

How to Build and Wire Our Robot

1. Chassis Setup

- Mount the **DC motor** to the back of a stable chassis platform.
- Attach the **servo motor** to the front steering mechanism or caster wheel (if differential turning isn't used).
- Fix the **ultrasonic sensors** at:
 - **Front** (facing forward)
 - **Left side**
 - **Right side**
- Secure the **Raspberry Pi 5** and power bank on the chassis with foam tape or brackets.

2. Wiring Instructions

Component	GPIO Pins	Notes
DC Motor (via L298N)	IN1 = GPIO17 IN2 = GPIO27 ENA = GPIO22	For forward/reverse + speed control
Servo Motor	GPIO21 or GPIO18	Connected to 5V & GND; control via PWM
Front Ultrasonic	TRIG = GPIO23 ECHO = GPIO24	Detects parking zone & front obstacles
Left Ultrasonic	TRIG = GPIO25 ECHO = GPIO8	Used for CCW wall-following
Right Ultrasonic	TRIG = GPIO7 ECHO = GPIO16	Used for CW wall-following
Start Button (optional)	GPIO20	Trigger to begin robot logic
Power Source	5V power bank or BEC	Must handle Pi + servo current draw

3. Power Tips

- Keep **servo power and Pi power separate** to avoid resets.
- Use **common ground** between Pi and motor/servo circuits.
- Ultrasonic sensors should be supplied with **5V**, but ensure their **ECHO line is safe** for 3.3V GPIO (use a voltage divider if needed).