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//Description:
//
//
//This example shows that PWM function from PIC18F4550. There are 2 channels which can be used as
PWM outputs.
//See from the schematic of PIC18F4550, these channels are noticed as CCP1 and CCP2. The PWM uses
timer2 as time base.
//Before PWM works, timer2 must be set.
//
//The PWM period is calculated by:
//PWM Period = [period+1]*4*Tosc*(TMR2 Prescaler).
//PWM Dutyicycle = (DCx<9:0>) x TOSC x (TMR2 prescaler).
//where DCx<9:0> is the 10-bit value specified in the call to this function.
//
//This example is using to PWM from both 2 channels to make fading LEDs.
//
//

#include <p18f4550.h>
#include <pwm.h> // include the PWM library
#include <delays.h> // include the delay library
#include <timers.h> // include the timer library

//Bootloader code, DO NOT DELETE!
extern void _startup (void);
#pragma code _RESET_INTERRUPT_VECTOR = 0x000800
void _reset (void)
{
    _asm goto _startup _endasm
}
#pragma code
#pragma code _HIGH_INTERRUPT_VECTOR = 0x000808
void _high_ISR (void)
{
    ;
}
#pragma code
#pragma code _LOW_INTERRUPT_VECTOR = 0x000818
void _low_ISR (void)
{
    ;
}
#pragma code

int a; //the variable for the dutyicycle.
//Delay functions
void Delay1mS(int x)
{//Pre: Delay library is included.
//Post:Delay for x*1ms.
    int i;
    for (i=0; i<x; i++) Delay1KTCYx(12);
}
void Delay10mS(int x)
{//Pre: Delay library is included.
//Post:Delay for x*10ms.
    int i;
    for (i=0; i<x; i++) Delay10KTCYx(12);
}
void Delay100mS(int x)
{//Pre: Delay library is included.
//Post:Delay for x*100ms.
    int i;
    for (i=0; i<x; i++) Delay10KTCYx(120);
}
void Delay1S(int x)
{//Pre: Delay library is included.
//Post:Delay for x*1s.
    int i;
    for (i=0; i<10*x; i++) Delay10KTCYx(120);
}

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void main( void )
{ //Pre: PWM and Delay library are included.
  //Post: The LED C1 and C2 change from dark to bright in 1.6second, and then fade to dark in
  1.6second.

  TRISC=0b11111001;          // Set channel C1 and C2 as PWM output.
  LATC= 0x00;                // Initialize the PORTC.

  OpenTimer2(T2_PS_1_16 & TIMER_INT_OFF); // Timer2 is used for the time base of the PWM. set
timer2 before PWM works.
                                // Set timer2 prescaler to 1:16, and set interrupts OFF

  OpenPWM1(159);              // PWM period =[ (period ) + 1] x 4 x TOSC x TMR2
prescaler. The value of period is from 0x00 to 0xff.
                                // Channel 1:PWM period = (159+1)*4*(1/48e6)*16 =
0.21ms

  OpenPWM2(159);              // Channel 2:PWM period = (159+1)*4*(1/48e6)*16 =
0.21ms

  //SetDCPWM1(640);           //PWM x Duty cycle = (DCx<9:0>) x TOSC x TMR2 prescaler
                                // Setting duty cycle for channel 1: DC = 640 *
(1/48e6)*16 = 0.21 ms, duty cycle is 100% now

  //SetDCPWM2(640);           // Setting duty cycle for Channel 2: DC = 640 *
(1/48e6)*16 = 0.21 ms, duty cycle is 100% now

  while(1) //Make fading LED
  {
    for(a=0;a<640; a=a+16) // Duty cycle increases in 1600 ms 0% --> 100%
    {

      SetDCPWM1(a); // give new value for the duty cycle.
      SetDCPWM2(a);
      Delay10mS(4);
    }

    for(a=0;a<640; a=a+16) // Duty cycle decreases in 1600 ms 100% --> 0%
    {

      SetDCPWM1(640-a); // give new value for the duty cycle.
      SetDCPWM2(640-a);
      Delay10mS(4);
    }
  }

  ClosePWM1(); // disable the PWM channel 1.
  ClosePWM2(); // disable the PWM channel 2.
}

```