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'-----Title-----
' File.....step_mot1.pbp
' Started....2/2/09
' Microcontroller used:  Microchip Technology 16F88
'                          microchip.com
' PicBasic Pro Code:  micro-Engineering Labs, Inc.
'                          melabs.com
' Stepper Motor Used:  Jameco #237623

'-----Program Description-----
' Program drives stepper motor to rotate, rather slowly.

'-----Schematic-----
' See schematic at:
'
http://www.cornerstonerobotics.org/schematics/pic_programming_step_mot1.pdf

'-----Related Lesson-----
' step_mot1.pbp is used in 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 PIC16F88, 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-----
'
'          PIC16F88 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-----
'
'          Delay  VAR  WORD  ' WORD for variable Delay
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*'-----Initialization-----'*

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TRISB = %00000000      ' Sets all PortB pins to output
OSCCON = $60           ' Sets the internal oscillator in the
                       ' 16F88 to 4 MHz
    
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*'-----Main Code-----'*

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Delay = 50              ' Sets Delay variable to 50(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
                       '   -----
                       '       250             1 A
                       '       100             1 A
                       '        50             0.93 A
                       '        20             0.80 A
                       '        10             0.62 A
                       '         6             0.50 A
                       '         5             0.44 A
                       '         4             0.11 A
                       '         3             0.16 A
                       '         2             Motor Stops Operating
                       '                               Properly
    
```

start:

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PORTB = 8              ' Equivalent to PORTB = %00001000
                       ' in binary. Makes pin RB3 HIGH and all
                       ' other PORTB pins LOW. This sends a
                       ' HIGH signal to the NPN transistor
                       ' connected to pin RB3. The NPN transistor
                       ' grounds one end of the coil connected
                       ' to it, activaing the coil.
                       ' All other coils are off.
    
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PAUSE Delay          ' PAUSE in milli-seconds so
                       ' PAUSE Delay is a pause of 50(ms)
    
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PORTB = 4              ' Equivalent to PORTB = %00000100
                       ' in binary. Makes pin RB2 HIGH and all
                       ' other PORTB pins LOW. This sends a
                       ' HIGH signal to the NPN transistor
                       ' connected to pin RB2. The NPN transistor
                       ' grounds one end of the coil connected
                       ' to it, activaing the coil.
                       ' All other coils are off.
    
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**PAUSE** Delay

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PORTB = 2              ' Equivalent to PORTB = %00000010
                       ' in binary. Makes pin RB1 HIGH and all
    
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                                ' other PORTB pins LOW. This sends a
                                ' HIGH signal to the NPN transistor
                                ' connected to pin RB1.
PAUSE Delay
PORTB = 1                        ' Equivalent to PORTB = %00000001
                                ' in binary. Makes pin RB0 HIGH and all
                                ' other PORTB pins LOW. This sends a
                                ' HIGH signal to the NPN transistor
                                ' connected to pin RB0.
PAUSE Delay
GOTO start                      ' Start process over again
END
```