```
'---------------Title--------------

' File......16F877A_pwm1.pbp
' Started....4/25/06
' Microcontroller used:  Microchip Technology 16F877A
'                        microchip.com
' PicBasic Pro Code: micro-Engineering Labs, Inc.
'                    melabs.com

'--------Program Desciption--------

' 16F877A_pwm1.pbp drives a dc motor at different speeds

'-------------Schematic------------

' See schematic at:
' http://www.cornerstonerobotics.org/schematics/pic16f877a_pwm1.pdf

'----------Related Lesson----------

' pwm1.pbp (the 16F88 program) is used in
' the lesson MOTOR CONTROL WITH PWM at:
' http://www.cornerstonerobotics.
org/curriculum/lessons_year2/erii21_motor_control_pwm.pdf

'------------Comments--------------

' Rather than reducing the voltage to a motor through
' a potentiometer for example, PWM cuts the time a
' motor receives voltage by turning pulses on and off
' very quickly. This pulse can feed a transistor switch
' which then drives the motor at different speeds.

'-----New PicBasic Pro Commands----

' The PicBasic Pro Compiler Manual is on line at:
' http://www.microengineeringlabs.com/resources/index.htm#Manuals
'
' PWM Pin, Duty, Cycle

' Pin is the output pin for the pulse.
' Duty adjusts the amount of time the pulse is on and off.
' Duty ranges from 0 (0% on time and 100% off time)
' to 255 (100% on time and 0% off time).
' Look around page 122 in the PicBasic Pro Compiler Manual
' The Jameco motors that we tested would not turn with
' duty values less than 140 (a 55% duty cycle).  See the
' Jameco gear head motor charts listed in the table.
' Cycle is the number of cycles the pulse is sent.

'---------Revision History---------

' 11/25/08 Convert from PIC16F84A to PIC16F88,
'          add PIC16F88 oscillator and ANSEL = 0 initializations.
' 1/3/09  Change MCU from 16F88 to 16F877A
```

```
'----------Initialization----------

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

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

start:

    PWM 0,255,200       ' Pulse sent to PORTB.0 at a duty
                        ' value of 255(100% duty cycle) for
                        ' 200 cycles.  At 4MHz, each cycle
                        ' is about 5 ms long, so the total
                        ' time for 200 cyclesis:
                        ' Total Time = 200*5 ms = 1000 ms or 1 sec.

    PWM 0,190,200       ' Pulse sent to PORTB.0 at a duty
                        ' value of 190(75% duty cycle) for
                        ' 200 cycles.  Motor rotational speed
                        ' approximately 50% of maximum rpm
                        ' for the Jameco motors used.

    PWM 0,140,200       ' Pulse sent to PORTB.0 at a duty
                        ' value of 140(55% duty cycle) for
                        ' 200 cycles.  Motor rotational speed
                        ' approximately 20-24% of maximum rpm
                        ' for the Jameco motors used.

    GOTO start           ' Jump to loop label and start all over

    END
```