Description - Lab Week 7 Part 1

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The objective is to generate PWM waveforms of specified frequency and duty cycle on (A) special function pins and (B) Any GPIO pin

Part 1A

You are asked to generate a PWM wavefrom of frequency 5000 Hz and duty cycle 35% on special function pin 5.7 . Answer the following questions

(i) Name the pin in the notation TAx.y

**TA2.2**

(ii) Which timer and CCR must be used?

**TimerA2 and CCR2**

(iii) Set up SMCLK at 3 MHz as the clock for the Timer Ax . Calculate the counts for CCR0 and CCRy

**SMCLK divider of 16 (48MHz of HFXTCLK / 16 = 3MHz)**

**CCR0 = 600 (3 MHz of SMCLK / 5000 Hz desired freq )**

**With SET RESET mode: 35% duty cycle would require CCR2 to turn on LED 65% of CCR0 value:**

**CCR2 = 390 (600\*0.65), this leaves LED on for 210 counts which is 35% of 600**

(iv) The starter project is provided in PWM\_BY\_COMPARE\_ON\_TA0.1.zip

It is designed to generate a PWM waveform with frequency 256 Hz and duty cycle 87.5% on TA0.1

Make necessary modifications in the code to meet the specs given above. Demonstrate its proper functioning by connecting a white LED to pin 5.7

Part 1B

You are asked to generate a PWM waveform of frequency 50 Hz and duty cycle 25% on GPIO pin 1.6

You are free to use any TimerAx and any CCRy (0<=x<=3. 1<=y<=4)

(i) Set up ACLK as the clock for Timer Ax. Calculate the counts for CCR0 and CCRy

**Default PWM on Pin P2.4 -> TA0.1**

**TimerA0 and CCR1**

**Set LFXTCLK to 128 KHz and base ACLK off it with diver of 4 (freq ACLK = 32 KHz)**

**CCR0 = 640 = 32 KHz of ACLK / 50 Hz desired**

**CCR1: 480 = 640 – 0.25\*640**

(ii) The starter project is provided in PWM\_BY\_COMPARE\_ON\_ANY\_PIN.zip

It is designed to generate a PWM waveform with frequency 1000 Hz and duty cycle 30% on Pin 2.2 (Blue LED2)

Make necessary modifications in the code to meet the specs given above. Demonstrate its proper functioning by connecting a white LED to pin 1.6

