Below is a **detailed beginner guide to build your first obstacle-avoiding robot** using the parts you listed. I'll explain the **assembly, wiring diagram, and programming logic** step-by-step so you can actually build it.

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1. Components Needed

Use these main parts:

- Microcontroller: Arduino Uno
- Motor controller: L298N Motor Driver Module
- Distance sensor: HC-SR04 Ultrasonic Sensor
- Motors: N20 DC Gear Motor (2 pieces)
- Robot base: 2WD Smart Robot Car Chassis Kit
- Power supply: 18650 Lithium-Ion Battery
- Jumper wires
- Breadboard

Optional but useful:

- On/off switch
- Battery holder

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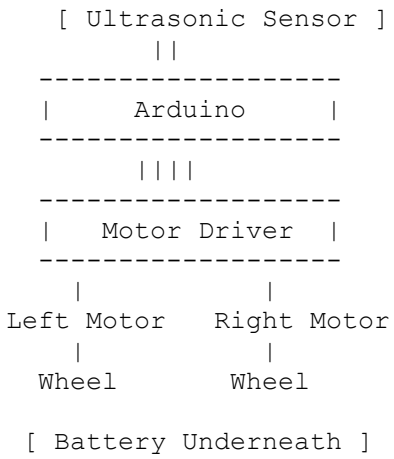
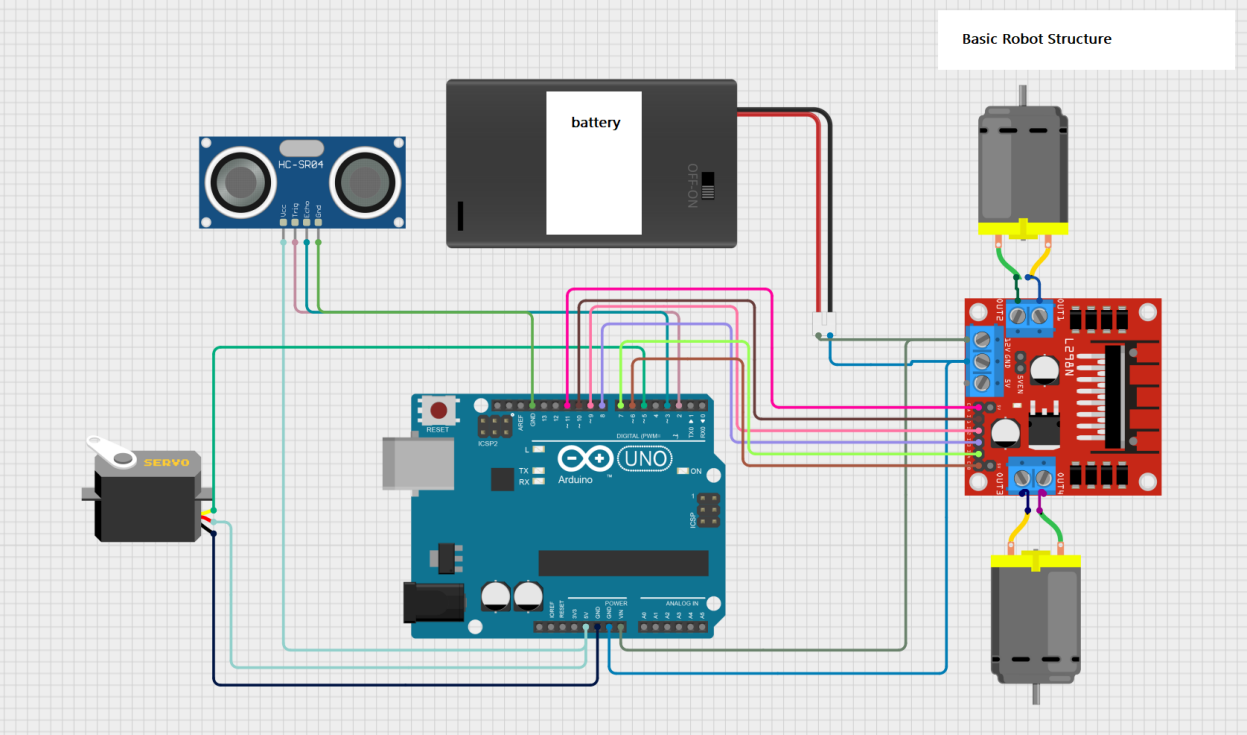
2. Basic Robot Structure

Your robot will look like this conceptually:





The **sensor detects obstacles**, the **Arduino processes data**, and the **motor driver moves the wheels**.

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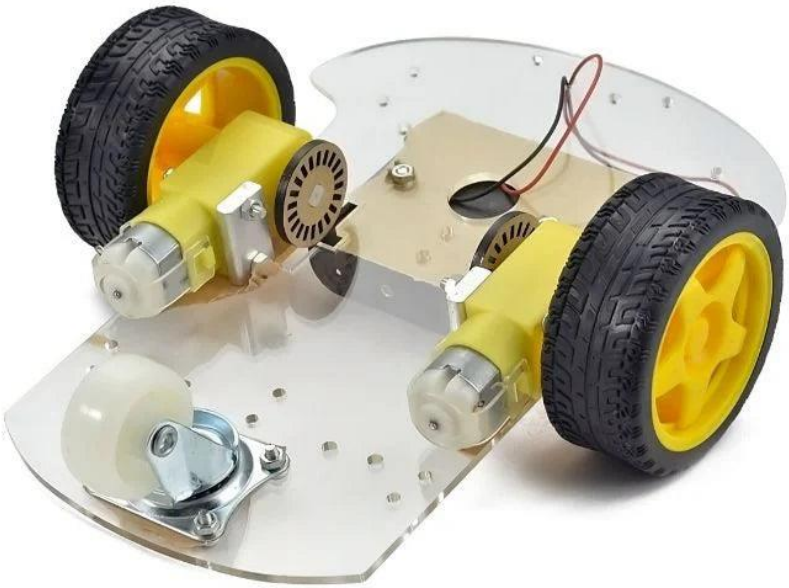
1. Assemble the Chassis

Steps:

1. Take the **2WD Smart Robot Car Chassis Kit** base plate.



2. Attach the **2 gear motors** to the motor holders.
3. Fix the **wheels** onto the motor shafts.
4. Attach the **battery holder** under or on the chassis.
5. Mount the **Arduino Uno** using screws.
6. Fix the **ultrasonic sensor** at the front of the robot.

Robot structure idea:

```
Front
  ↑
 [ Ultrasonic Sensor ]

 [ Arduino Board ]

 [ Motor Driver ]

Left Wheel     Right Wheel

     Battery
```

---

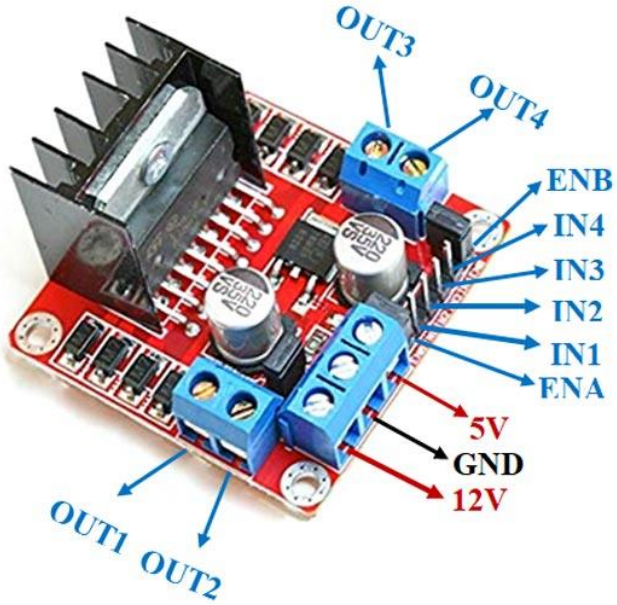
4. Wiring Diagram

Motor Driver to Motors

L298N Motor Driver

```
OUT1 ---- Left Motor +
OUT2 ---- Left Motor -

OUT3 ---- Right Motor +
OUT4 ---- Right Motor -
```



Motor Driver to Arduino

```
Arduino         L298N
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Pin 8    -----> IN1
Pin 9    -----> IN2
Pin 10   -----> IN3
Pin 11   -----> IN4
5V       -----> 5V
GND      -----> GND
```

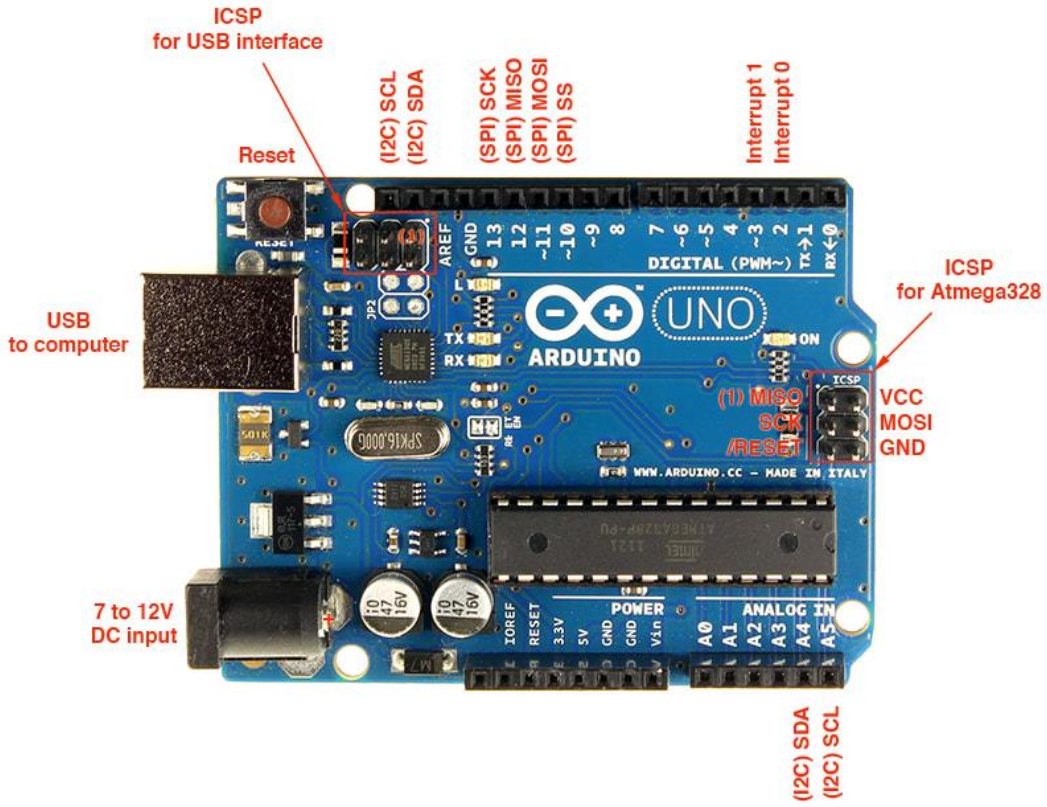

Ultrasonic Sensor Wiring

```
HC-SR04 Sensor      Arduino
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VCC  -------------> 5V
GND  -------------> GND
TRIG -------------> Pin 6
ECHO -------------> Pin 7
```
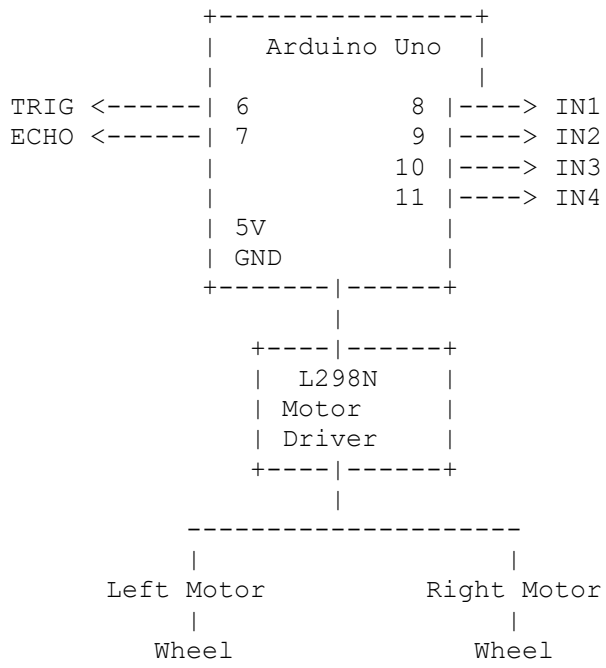

5. Complete Connection Diagram



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6. Install Programming Software

Download:

- Arduino IDE

Steps:

1. Install the software.
2. Connect Arduino using USB.
3. Select **Tools → Board → Arduino Uno**.
4. Select the correct **COM Port**.

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7. Simple Robot Logic

Your robot will follow this logic:

```
Start

Measure distance

IF distance > 20 cm
    Move forward

IF distance < 20 cm
    Stop
    Turn right

Repeat
```

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8. Example Arduino Code (Simple)

```
#define trigPin 6
#define echoPin 7

#define IN1 8
#define IN2 9
#define IN3 10
#define IN4 11

void setup()
{
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);

pinMode(IN1, OUTPUT);
pinMode(IN2, OUTPUT);
pinMode(IN3, OUTPUT);
pinMode(IN4, OUTPUT);

Serial.begin(9600);
}

void loop()
{
```

```
long duration;
int distance;

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

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

duration = pulseIn(echoPin, HIGH);
distance = duration * 0.034 / 2;

if(distance > 20)
{
forward();
}
else
{
stopRobot();
delay(500);
turnRight();
delay(500);
}
}

void forward()
{
digitalWrite(IN1,HIGH);
digitalWrite(IN2,LOW);
digitalWrite(IN3,HIGH);
digitalWrite(IN4,LOW);
}

void stopRobot()
{
digitalWrite(IN1,LOW);
digitalWrite(IN2,LOW);
digitalWrite(IN3,LOW);
digitalWrite(IN4,LOW);
}

void turnRight()
{
digitalWrite(IN1,HIGH);
digitalWrite(IN2,LOW);
digitalWrite(IN3,LOW);
digitalWrite(IN4,HIGH);
}
```

Upload the code to the Arduino.

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9. Power the Robot

1. Insert **18650 Lithium-Ion Battery** into the battery holder.
2. Turn on the power switch.
3. Place the robot on the floor.

The robot will:

- Move forward
- Detect objects
- Turn when obstacle appears

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10. Ideas to Improve the Robot

Add features like:

- Bluetooth control using HC-05 Bluetooth Module
- Camera vision using Raspberry Pi Camera Module
- Voice control with Python
- Line-following sensors

 After this project you will understand:

- Sensors
- Motor control
- Arduino programming
- Robot design basics