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obstacle_detecting_walking_stick_ultrasonic | Arduino 1.8.19 (Windows Store 1.8.57.0)
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obstacle_detecting_walking_stick_ultrasonic
/*
Code to make a buzzer beep faster as an object gets closer to an ultrasonic distance sensor
For instructions and circuit diagram see:
https://www.sciencebuddies.org/science-fair-projects/project-ideas/Elec\_p107/electricity-electronics/obstacle-detecting-walking-stick
*/

// constant variables for pins
const int trigPin = 6;
const int echoPin = 7;
const int buzzerPin = 8;

int threshold = 20; // threshold distance to activate buzzer
// buzzer delay variables
int buzzerDelay;
int buzzerDelayMin = 10;
int buzzerDelayMax = 250;

long duration; // ultrasonic return pulse duration
long cm;      // distance in centimeters

void setup() { // setup code that only runs once
  // set pin modes
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
}

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pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(buzzerPin, OUTPUT);
// uncomment the next line to use serial print for debugging
Serial.begin(9600);
}

void loop() {

  // send trigger pulse
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // read echo pulse
  duration = pulseIn(echoPin, HIGH);

  // convert the time into a distance
  cm = microsecondsToCentimeters(duration);

  // control the buzzer
  if(cm < threshold){ // if an object is closer than the threshold
    // map the distance to the buzzer delay time
    buzzerDelay = map(cm, 0, threshold, buzzerDelayMin, buzzerDelayMax);
  }
}
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    digitalWrite(buzzerPin,HIGH);
    delay(buzzerDelay);
    digitalWrite(buzzerPin,LOW);
    delay(buzzerDelay);
}
else{ // if an object is farther away than the threshold
    digitalWrite(buzzerPin,LOW); // turn buzzer off
}

// uncomment the next line for debugging
Serial.println(cm);
}
long microsecondsToInches(long microseconds) {
    // According to Parallax's datasheet for the PING)), there are 73.746
    // microseconds per inch (i.e. sound travels at 1130 feet per second).
    // This gives the distance travelled by the ping, outbound and return,
    // so we divide by 2 to get the distance of the obstacle.
    // See: https://www.parallax.com/package/ping-ultrasonic-distance-sensor-downloads/
    return microseconds / 74 / 2;
}
long microsecondsToCentimeters(long microseconds) {
    // The speed of sound is 340 m/s or 29 microseconds per centimeter.
    // The ping travels out and back, so to find the distance of the object we
    // take half of the distance travelled.
    return microseconds / 29 / 2;
}
```