//First we declare all the variables

long verticalDistance;

long horizontalDistance;

long vDuration;

long hDuration;

//Next we declare GPIOs with constants in order to make them easily changable

const int trigpinVertical = 2;

const int echopinVertical = 4;

const int trigpinHorizontal = 8;

const int echopinHorizontal = 11;

const int vMotor = A2;

const int buzzer = 13;

void setup() {// code written inside this fucntion runs once, when the Microcontroller is powered on

//Here we declare GPIOs with input or output as per our need

pinMode(trigpinVertical, OUTPUT);

pinMode(echopinVertical, INPUT);

pinMode(vMotor, OUTPUT);

pinMode(buzzer, OUTPUT);

pinMode(trigpinHorizontal, OUTPUT);

pinMode(echopinHorizontal, INPUT);

Serial.begin(9600); // we initialize serial monitor in order to view the readings of the sensors when connected to computer

}

void loop() {//the code written inside this function rus repeatedly in a loop

//here we set up the first ultrasonic sensor

digitalWrite(trigpinVertical, LOW);

delayMicroseconds(2);

digitalWrite(trigpinVertical, HIGH);

delayMicroseconds(10);

digitalWrite(trigpinVertical, LOW);

vDuration = pulseIn(echopinVertical, HIGH);

verticalDistance= vDuration\*0.034/2;

//here we set up the second ultrasonic sensor

digitalWrite(trigpinHorizontal, LOW);

delayMicroseconds(2);

digitalWrite(trigpinHorizontal, HIGH);

delayMicroseconds(10);

digitalWrite(trigpinHorizontal, LOW);

hDuration = pulseIn(echopinHorizontal, HIGH);

horizontalDistance= hDuration\*0.034/2;

//here we print in the sensor values into the serial monitor we earlier initialized

Serial.print("Distance vertical: ");

Serial.println(verticalDistance);

Serial.print("Distance horizontal: ");

Serial.println(horizontalDistance);

if(horizontalDistance > 20 and horizontalDistance < 120){ //we write the first logic statement in order to detect pits and holes in front of the shoe and take an action accordingly

digitalWrite(buzzer, HIGH);

delay(250);

digitalWrite(buzzer, LOW);

delay(250);

digitalWrite(vMotor, HIGH);

delay(250);

digitalWrite(vMotor, LOW);

delay(250);

}

else if(verticalDistance < 80 and verticalDistance > 50){ //we write the second logic statement in order to detect obstacles in less than 1m range, but more than 50cm

digitalWrite(buzzer, HIGH);

delay(500);

digitalWrite(buzzer, LOW);

delay(500);

digitalWrite(vMotor, LOW);

}

else if(verticalDistance < 50){ //we write the third logic statement in order to detect obstacles which are as close as 50cm

digitalWrite(buzzer, HIGH);

digitalWrite(vMotor, HIGH);

}

else{ //we tell the Microcontroller to shut everything down if there is neither a obstacle nor a pit in front of the shoe

digitalWrite(buzzer, LOW);

digitalWrite(vMotor, LOW);

}

}