**Vehicle Preparation Guide**

**Introduction**  
This document outlines the step-by-step instructions on how to assemble and prepare the self-driving vehicle for competition. The guide will cover mechanical assembly, electronic connections, and final setup.

**1. Mechanical Assembly**

1. **Chassis Preparation:**
   * Start with the main chassis of the vehicle.
   * Mount the four wheels onto the axle.
   * Ensure that the chassis size adheres to the competition's dimension restrictions (300x200 mm).
2. **Motor Mounting:**
   * Mount the motors to the designated motor slots on the chassis.
   * Make sure the motors are securely fastened and aligned.

**2. Electronic Connections**

1. **Motor Driver (L298D):**
   * Connect motor 1 (left side) to the motor output terminals 1 and 2 of the L298D motor driver.
   * Connect motor 2 (right side) to the motor output terminals 3 and 4.
2. **Power Supply:**
   * Attach the LiPo battery to the main power input of the motor driver.
   * Ensure proper voltage matching for smooth operations.
3. **Arduino and Sensors:**
   * Connect the IR sensor, ultrasonic sensors, and color sensors to the corresponding pins on the Arduino Uno.
   * Ensure the correct placement of the IR sensor for line following and the ultrasonic sensor for obstacle detection.

**3. Final Setup and Calibration**

1. **Power On:**
   * Once the entire vehicle is assembled, power it on by connecting the battery.
2. **Testing and Calibration:**
   * Run the initial test to check the movement of the vehicle.
   * Adjust the sensor positions and fine-tune the calibration for accurate detection of obstacles, color lines, and path corrections.

**4. Troubleshooting Tips**

* **Motor not running:** Check the wiring of the motor driver and ensure it's powered correctly.
* **Sensor not detecting:** Verify sensor connections to the Arduino and recalibrate using provided code.