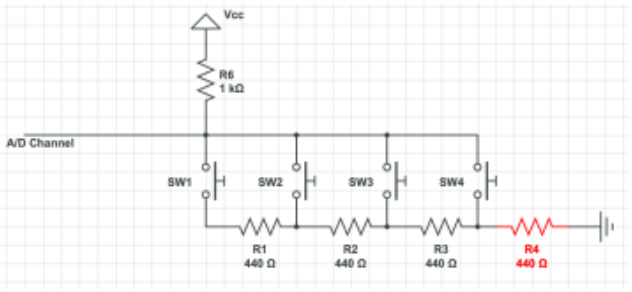
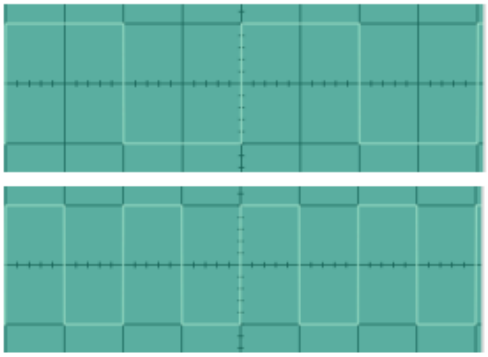
Laboratory Activity - Timer 1 Compare Mode to Generate a Square Waves
The Microchip PIC 18F4520 has two Capture and Compare circuits. In class we covered CCP1 in compare mode and the mathematics that dominate the circuit.

Activity Description
Reuse the C program for the 18F4520 capable of determining which push button was pressed based on a single analog measurement.



The Microcontroller should generate a square wave of unique frequency for each push button press utilizing the compare interrupt of your choice (CCP1 or CCP2). You may achieve the desired result by manipulating the value of the CCPR1 register or CCPR2 on each button press detection. Your output may look like the following images in an oscilloscope.



Demonstrate the software to your instructor to receive credit. _____

```c
#include <18f4520.h>
#use delay (clock = 20000000)
#fuses HS, NOWDT, NOLVP
#include "../../Library/myLibrary.h"
#include "../../Library/modifiedlcd.h"

float Vin = 0;
unsigned int16 x = 1000;

#INT_AD
void int_ad_isr() {
   Vin = *Q * (5.0 / 1023.0 );
}

#INT_CCP1
void int_ccp1_isr() {
   *CCPR1 = *CCPR1 + x;
   // output_toggle(PIN_C3);
}

main(){
   // Initialize LCD
   lcd_init();

   // Analog setup
   *TRISA = 0x01;
   ADCON1 -> PCFGx = 0xE;
   ADCON0 -> ADON = 1;
   ADCON0 -> CHSx = 0;   // Channel 0
   ADCON1 -> VCFG0 = 0;
   ADCON1 -> VCFG1 = 0;
   ADCON2 -> ADFM = 1;   // Right Justified
   ADCON2 -> ACQTx = 5;
   ADCON2 -> ADCSx = 5;

   // Interrupt setup
   PIE1 -> ADIE = 1;

   // CCP setup
   *TRISC = 0x00;
   CCP1CON -> CCPxMx = 0x2;
   T1CON -> TMR1ON = 1;
   PIE1 -> CCP1IE = 1;
   INTCON -> PEIE = 1;
   INTCON -> GIE = 1;

   while(1){
      ADCON0 -> GODONE=1;   // Trigger
      delay_ms( 250 );

      if( Vin > 3.18 && Vin < 3.20 ) {
         x = 10E3;
         printf(lcd_putc,"\fSW1");
```

```
            printf(lcd_putc,"\fSW1");
        }
        else if( Vin > 2.80 && Vin < 2.90 ) {
            x = 20E3;
            printf(lcd_putc,"\fSW2");

        }
        else if( Vin > 2.30 && Vin < 2.40 ) {
            printf(lcd_putc,"\fSW3");
            x = 30E3;
        }
        else if( Vin > 1.50 && Vin < 1.60 ) {
            printf(lcd_putc,"\fSW4");
            x = 40E3;
        }
        else {
            printf(lcd_putc,"\fPush a button...");
        }
    }
}
```