Obstacle Avoidance Robot

Components Used:

1. **Arduino Uno** (1 unit)
2. **H-bridge** (1 unit)
3. **Ultrasonic Sensors (HC-SR04)** (3 units - Left, Front, and Right)
4. **Motors** (4 units)
5. **Batteries** (3 units)
6. **Wires and connectors**
7. **Chassis**
8. **Breadboard**

Pin Assignments:

Component	Pin Description	Arduino Pin
Left Motor	Direction Control 1	Pin 3
	Direction Control 2	Pin 5
Right Motor	Direction Control 1	Pin 6
	Direction Control 2	Pin 9
Left Ultrasonic Sensor	Trig Pin	Pin 2
	Echo Pin	Pin 4
Front Ultrasonic Sensor	Trig Pin	Pin 7
	Echo Pin	Pin 8
Right Ultrasonic Sensor	Trig Pin	Pin 10
	Echo Pin	Pin 11

Hardware Connections:

1. Connecting the Motors:

The two **DC motors** will be connected to the **L298N Motor Driver** for speed and direction control.

- Connect the **left motor's positive terminal** to **OUT1** on the H-bridge.
- Connect the **left motor's negative terminal** to **OUT2** on the H-bridge.
- Connect the **right motor's positive terminal** to **OUT3** on the H-bridge.
- Connect the **right motor's negative terminal** to **OUT4** on the H-bridge.

2. Connecting Motor Driver to Arduino:

The H-bridge **motor driver** receives control signals from the **Arduino** for the direction and speed of the motors:

- Connect **IN1** (L298N) to **pin 3** on the Arduino.
- Connect **IN2** (L298N) to **pin 5** on the Arduino.
- Connect **IN3** (L298N) to **pin 6** on the Arduino.
- Connect **IN4** (L298N) to **pin 9** on the Arduino.

These pins control the direction and speed of the left and right motors.

3. Powering the Motor Driver:

- Connect the **+12V pin** of the **L298N motor driver** to the **positive terminal of the battery pack**.
- Connect the **GND pin** of the L298N motor driver to the **GND of the battery pack** (common ground).
- Connect the **5V pin** from the L298N motor driver to the **5V pin** on the **Arduino** for powering the Arduino.

4. Connecting Ultrasonic Sensors to Arduino:

Use three **HC-SR04 ultrasonic sensors** to detect obstacles from the left, front, and right.

- **Left Ultrasonic Sensor**:
  - Connect the **Trig** pin to **pin 2** on the Arduino.
  - Connect the **Echo** pin to **pin 4** on the Arduino.
- **Front Ultrasonic Sensor**:
  - Connect the **Trig** pin to **pin 7** on the Arduino.
  - Connect the **Echo** pin to **pin 8** on the Arduino.
- **Right Ultrasonic Sensor**:
  - Connect the **Trig** pin to **pin 10** on the Arduino.
  - Connect the **Echo** pin to **pin 11** on the Arduino.

5. Powering the Ultrasonic Sensors:

- Connect the **VCC pin** of each ultrasonic sensor to the **5V pin** on the Arduino.
- Connect the **GND pin** of each ultrasonic sensor to the **GND pin** on the Arduino.

6. Power Supply for Arduino:

- The Arduino is powered through the **5V pin** from the L298N motor driver.
- Ensure that the **GND pin** of the Arduino is connected to the **common ground** shared by the L298N motor driver and the ultrasonic sensors.
