' Robotics with the Boe-Bot - RomingwithIrandPhotoresisterbyus.bs2

' Boe-Bot to detect using the infared and photorisister.

' {$STAMP BS2}

' {$PBASIC 2.5}

DEBUG "Program is Ready To Run!"

'[ Variable for Ir]

irDetectLeft VAR Bit

irDetectRight VAR Bit

pulseCount VAR Byte

counter VAR Nib

'[ Variable for Photoresister]

timeLeft VAR Word

timeRight VAR Word

average VAR Word

difference VAR Word

'[ Initialization ]

FREQOUT 4, 2000, 3000

'[ Main Routine for Ir]

DO

 FREQOUT 8, 1, 45500

 irDetectLeft = IN9

 FREQOUT 2, 1, 45500

 irDetectRight = IN0

 IF (irDetectLeft = 0) AND (irDetectRight = 0) THEN

 GOSUB Back\_Up ' Both IR pairs detect obstacle

 GOSUB Turn\_Left ' Back up & U-turn (left twice)

 GOSUB Turn\_Left

 ELSEIF (irDetectLeft = 0) THEN ' Left IR pair detect

 GOSUB BACK\_UP ' Back up & turn right

 GOSUB Turn\_Right

 ELSEIF (irDetectRight = 0) THEN ' Right IR pair detect

 GOSUB Back\_Up ' Back up & turn left

 GOSUB Turn\_Left

 ELSE ' Both IR pairs 1, no detects

 GOSUB Forward\_Pulse ' Apply a forwards pulse

 ENDIF ' and check again

LOOP

'[ Main Routine for Photoresister ]

DO

 GOSUB Test\_Photoresistors

' For mismatched photoresistors, use Appendix F, uncomment and use next line.

' timeLeft = (timeLeft \*/ 351 + 7 ' Replace 351 with your own values.

 GOSUB Average\_And\_Difference

 GOSUB Navigate

LOOP

'[ Subroutines for Ir]

Forward\_Pulse: ' Send a single forward pulse.

 PULSOUT 13, 850

 PULSOUT 12, 650

 PAUSE 20

 RETURN

Turn\_Left:

 FOR pulseCount = 0 TO 20 ' Left turn, about 90-degrees.

 PULSOUT 13, 650

 PULSOUT 12, 650

 PAUSE 20

 NEXT

 RETURN

Turn\_Right:

 FOR pulseCount = 0 TO 20 ' Right turn, about 90-degrees.

 PULSOUT 13, 850

 PULSOUT 12, 850

 PAUSE 20

 NEXT

 RETURN

Back\_Up:

 FOR pulseCount = 0 TO 40 ' Back up.

 PULSOUT 13, 650

 PULSOUT 12, 850

 PAUSE 20

 NEXT

 RETURN

'[ Subroutines for Photoresister - Test\_Photoresistors]

Test\_Photoresistors:

 HIGH 6 'Left RC time measurement.

 PAUSE 3

 RCTIME 6,1,timeLeft

 HIGH 3 'Right RC time measurement.

 PAUSE 3

 RCTIME 3,1,timeRight

 RETURN

'[ Subroutines for Photoresister - Test\_Average\_And\_Difference]

Average\_And\_Difference:

 average = timeRight + timeLeft / 2

 difference = average / 6

 RETURN

'[ Subroutines for Photoresister - Navigate]

Navigate:

 ' Shadow significantly stronger on left detector, turn right.

 IF (timeLeft > timeRight + difference) THEN

 PULSOUT 13, 850

 PULSOUT 12, 850

 ' Shadow significantly stronger on right detector, turn left.

 ELSEIF (timeRight > timeLeft + difference) THEN

 PULSOUT 13, 650

 PULSOUT 12, 650

 ' Shadow in same neighborhood of intensity on both detectors.

 ELSE

 PULSOUT 13, 850

 PULSOUT 12, 650

 ENDIF

 PAUSE 10

 RETURN