🔌 Connection Details

🟦 NodeMCU CP2102 Pin Mapping Overview

Sensor	VCC (Power)	GND	Signal Pin (NodeMCU)	Notes
DHT11 (Temperature)	3.3V	GND	**D3 (GPIO 0)**	Add 10kΩ pull-up resistor to data pin (optional)
BMP180 (Pressure)	3.3V	GND	**SDA → D2 (GPIO 4)**	I2C Communication
			SCL → D1 (GPIO 5)	I2C Communication
MQ-7 (Gas Sensor)	3.3V	GND	**A0**	Analog output (gas/CO concentration)
MQ-3 (Smoke Sensor)	3.3V	GND	**D5 (GPIO 14)** *(or A0)*	Use digital output or analog (if only one analog sensor)
Breadboard	Power rail connected to 3.3V and GND of NodeMCU			

🧠 Explanation / Tips

- **Power Supply**: NodeMCU CP2102 works on **3.3V logic**, so connect all sensors to 3.3V, **not 5V**.
- **Analog Pins**: NodeMCU has **only one analog pin (A0)**. If using both MQ-7 and MQ-3 with analog output, you must:
    - Use a **multiplexer**
    - Or use **one sensor in digital mode** with a threshold.
- **DHT11 Timing**: Use a short delay (e.g., delay(2000)) between readings.
- **BMP180** uses I2C protocol — no need to define analog/digital pins manually; just connect to D1 (SCL) and D2 (SDA).

✅ Sample Pin Mapping Summary

🔌 Sensor to NodeMCU Connections

- **DHT11 Temperature Sensor**
  - VCC → 3.3V
  - GND → GND
  - Data → D3 (GPIO 0)

- **BMP180 Pressure Sensor (I2C)**
  - VCC → 3.3V
  - GND → GND
  - SDA → D2 (GPIO 4)
  - SCL → D1 (GPIO 5)

- **MQ-7 Gas Sensor**
  - VCC → 3.3V
  - GND → GND
  - AO → A0

- **MQ-3 Smoke Sensor**
  - VCC → 3.3V
  - GND → GND
  - AO → D5 (GPIO 14) *(or A0 if only one analog sensor)*

- All sensors are connected via a breadboard using male-male and male-female jumper wires.