SECTION 1 (4344) Lab #6, Due: 2015, March 11

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	Switch value in binary	PWM Duty Cycle	Numerator	Denominator	
1.	000	11%	Y1=1	X=9	
	001	22%	Y1=2	X=9	
	010	33%	Y1=3	X=9	
	011	44%	Y1=4	X=9	
	100	55%	Y1=5	X=9	
	101	66%	Y1=6	X=9	
	110	77%	Y1=7	X=9	
	111	88%	Y1=8	X=9	

2. To get the required delay time, let us consider the snippet of code below for yet to be determined positive integers x and y.

DELAY:

MOV RO, #x

LOOPO: MOV R1, #y LOOP1: DJNZ R1, LOOP1 DJNZ R0, LOOPO

The number of machine cycles for this code is

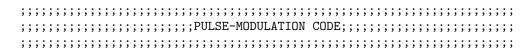
$$2 + [2 + 4 \cdot y + 4] \cdot x = 4xy + 6x + 2.$$

Since we our machine is a DS89C450 and since we want to generate a $\frac{1}{5400}s$ delay time, we must have that

$$(4xy + 6x + 2) \cdot 90.42ns = \frac{1}{5400}.$$

So choose x = 11 and solve to get $y \approx 45$.

3.



MOV PO, #0 ;Set Port O as output

MOV P1, #07H ;Use low 3-bit of P1 for modulation

MAIN_LOOP:

MOV R2, P1 ; Read data from switch into R2 INC R2 ; Add 1 to get index of switch

MOV PO, #OFFH ; Turn on LEDs

DELAY_ON:

ACALL	DELAY	;Keep	LEDs	on	for	R2	*	Delay	time

DJNZ R2, DELAY_ON

MOV R2, P1 ;Read data from switch into R2

MOV A, #8

SUBB A, R2 ;Off Time = (8 - R2) * Delay time

MOV R2, A

MOV PO, #0 ;Turn off LEDs

DELAY_OFF:

ACALL DELAY ; Keep LEDs on for R2 * Delay time

DJNZ R2, DELAY_OFF

SJMP MAIN_LOOP

DELAY:

MOV RO, #11 ; Delay time for DS89C450 at 600 Hz

LOOPO:

MOV R1, #45

LOOP1:

DJNZ R1, LOOP1 DJNZ R0, LOOP0

RET

END