**EENG 3040 Microprocessors**

**In Class Exercise 5**

**To be done during the lecture period on September 11, 2015**

* For each of the following commands, complete the table with the number of clock cycles it takes to run and the number of seconds that takes with a 4MHz clock

|  |  |  |
| --- | --- | --- |
| Command | Clock Cycles | Time |
| MOVLW 0x0F | 1 | 1 microsecond |
| GOTO Loop | 2 | 2 microseconds |
| RETURN | 2 | 2 microseconds |
| ADDLW 5 | 1 | 1 microsecond |
| DECFSZ COUNT, 1 | 1 or 2 depending on value of COUNT | 1 or 2 microseconds depending on value of COUNT |

* Determine the total number of clock cycles the following code takes to run

MySub CLRF PORTB

INCF PORTB, 1  
 ADDLW 0x17

RETURN

Total Clock Cycles: \_\_\_\_\_

* Assuming you have properly declared a variable named COUNTER, determine how many clock cycles the following code takes to run. Be sure to include the clock cycles necessary to call the subroutine:

DELAY MOVLW 0x20

MOVWF COUNTER

NOP

LOOP NOP

DECFSZ COUNTER, 1

GOTO LOOP

RETURN

* Write a delay subroutine that lasts for 0.01s