**1. Motor Driver Connections**

These connections help the motors turn forward and backward.

* **Arduino Pin 5** → **IN1 on Motor Driver (Motor 1 – Forward)**
* **Arduino Pin 6** → **IN2 on Motor Driver (Motor 1 – Reverse)**
* **Arduino Pin 9** → **IN1 on Motor Driver (Motor 2 – Forward)**
* **Arduino Pin 10** → **IN2 on Motor Driver (Motor 2 – Reverse)**

**2. PWM Speed Control for Motors**

These connections control how fast the motors go by sending special signals (PWM).

* **Arduino Pin 3** → **Speed Control for Motor 1 on Motor Driver**
* **Arduino Pin 11** → **Speed Control for Motor 2 on Motor Driver**

**3. Ultrasonic Sensor Connections**

These connections let the Arduino measure how far away objects are.

* **Arduino Pin 12** → **Trig Pin on Ultrasonic Sensor**
* **Arduino Pin 13** → **Echo Pin on Ultrasonic Sensor**

**4. Stepper Motor Connections**

These connections help the stepper motor move step by step.

* **Arduino Pin 2** → **IN1 on Stepper Motor**
* **Arduino Pin 4** → **IN2 on Stepper Motor**
* **Arduino Pin 7** → **IN3 on Stepper Motor**
* **Arduino Pin 8** → **IN4 on Stepper Motor**

**5. Battery Connections**

The battery gives power to the Arduino and the motors.

* **Battery Positive (+)** → **VCC Pin on Motor Driver** 12v Pin
* **Battery Negative (−)** → **GND Pin on Motor Driver GND Pin**
* **Barrel Connector** → **Arduino**

**6. Summary of Connections**

Here is a simple table to help you see all the parts together.

| **Component** | **Arduino Pin** | **What It Connects To** |
| --- | --- | --- |
| **Motor 1 (Left Motor)** | Pin 5 (IN1) | Motor Driver IN1 (Motor 1) |
|  | Pin 6 (IN2) | Motor Driver IN2 (Motor 1) |
| **Motor 2 (Right Motor)** | Pin 9 (IN1) | Motor Driver IN1 (Motor 2) |
|  | Pin 10 (IN2) | Motor Driver IN2 (Motor 2) |
| **Motor Speed Control** | Pin 3 | Motor Driver Speed Control (Motor 1) |
|  | Pin 11 | Motor Driver Speed Control (Motor 2) |
| **Ultrasonic Sensor** | Pin 12 | Trig Pin on Sensor |
|  | Pin 13 | Echo Pin on Sensor |
| **Stepper Motor** | Pin 2 | IN1 on Stepper Motor |
|  | Pin 4 | IN2 on Stepper Motor |
|  | Pin 7 | IN3 on Stepper Motor |
|  | Pin 8 | IN4 on Stepper Motor |
| **Battery** | (+) | VCC Pin on Motor Driver 12v Pin |
|  | (−) | GND Pin on Motor Driver GND Pin |

Below is a document you can copy and paste into a Word file. It uses simple language and has boxes where you can later add pictures. Enjoy!

**Arduino Uno Project Guide**

This guide shows you how to connect an Arduino Uno with different parts. Follow the steps and check the boxes for pictures later.

**1. Motor Driver Connections**

These connections help the motors turn forward and backward.

* **Arduino Pin 5** → **IN1 on Motor Driver (Motor 1 – Forward)**
* **Arduino Pin 6** → **IN2 on Motor Driver (Motor 1 – Reverse)**
* **Arduino Pin 9** → **IN1 on Motor Driver (Motor 2 – Forward)**
* **Arduino Pin 10** → **IN2 on Motor Driver (Motor 2 – Reverse)**

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**2. PWM Speed Control for Motors**

These connections control how fast the motors go by sending special signals (PWM).

* **Arduino Pin 3** → **Speed Control for Motor 1 on Motor Driver**
* **Arduino Pin 11** → **Speed Control for Motor 2 on Motor Driver**

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**3. Ultrasonic Sensor Connections**

These connections let the Arduino measure how far away objects are.

* **Arduino Pin 12** → **Trig Pin on Ultrasonic Sensor**
* **Arduino Pin 13** → **Echo Pin on Ultrasonic Sensor**

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**4. Stepper Motor Connections**

These connections help the stepper motor move step by step.

* **Arduino Pin 2** → **IN1 on Stepper Motor**
* **Arduino Pin 4** → **IN2 on Stepper Motor**
* **Arduino Pin 7** → **IN3 on Stepper Motor**
* **Arduino Pin 8** → **IN4 on Stepper Motor**

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**5. Battery Connections**

The battery gives power to the Arduino and the motors.

* **Battery Positive (+)** → **VCC Pin on Motor Driver** (or the 5V Pin on Arduino)
* **Battery Negative (−)** → **GND Pin on Motor Driver and Arduino**

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**6. Summary of Connections**

Here is a simple table to help you see all the parts together.

| **Component** | **Arduino Pin** | **What It Connects To** |
| --- | --- | --- |
| **Motor 1 (Left Motor)** | Pin 5 (IN1) | Motor Driver IN1 (Motor 1) |
|  | Pin 6 (IN2) | Motor Driver IN2 (Motor 1) |
| **Motor 2 (Right Motor)** | Pin 9 (IN1) | Motor Driver IN1 (Motor 2) |
|  | Pin 10 (IN2) | Motor Driver IN2 (Motor 2) |
| **Motor Speed Control** | Pin 3 | Motor Driver Speed Control (Motor 1) |
|  | Pin 11 | Motor Driver Speed Control (Motor 2) |
| **Ultrasonic Sensor** | Pin 12 | Trig Pin on Sensor |
|  | Pin 13 | Echo Pin on Sensor |
| **Stepper Motor** | Pin 2 | IN1 on Stepper Motor |
|  | Pin 4 | IN2 on Stepper Motor |
|  | Pin 7 | IN3 on Stepper Motor |
|  | Pin 8 | IN4 on Stepper Motor |
| **Battery** | (+) | VCC (Motor Driver or Arduino) |
|  | (−) | GND (Motor Driver and Arduino) |

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**7. How to Power the Components**

* **Battery:** (For example, a 12V battery) powers both the Arduino Uno and the motor driver.
* **Positive (+) Terminal:** Connect this to the **VCC** pin on the motor driver (or the 5V on the Arduino).
* **Negative (−) Terminal:** Connect this to the **GND** pin on the motor driver and Arduino.

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**8. Important Notes**

* **Common Ground:** Make sure that the **GND** (ground) connections from the battery, motor driver, and Arduino are all connected. This helps all the parts work together.
* **Motor Driver Power:** The motor driver gets its power from the battery because it needs more energy to run the motors.

**Picture placeholder:**

|\_\_\_\_\_\_\_\_\_\_\_|

**Remember:**  
Always double-check your connections. You can add pictures in the boxes later to help you remember what each part looks like.

Happy building and have fun with your Arduino project!