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'-----Title-----
' File.....pwm_sn754410_1.pbp
' Started....1/10/09
' Microcontroller used:  Microchip Technology 16F88
'                          microchip.com
' PicBasic Pro Code:  micro-Engineering Labs, Inc.
'                          melabs.com

'-----Program Description-----
' Program uses the command PAUSEUS to generate its own
' PWM signals to drive the SN574410 H-bridge motor driver.
' FOR..NEXT loop changes the motor speed.

'-----Related Programs-----
' Robotic application used in proportionall.pbp at:
' http://www.cornerstonerobotics.org/picbasic_robots1.php

'---Review PicBasic Pro Command---
' The PicBasic Pro Compiler Manual is on line at:
' http://www.microengineeringlabs.com/resources/index.htm#Manuals
'
' PAUSEUS Period
' Pause the program for Period in microseconds
' Look around page 113 in the PicBasic Pro Compiler Manual

'-----PIC Connections-----
'
'      16F88 Pin          Wiring
'      -----          -
'      RB0              PWM Motor 2
'      RB1              Direction Motor 2
'      RB2              PWM Motor 1
'      RB3              Direction Motor 1
'      RB4              LED1 through 150 ohm resistor
'      RB5              LED2 through 150 ohm resistor
'
' See schematic at:
' http://www.cornerstonerobotics.
org/schematics/pic_programming_pwm_sn754410.pdf

'-----Variables-----
'
'      c0                VAR WORD          ' WORD to store counter, c0
'
'      pulse_width      VAR WORD          ' Word to store pulse_width

'-----Initialization-----
'
'      ANSEL = 0          ' Configure all pins to digital
'                          ' operation since not using ADC
'                          ' (Analog to Digital Converter)
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OSCCON = $60           ' Sets the internal oscillator in the
                        ' 16F88 to 4 MHz

TRISB = %00000000     ' Sets all pins in PORTB as outputs

PORTB = %00000000     ' Sets all PORTB pins to LOW

'-----Main Code-----

loop:

HIGH 4: HIGH 5: PAUSE 500: LOW 4: LOW 5
                        ' Blinks LEDs connected to RB4
                        ' and RB5 for 500 ms.

GOSUB forward          ' Jump to subroutine forward

HIGH 4: PAUSE 100: LOW 4
                        ' Blinks LED connected to RB4
                        ' for 100 ms.

GOSUB backup          ' Jump to subroutine backup

HIGH 5: PAUSE 100: LOW 5
                        ' Blinks the LED connected to RB5
                        ' for 100 ms.

GOSUB turn            ' Jump to subroutine turn

GOTO loop              ' Jump to label loop

END

forward:              ' Subroutine forward

FOR c0 = 5000 TO 20000 STEP 50
                        ' FOR..NEXT loop counts from 5000
                        ' to 20000 in steps of 50.

pulse_width = c0      ' Assigns the current value of c0 to
                        ' the variable pulse_width.

HIGH 1 : HIGH 3       ' Set the direction of Motors 2 and 1
                        ' to forward

HIGH 0 : HIGH 2       ' Leading edge of pulse into PWM input
                        ' pins of SN754410 H-bridge for
                        ' Motors 2 and 1.

PAUSEUS pulse_width   ' Length of pulse_width in microseconds
                        ' HIGH for pulse_width in microseconds.

LOW 0 : LOW 2         ' Falling edge of pulse

PAUSEUS 20000-pulse_width
                        ' LOW for 20 ms period - pulse_width (in
                        ' microseconds)
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NEXT                                ' Loop back to FOR command for next c0
RETURN                             ' Return to next line in the main program
backup:                               ' Subroutine backup
FOR c0 = 5000 TO 20000 STEP 50    ' FOR..NEXT loop counts from 5000
                                        ' to 20000 in steps of 50.
pulse_width = c0                      ' Assigns the current value of c0 to
                                        ' the variable pulse_width.
LOW 1 : LOW 3                       ' Set the direction of Motors 2 and 1
                                        ' to reverse
HIGH 0 : HIGH 2                     ' Leading edge of pulse into PWM input
                                        ' pins of SN754410 H-bridge for
                                        ' Motors 2 and 1.
PAUSEUS pulse_width                 ' Length of pulse_width in microseconds
                                        ' HIGH for pulse_width in microseconds.
LOW 0 : LOW 2                       ' Falling edge of pulse
PAUSEUS 20000-pulse_width           ' LOW for 20 ms period - pulse_width (in
                                        ' microseconds)
NEXT                                ' Loop back to FOR command for next c0
RETURN                             ' Return to next line in the main program
turn:                                 ' Subroutine turn
FOR c0 = 5000 TO 20000 STEP 50    ' FOR..NEXT loop counts from 5000
                                        ' to 20000 in steps of 50.
pulse_width = c0                      ' Assigns the current value of c0 to
                                        ' the variable pulse_width.
LOW 1 : HIGH 3                       ' Set the direction of Motors 2 to reverse
                                        ' and Motor 1 to forward
HIGH 0 : HIGH 2                     ' Leading edge of pulse into PWM input
                                        ' pins of SN754410 H-bridge for
                                        ' Motors 2 and 1.
PAUSEUS pulse_width                 ' Length of pulse_width in microseconds
                                        ' HIGH for pulse_width in microseconds.
LOW 0 : LOW 2                       ' Falling edge of pulse
PAUSEUS 20000-pulse_width           ' LOW for 20 ms period - pulse_width (in
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**NEXT**                   ' *microseconds)*

**RETURN**               ' *Loop back to FOR command for next c0*

                         ' *Return to next line in the main program*