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'-----Title-----
' File.....16F877A_pwm_sn754410_1.pbp
' Started....1/10/09
' Microcontroller used:  Microchip Technology 16F877A
'                          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 proportional1.pbp at:
' http://www.cornerstonerobotics.org/picbasic_robots1.php
' Microcontroller used:  Microchip Technology 16F88

'---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-----
'
'      16F877A 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/pic16f877a_h_bridge_sn754410.pdf

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

'-----Initialization-----
'
'      ADCON1 = %00000110      ' Changes PORTE and PORTA analog bits to
'                               ' digital operation since not using ADC
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                                ' (Analog to Digital Converter)

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)

    NEXT                          ' Loop back to FOR command for next c0
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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
                          ' microseconds)
```

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

**RETURN**                *' Return to next line in the main program*