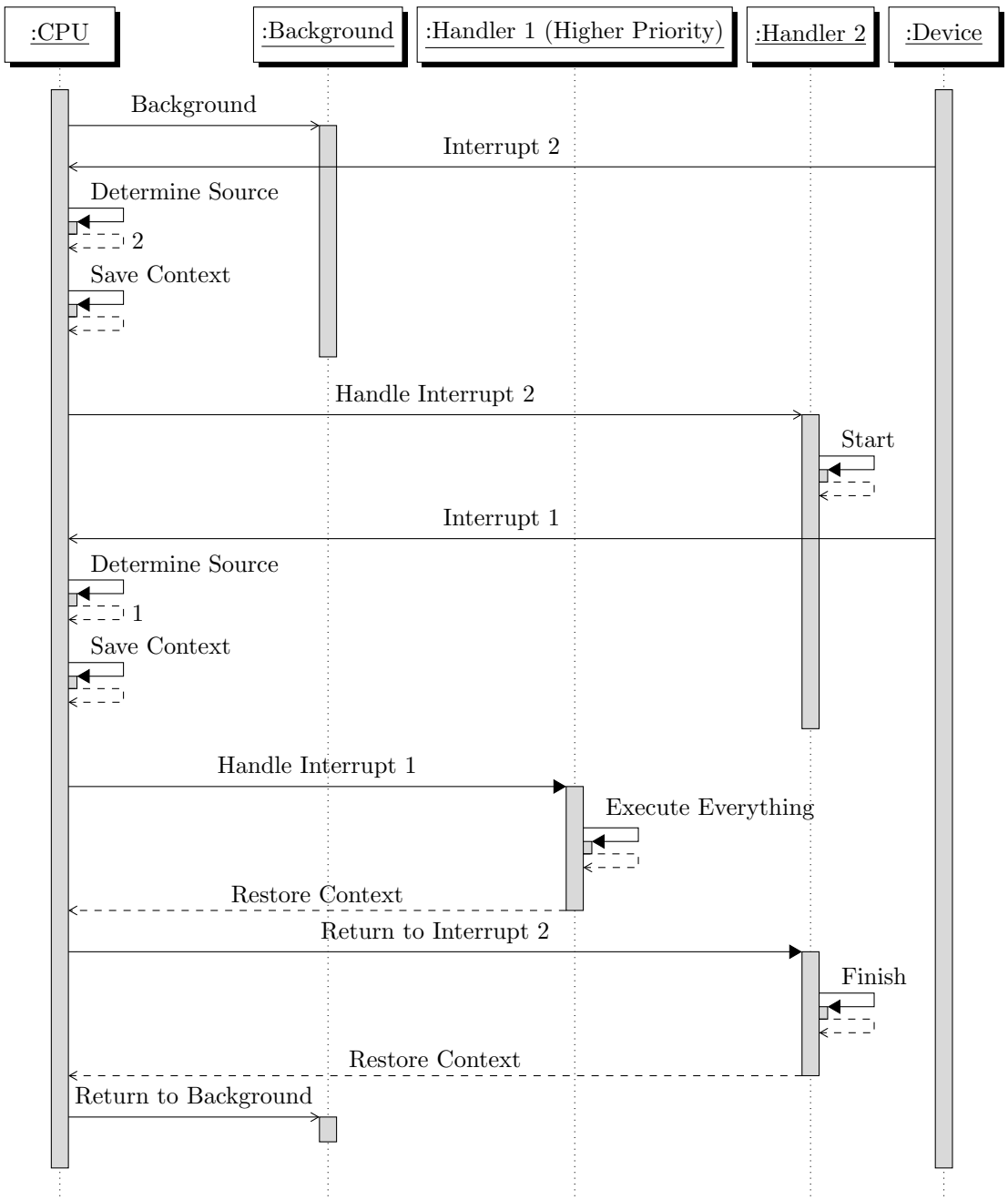
Q3 - 12: Draw a UML sequence diagram for an interrupt-driven write of a device. The diagram should include the background program, the handler, and the device.



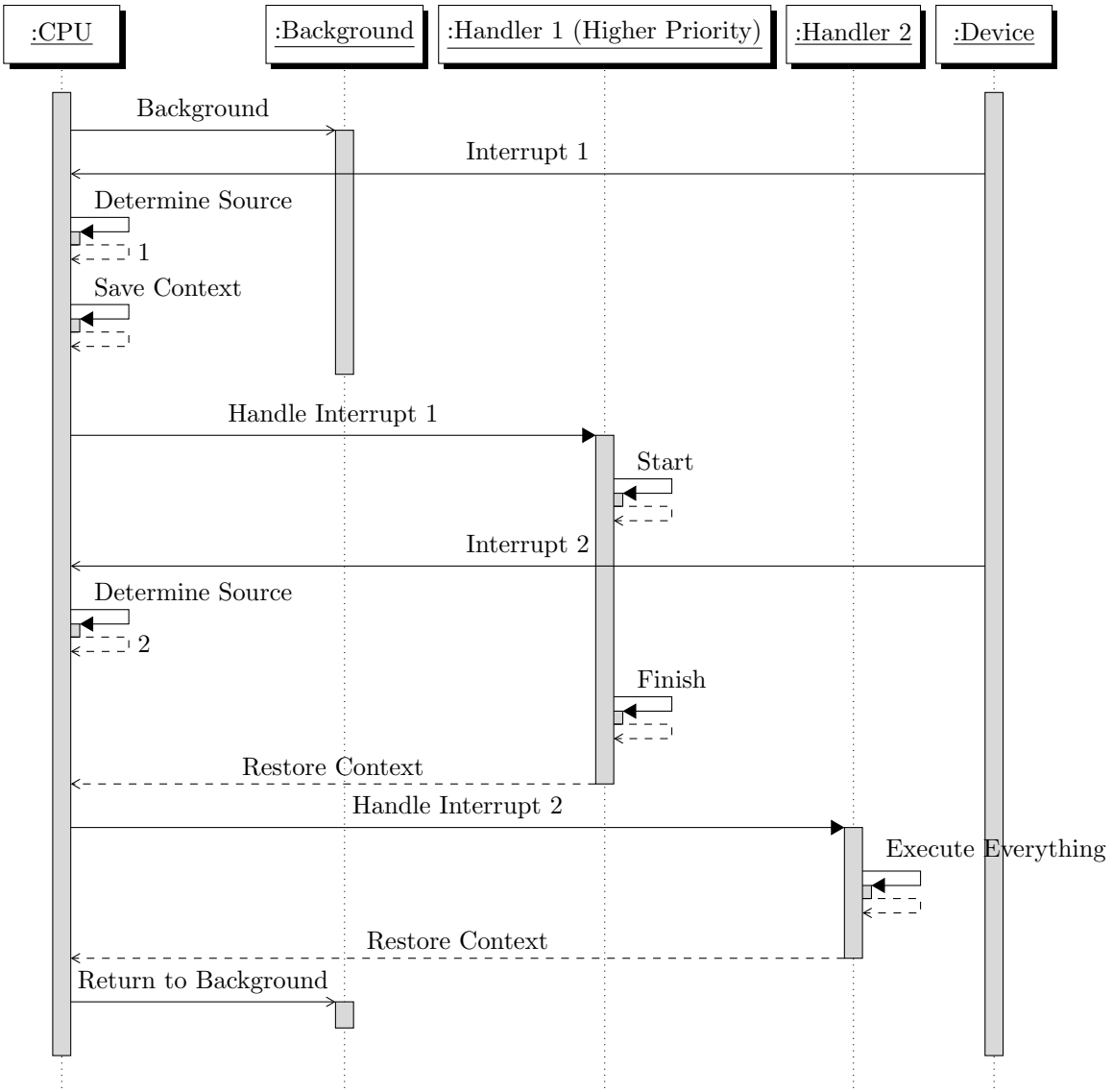
Q3 - 13: Draw a UML sequency diagram for a vectored interrupt-driven read of a device. The diagram should include the background program, the interrupt vector table, the handler, and the device.



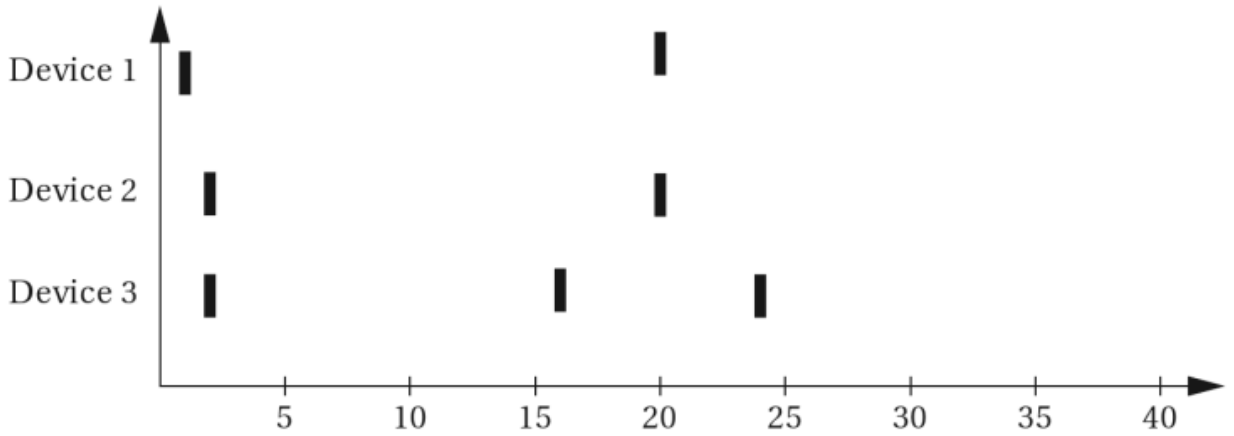
Q3 - 15: Draw a UML sequence diagram of a higher-priority interrupt that happens during a lower-priority interrupt handler. The diagram should include the device, the two handlers, and the background program.



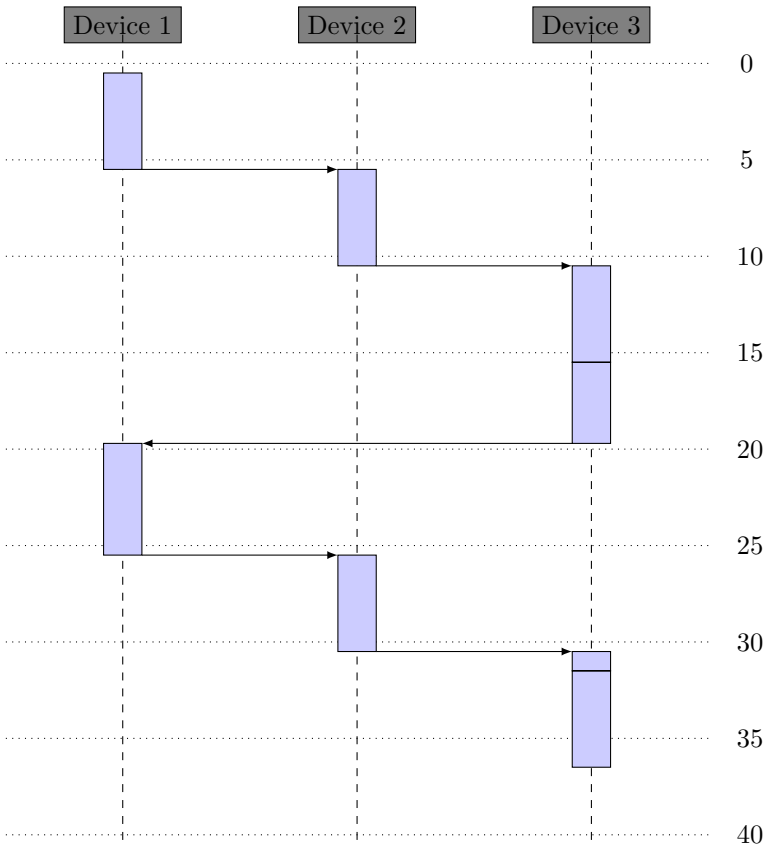
Q3 - 16: Draw a UML sequence diagram of a lower-priority interrupt that happens during a higher-priority interrupt handler. The diagram should include the device, the two handlers, and the background program.



Q3 - 19: Three devices are attached to a microprocessor: Device 1 has highest priority and device 3 has lowest priority. Each device's interrupt handler takes 5 time unites to execute. Show what interrupt handler (if any) is executing at each time given the sequence of device interrupts displayed below.



(a) Device Interrupt Timing



(b) Sequence Diagram for Interrupt Handlers