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Assignment #3  
Basic PIC24

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1. Convert the instruction to “add #0x2FA, W4” to machine code.
2. Convert the instruction to “inc.b 0x1000” to machine code.
3. Speculate as to why there is no instruction “add f<sub>p</sub>, W2, f<sub>d</sub>” where f<sub>p</sub> and f<sub>d</sub> are data memory addresses.
4. For this problem assume the memory/register contents are as shown in the following tables

Location	Value
W0	0x1006
W1	0x00D2
W2	0x1000
W3	0x45FD
W4	0x1008

Location	Value
0x1000	0xECDC
0x1002	0x38F2
0x1004	0x0044
0x1006	0xBC4D
0x1008	0xFFFF

at the *start* of each instruction. Give the modified memory location or register and its content.

- (a) mov W3, 0x1008
  - (b) mov 0x1004, WREG
  - (c) mov #0x1004, W2
  - (d) mov [W4], W0
  - (e) mov.b [W4], [W2]
  - (f) add [W0], W0, W2
  - (g) dec 0x1008
  - (h) inc.b 0x1007
  - (i) inc W0, [W3]
5. For this problem consider the following assembly language code

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

- (a) If  $F_{OSC}$  is 140 MHz, what is the execution time for one iteration of the loop?
- (b) What is the value of `W0` after the 4<sup>th</sup> iteration. (Bonus points: solve this problem by simulating the code in MPLAB and providing a screenshot showing the value of `W0` after 4 iterations.)