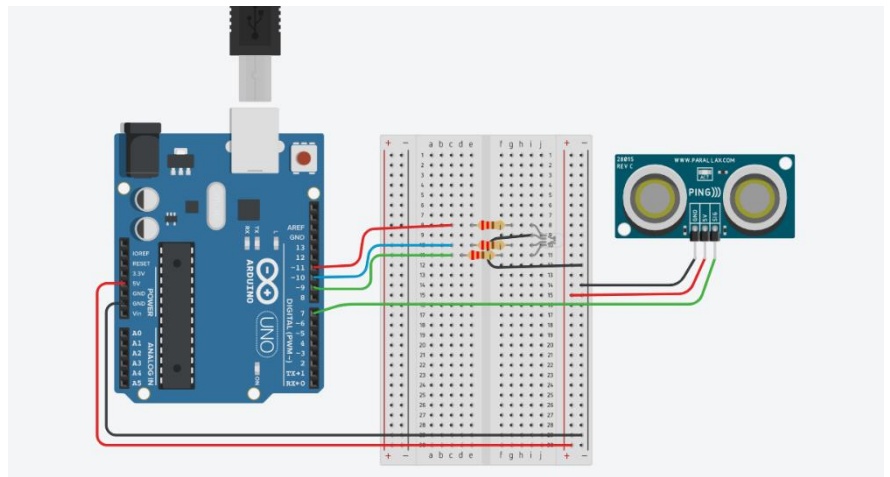NAME: ALI HASSAN HASHIM ALAYAFY

TASK #4.2 - Digital Sensor

ULTRASONIC is digital sensor using digital pins, digital sensor can read or take two values.

I make a circuit using **tinkercad,** ULTRASONIC circuit using both of Arduino uno and ULTRASONIC and resistor wires.

Figure 1 ULTRASONIC CIRCUIT

CODE

```cpp
const int pingPin = 7;
const int red=11;
const int blue=10;
int green=9;
void setup() {
  // initialize serial communication:
  Serial.begin(9600);
  pinMode(red,OUTPUT);
  pinMode(blue,OUTPUT);
  pinMode(green,OUTPUT);
}

void loop() {
  // establish variables for duration of the ping, and the distance result
  // in inches and centimeters:
  long duration, inches, cm;

  // The PING))) is triggered by a HIGH pulse of 2 or more microseconds.
  // Give a short LOW pulse beforehand to ensure a clean HIGH pulse:
  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);

  // The same pin is used to read the signal from the PING))): a HIGH pulse
  // whose duration is the time (in microseconds) from the sending of the ping
  // to the reception of its echo off of an object.
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);

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

  Serial.print(inches);
  Serial.print("in, ");
  Serial.print(cm);
  Serial.print("cm");
  Serial.println();
   if(inches<10){
      digitalWrite(red,HIGH);
      digitalWrite(green,LOW);
      digitalWrite(blue,LOW);
   }
   else if (inches>10 && inches<50){
      digitalWrite(red,LOW);
      digitalWrite(green,LOW);
      digitalWrite(blue,HIGH);
   }

   else{
      digitalWrite(red,LOW);
      digitalWrite(green,HIGH);
      digitalWrite(blue,LOW);
   }
}
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: http://www.parallax.com/dl/docs/prod/acc/28015-PING-v1.3.pdf
  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;
}
```

Figure 2 CODE