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'-----Title-----
' File.....16F877A_step_mot_hi_torque.pbp
' Started....2/14/09
' Microcontroller Used:  Microchip Technology 16F877A
'                          microchip.com
' PicBasic Pro Code:  micro-Engineering Labs, Inc.
'                          melabs.com
' Stepper Motor Used:  Jameco #237623
' (#237623 - 4.8V, 1500mA, 1.8 Degree Step Angle or 200 Steps/Revolution)

'-----Program Description-----
' Program drives stepper motor with about 1.4 times the
' torque as in step_mot1.pbp.

'-----Schematic-----
' Use the same schematic as step_mor1.pbp.  See schematic at:
' http://cornerstonerobotics.org/schematics/pic\_16f877a\_step\_mot1.pdf

'-----Related Lesson-----
' See the lesson Stepper Motor Control with a PIC at:
' http://www.cornerstonerobotics.org/curriculum/lessons\_year2/erii\_stepper\_motor.pdf
' Lesson also includes a section on how to figure out how to hook
' up a stepper motor with six leads when a data sheet for the
' motor is unavailable.

'-----Comments-----
' WITH THE PIC16F877A, BE CERTAIN TO HAVE SEPARATE POWER
' SOURCES FOR THE PIC AND THE STEPPER MOTOR.  MAKE SURE
' TO HAVE A COMMON GROUND BETWEEN THE PIC AND MOTOR.

'---PicBasic Pro Compiler Manual---
' The PicBasic Pro Compiler Manual is on line at:
' http://www.microengineeringlabs.com/resources/index.htm#Manuals

'-----PIC Connections-----
'
'      PIC16F877A Pin          Wiring
'      -----
'      RB0                    Stepper Motor Control Wire 1
'      RB1                    Stepper Motor Control Wire 2
'      RB2                    Stepper Motor Control Wire 3
'      RB3                    Stepper Motor Control Wire 4
'      Vdd                    +5 V
'      Vss                    Ground
'      MCLR                   4.7K Resistor to +5 V

'-----Variables-----
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Delay    VAR    WORD    ' WORD for variable Delay

'-----Initialization-----

TRISB = %00000000    ' Sets all PortB pins to output

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

Delay = 5    ' Sets Delay variable to 5(msec)
              ' Delay changes the rotational speed
              ' of the motor. Check for the minimum
              ' Delay value of your motor.
              '
              ' Delay Value    Approx. No-load Current
              '                Jameco #237623 Stepper Motor
              ' -----
              ' 20                1.43 A
              ' 10                1.13 A
              ' 6                  0.72 A
              ' 5                  0.60 A
              ' 4                  0.40 A
              ' 3                  0.19 A
              ' 2                  Motor Stops Operating
              '                    Properly

start:

PORTB = 12    ' Equivalent to PORTB = %00001100
              ' in binary. Makes pin RB3 and RB2 HIGH and
              ' all other PORTB pins LOW. This sends a
              ' HIGH signal to the NPN transistors
              ' connected to pins RB3 & RB2. The NPN
              ' transistors ground the ends of the coils
              ' connected to them, activaing those 2 coils.
              ' All other coils are off.

PAUSE Delay    ' PAUSE in milli-seconds so
              ' PAUSE Delay is a pause of 5(ms)

PORTB = 6    ' Equivalent to PORTB = %00000110
              ' in binary. Makes pin RB2 and RB1 HIGH and
              ' all other PORTB pins LOW. This sends a
              ' HIGH signal to the NPN transistors
              ' connected to pins RB2 & RB1. The NPN
              ' transistors ground the ends of the coils
              ' connected to them, activaing those 2 coils.
              ' All other coils are off.

PAUSE Delay

PORTB = 3    ' Equivalent to PORTB = %00000011
              ' in binary. Makes pin RB1 and RB0 HIGH and
              ' all other PORTB pins LOW. This sends a
              ' HIGH signal to the NPN transistors
              ' connected to pins RB1 & RB0.

PAUSE Delay

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PORTB = 9           ' Equivalent to PORTB = %00001001
                    ' in binary. Makes pin RB3 and RB0 HIGH and
                    ' all other PORTB pins LOW. This sends a
                    ' HIGH signal to the NPN transistors
                    ' connected to pins RB3 & RB0.

PAUSE Delay

GOTO start         ' Start process over again

END
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