Purpose
This lab will teach you how to use the PWM hardware in the M-Core and the Logic Analyzer. You will use the PWM’s to generate three separate interrupts. Each interrupt will post a semaphore which will let a task run. You will use the logic analyzers to measure the amount of time spent in each task.

Description
Chapter 15 of the MMC2001 Reference Manual contains a lot of information about the various registers needed for using the PWM and practically zero information about how to use them. The tricky pieces are:

Reading the PWM Control Register will clear the interrupt. Keep that in mind for your ISR code.

The CLK SEL field of the PWM Control Register is dividing a 32 MHz clock; that’s 32,000,000 cycles per second. Using this field, you can divide 32 MHz by various numbers for the comparison registers.

The PWM Counter Register only has ten bits, so it’s always less than 1024. Keep this in mind when setting the PWM Period and PWM Width Registers and also when selecting what to divide 32 MHz by.

Create an ISR for PWM’s 0, 1, and 2. Create three tasks. Each ISR will post a semaphore to a corresponding task. The tasks will turn on a GPIO pin, perform a math function in a loop several thousand times, and then turn off the GPIO pin.

Use the Logic Analyzers to capture a waveform of the output on the GPIO pins. It shouldn’t be too difficult for you to figure mostly out on your own. Don’t worry, I’ll help you if you get stuck.

Requirements
A printout of the code (if it doesn’t work), the waveform, and the TA’s signature.

TA: ____________________________