**EENG 260 HW3:**

**Problem 1:** Overflow

Consider the addition of two signed 32-bit numbers.

1. If a positive number is added to a negative number under what conditions will a signed overflow occur?
2. What is the name of the condition code register?
3. What bit of this register will indicate that a signed overflow has occurred?

**Problem 2:** Port A Configuration

Please write software that initializes PortA so that pins 7, 5, 3, and 1 are output and the rest are input.

**Problem 3:** Interrupts

1. Please provide the definition of an interrupt.
2. Provide a description of Polled I/O
3. Provide a description of interrupt driven I/O

**Problem 4:** Logic Circuit for I/O interfacing

Design a logic circuit that is needed to drive a bidirectional I/O pin to either transfer a bit to the CPU or transfer a bit from the CPU to the I/O pin.

Basically this would be the logic circuit used to drive a data direction register to configure an I/O port to serve as an input or as an output. Employ your knowledge of ENGR 160/250 will come in handy.

CPU

DDR for I/O PORT

Bi-Directional Interconnect

Design for just one bit

**Problem 5:** Interrupts [25 Points]

1. Provide steps needed to enable interrupts, both external and internal
2. Provide instructions you would use to disable interrupts, both internal and external.
3. For TM4C123GH6PM, if interrupts are disabled does it mean that the CPU will not recognize them at all, or would they be queued as pending interrupts?
4. Do software interrupts have mask bits i.e. do they need to be disabled and enabled by setting registers of the NVIC appropriately?
5. Nesting interrupt is normally not advisable because of the potential indeterminate nature of nesting interrupts. The TM4C123GH6PM is however designed to accommodate interrupt nesting. Please identify the design factors that mitigate the potential indeterminism caused by nesting,
6. If you are using SysTick interrupts, how would you set the priority to level 6? (Problem 9.1 pp. 374 of textbook)
7. If you are using Timer0A interrupts how would you set priority to level 5? (Problem 9.2 pp. 374 textbook)