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'----Title-----
' File.....sonar2.pbp
' Started....5/15/06
' Microcontroller used: Microchip Technology 16F88
                       microchip.com
' PBPro Code, micro-Engineering Labs, Inc.
             melabs.com
'----Program Desciption-----
' Using the Devantech SRF04 ultrasonic range finder,
' the distance from the range finder to an object
' is displayed on an LCD screen in inches and LED's
' light up showing the closeness to that object
' according to the table below.
  Distance in inches # Lit LED's
       4 or less
                            4
       6 or less
       8 or less
                             2
       10 or less
'-----Revision History-----
' 11/25/08 Convert from PIC16F84A to PIC16F88,
' add PIC16F88 oscillator and ANSEL = 0 initializations.
'----Constants/Defines-----
   conv_to_inches CON 15 ' Assigns the value 15 to the
                                ' constant conv_to_inches
'-----Variables-----
   emit
          VAR PORTB.0
                                ' Pin RB0 assigned the name emit
   echo VAR PORTB.1
                                ' Pin RB1 assigned the name echo
                                ' Defines dist_raw as a 16 bit
   dist_raw VAR WORD
                                ' variable
                                ' Defines dist inch as a 16 bit
   dist_inch VAR WORD
                                ' variable
'----Initialization-----
   TRISB = %0000010
                               ' Sets PORTB.1 (echo) as input,
                               ' all other PORTB pins as outputs
   ANSEL = 0
                               ' Configure all pins to digital
                               ' operation since not using ADC
                               ' (Analog to Digital Converter)
   OSCCON = $60
                               ' Sets the internal oscillator in the
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' 16F88 to 4 MHz
'----Main Code-----
start:
                                 ' start label
                                 ' Pulse Width:
   PULSOUT emit,1
                                 ' Sends a pulse out on pin RBO (emit)
                                 for 10 usec. The period,(1) is
                                  ' multiplied by the increment for
                                  ' a 4 MHz oscillator(10 usec)
                                  ' to get a pulse out time of 10 usec.
   PULSIN echo,1,dist_raw
                                 ' Measures the pulse width on pin RB1
                                 ' (echo) and assigns the reading to the
                                  ' variable dist_raw.
   dist_inch = (dist_raw/conv_to_inches) ' Converts raw sonar reading
                                  ' to inches.
   LCDOUT $FE,1, "Dist.in inch." ' Clears LCD screen, displays
                                ' "Dist. in inch."
   LCDOUT $FE,$14,#dist_inch
                                ' Moves cursor over one space,
                                 ' displays value of the variable
                                 ' dist_inch
   IF dist_inch <= 4  THEN LED4 ' If the distance is equal or less</pre>
                                ' than 4 inches, go to LED4 label.
   IF dist_inch <= 6  THEN LED3 ' If the distance is equal or less</pre>
                                 ' than 6 inches, go to LED3 label
   IF dist_inch <= 8  THEN LED2 ' See note directly above</pre>
   IF dist_inch <= 10 THEN LED1 ' See note directly above</pre>
                                ' Pause 10 milliseconds
   PAUSE 10
   GOTO start
```

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LED4:
                                  ' LED4 label
    PORTB = %11110000
                                  ' Set RB4,5,6,7 to HIGH (+5v) and
                                  ' RB0,1,2,3 to LOW (Ov).
    GOTO bottom
                                  ' Go to bottom label
LED3:
                                  ' Set RB4,5,6 to HIGH (+5v) and
    PORTB = %01110000
                                  ' RB0,1,2,3,7 to LOW (0v).
    GOTO bottom
                                  ' Go to bottom label
LED2:
    PORTB = %00110000
                                 ' Set RB4,5 to HIGH (+5v) and
                                  ' RB0,1,2,3,6,7 to LOW (Ov).
    GOTO bottom
                                  ' Go to bottom label
LED1:
    PORTB = %00010000
                                  ' Set RB4 to HIGH (+5v) and
                                  ' RB0,1,2,3,5,6,7 to LOW (Ov).
    GOTO bottom
                                  ' Go to bottom label
bottom:
    PAUSE 10
                                 ' Pause 10 milliseconds
    PORTB = %0000000
                                 ' Set all PORTB pins to LOW (0v).
    GOTO start
    END
```