University of Notre Dame
Department of Electrical Engineering

EE 30321 **Embedded Systems** **Stevenson**

Assignment #4
Assembly Language Programs

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1. Simulate the following code in MPLABX

```
start:  mov #0x0100, W0
        mov #0x0010, W1
loop:   add W0, W1, W2
        add.b W1, #0x03, W1
        mov W2, W0
        goto loop
```

   (a) If F_{CYC} is 100 MHz, what is the execution time for one iteration of the loop as measured by the stopwatch?

   (b) What is the value of `W0` after the 40^{th} iteration.

2. Write a PIC24 assembly language program that counts the number of 1's in a 16-bit word. The number to be tested should be stored in a symbol label *num* (e.g. use "`.equ num, 0xA4EF`"). At the end of the program the register `WREG0` should contain the number of 1's in the 16-bit number .

3. Write a PIC24 assembly language program that produces the Fibonacci sequence. In a Fibonacci series each number is the sum of the two previous ones, e.g. 0, 1, 1, 2, 3, 5, 8, 13, ... Store the the Fibonacci numbers starting at file register 0x1000, include all the number within a 16-bit range.