EET364 Microcontroller Systems
OIT Portland West, Winter 2011
Homework Assignment #6
Due February 17

Homework #6 is actually the first homework assignment this term that isn't a lab assignment. So you don't need your Dragon12 board for this one!

In this homework assignment which concerns our MC9S12DG256 microcontroller, a *physical* address is 20 bits, providing a 1 megabyte address space. The *CPU* address is the 16-bit address space that we have access to in our HCS12 instruction set (with the exception of the *call* and *rtc* instructions)

1. Explain how PPAGE is used to access the flash EEPROM memory.

2. From what two CPU addresses is it possible to see the interrupt vector table?

3. If PPAGE=$3B and the CPU reads location $9200, what physical address is accessed?

4. How would you access physical memory location $E5432? Provide the instruction sequence that will load the contents of memory location $E5432 into accumulator A.

5. How would you call a subroutine at physical memory location $E5432? Provide the instruction or instruction sequence that will do this.

6. When implementing buffering for an interrupt driven input device, what should you do if the buffer is empty and the subroutine is called to fetch a byte from the buffer?

7. Can an interrupt routine for an input device put data into the same buffer that an interrupt routine for an output device is removing data? If your answer is "no" explain why. If your answer is "yes" explain any conditions that must be true.

8. Why does an interrupt routine for an output device have to disable the output device's interrupt enable if the output buffer is empty?

9. Can an interrupt service routine transfer more than one byte of data at a time? If you answer "yes" give an example.

10. A buffered output interrupt routine is used to send characters to a terminal. The program sends a 60 character message to the display every second, calculating between each message. Why should the size of the buffer be larger than the size of the message? On the other hand, why might it be better if the buffer were much smaller than the size of the message?