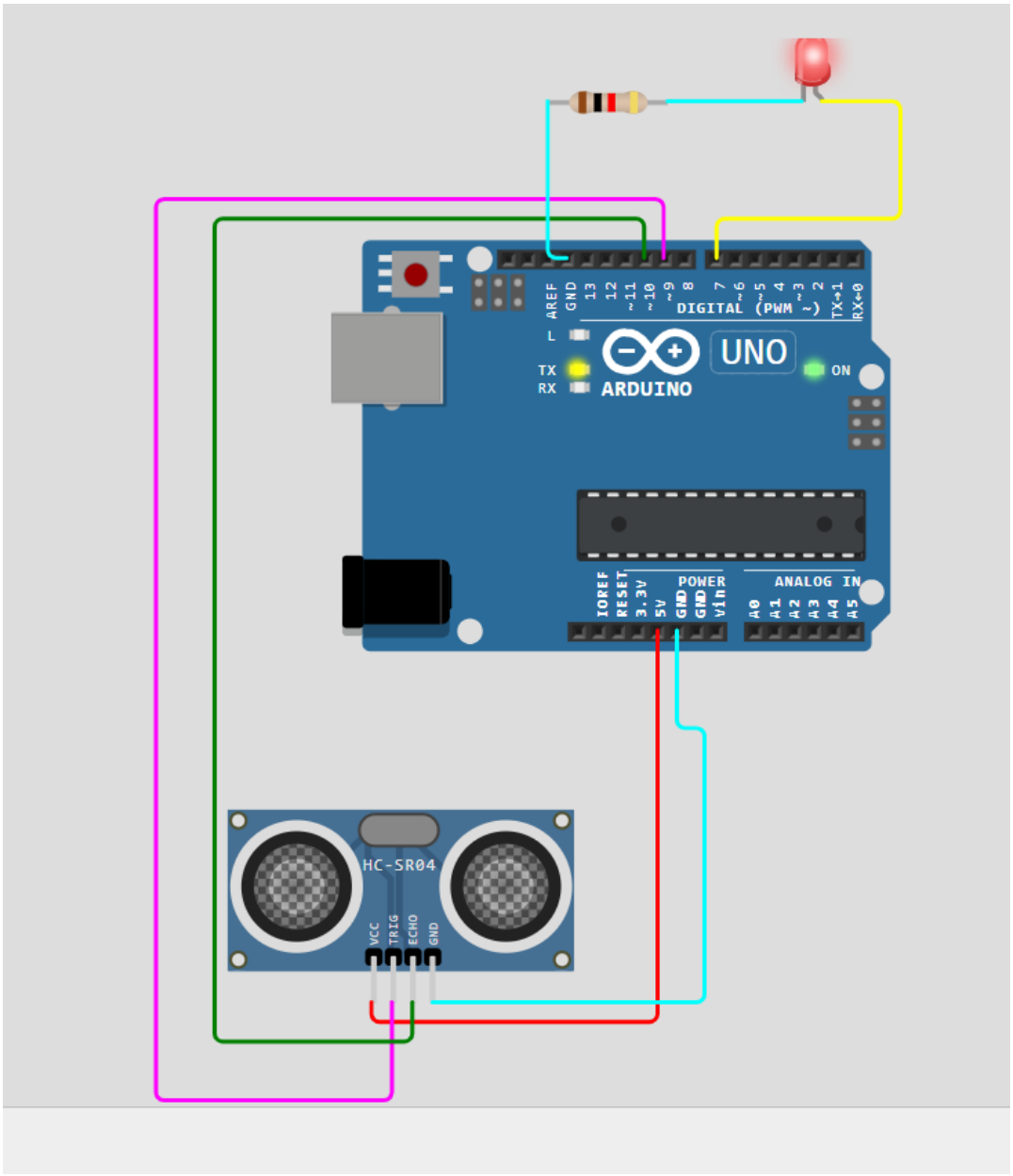
Practice **obstacle tracking / detection** on **Wokwi Arduino Simulator** using an **Arduino Uno** with an **HC-SR04 Ultrasonic Sensor**



You can practice **obstacle tracking / detection** on **Wokwi Arduino Simulator** using an **Arduino Uno** with an **HC-SR04 Ultrasonic Sensor**. This sensor measures distance and helps detect obstacles in front of it.

Below is a **simple beginner project** you can simulate on Wokwi.

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1 Components to add in Wokwi

Search and add these parts in the simulator:

- Arduino Uno
- HC-SR04 Ultrasonic Sensor
- LED (optional for obstacle alert)
- Resistor (220Ω)
- Jumper wires

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2 Wiring Connections

Ultrasonic Sensor → Arduino

Sensor Pin	Arduino Pin
VCC	5V
GND	GND
TRIG	Pin 9
ECHO	Pin 10

LED (optional obstacle indicator)

LED	Arduino
Positive	Pin 7
Negative	GND through resistor

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3 Arduino Code for Obstacle Detection

```
#define TRIG 9
#define ECHO 10
#define LED 7

long duration;
int distance;

void setup() {
  pinMode(TRIG, OUTPUT);
  pinMode(ECHO, INPUT);
  pinMode(LED, OUTPUT);
  Serial.begin(9600);
}

void loop() {

  digitalWrite(TRIG, LOW);
  delayMicroseconds(2);

  digitalWrite(TRIG, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG, LOW);

  duration = pulseIn(ECHO, HIGH);

  distance = duration * 0.034 / 2;

  Serial.print("Distance: ");
  Serial.println(distance);

  if(distance < 20){
    digitalWrite(LED, HIGH); // obstacle detected
  } else {
    digitalWrite(LED, LOW);
  }

  delay(200);
}
```

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4 How it Works

1. The **ultrasonic sensor sends sound waves**.
2. The waves **bounce back from obstacles**.
3. The sensor measures the **time taken to return**.
4. Arduino converts this time into **distance (cm)**.
5. If distance **< 20 cm**, it turns the **LED ON**.

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5 How to Test in Wokwi

1. Open **wokwi.com**
2. Create **New Arduino Project**
3. Add **HC-SR04 sensor**
4. Paste the code
5. Start simulation
6. Move the **distance slider** of the sensor to simulate obstacles.

To **check obstacles in the simulation** on **Wokwi Arduino Simulator** when using an **HC-SR04 Ultrasonic Sensor** with an **Arduino Uno**, you simulate the obstacle by **changing the sensor distance value**.

Here is how to do it

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1 Start the Simulation

1. Open your project in **Wokwi Arduino Simulator**
2. Click ▶ **Start Simulation**

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2 Open the Sensor Control

1. Click on the **HC-SR04 ultrasonic sensor** in the circuit.
2. A **distance slider / input box** will appear.

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3 Change the Distance

You simulate an obstacle by **changing the distance value**.

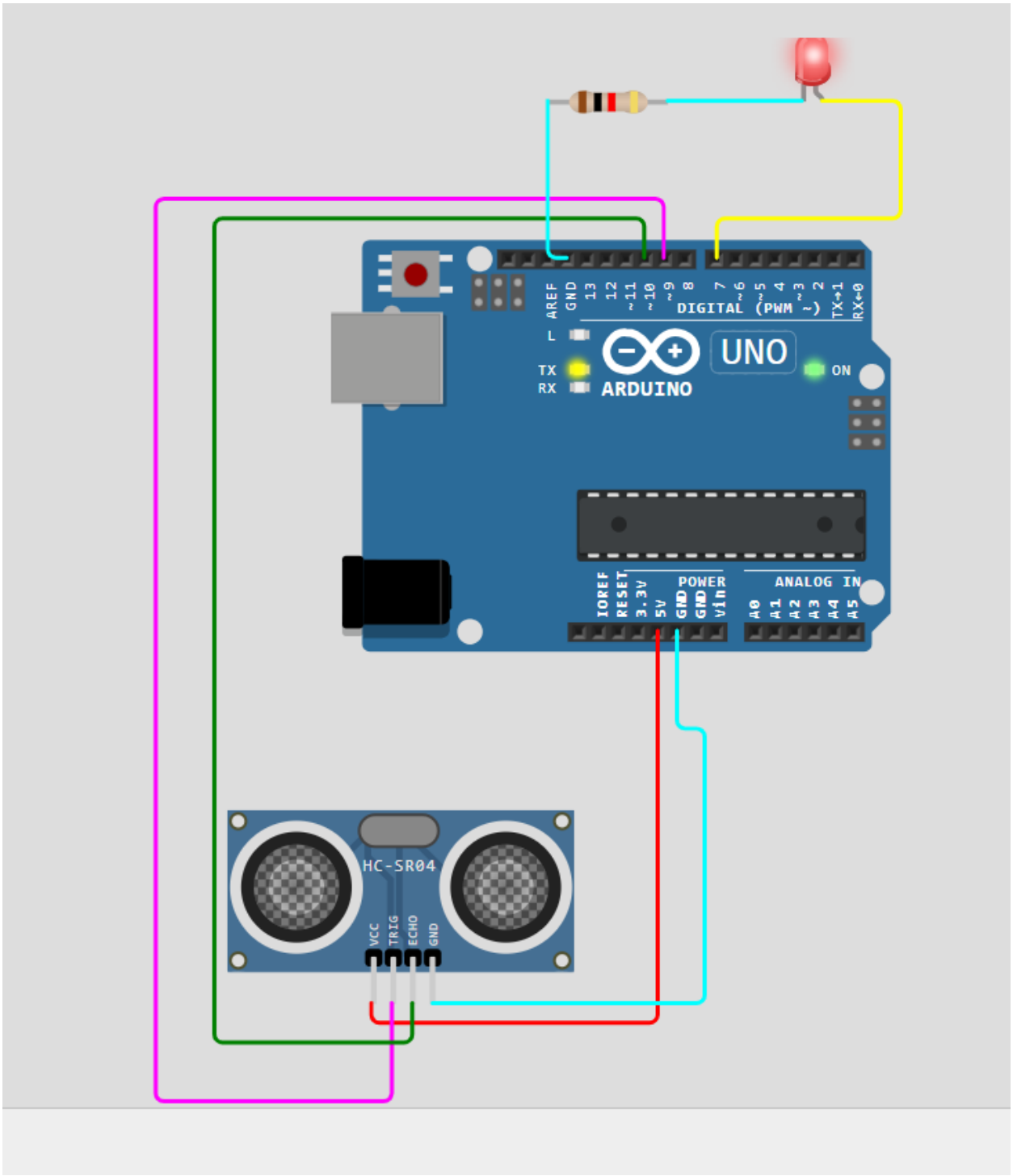
Example:

Distance	Meaning
100 cm	No obstacle
50 cm	Object far away
20 cm	Object getting closer
10 cm	Obstacle detected

If your code says:

```
if(distance < 20)
```

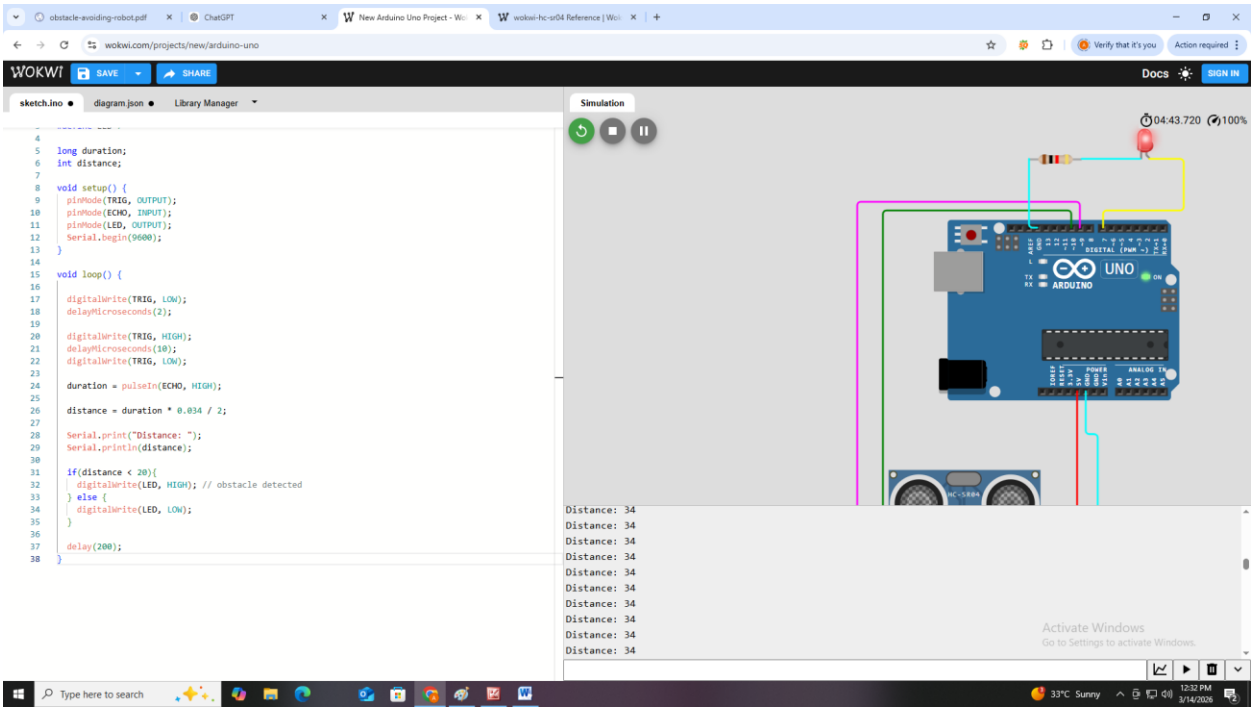
Then when you set the sensor to **10 cm**, the **LED will turn ON** □.


AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM ~)
L
TX
RX
ARDUINO
UNO
ON
IOREF
RESET
3.3V
5V
GND
GND
Vin
POWER
ANALOG IN
A0
A1
A2
A3
A4
A5
HC-SR04
VCC
TRIG
ECHO
GND

4 Check the Serial Monitor

1. Click **Serial Monitor** at the bottom.
2. You will see values like:

```
Distance: 35
Distance: 18
Distance: 10
```



When it goes **below 20**, your obstacle condition triggers.