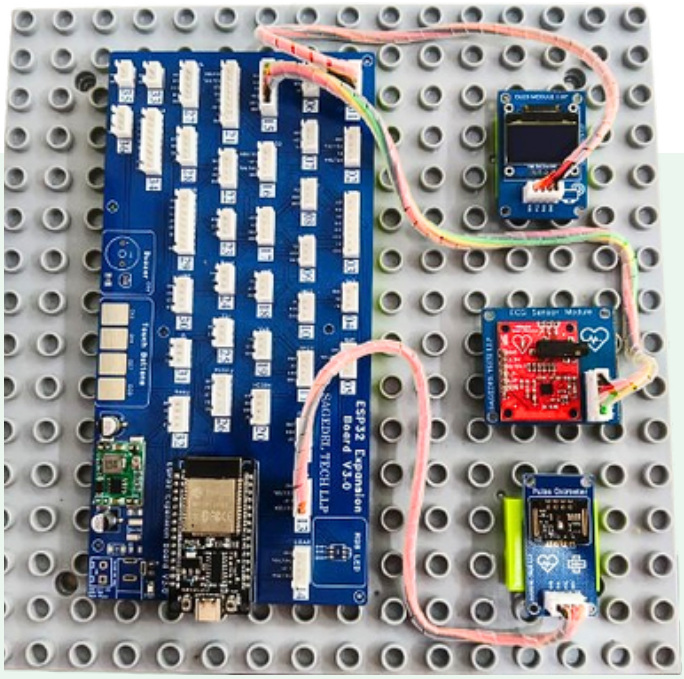
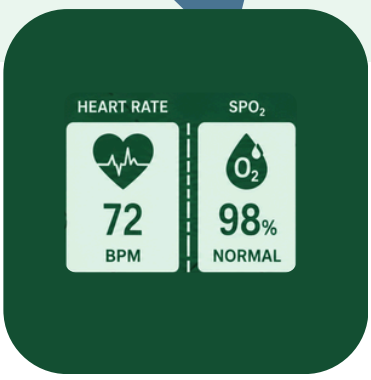
SAGEDEL
SKILL ADAPTIVE EDUCATION

HEALTH MONITORING SYSTEM

Health Monitoring System — Real-Time Heart Rate, ECG and SpO_2 Monitoring Module

2026





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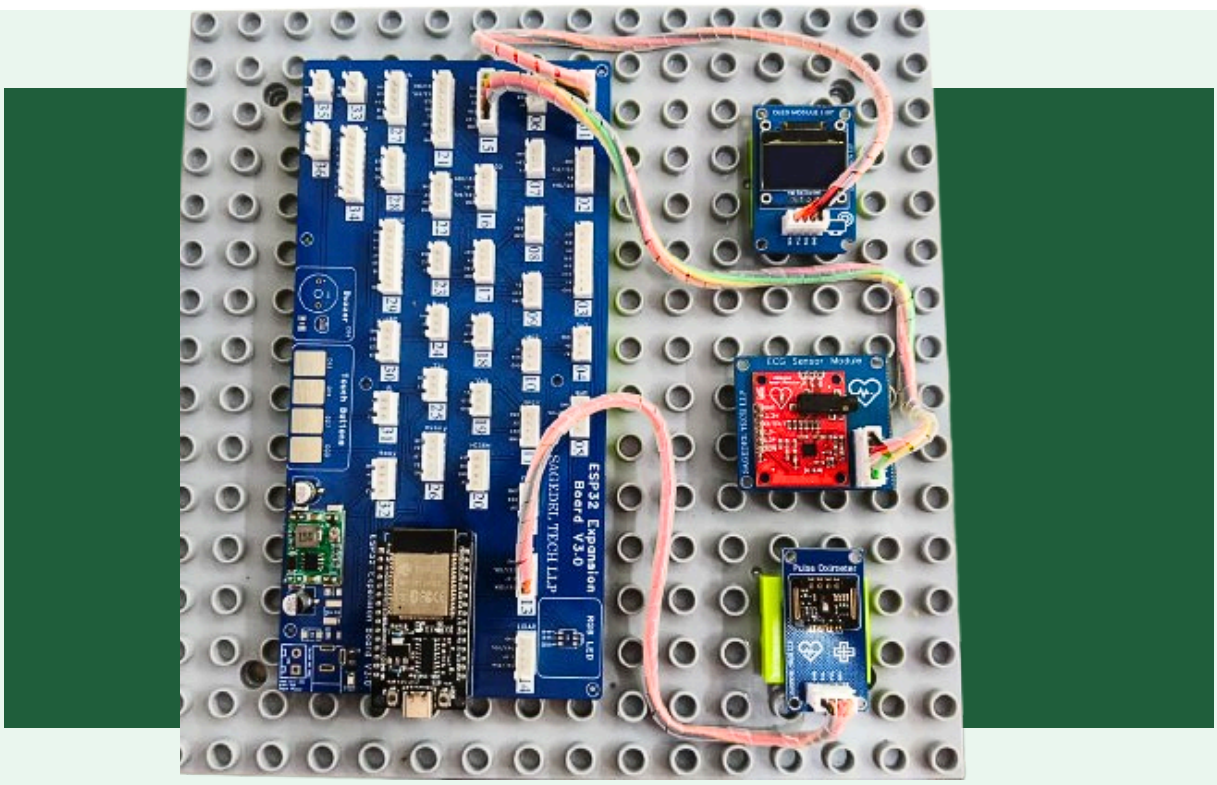
HEALTH MONITORING SYSTEM

Objective:

Learn how to interface MAX30105 and AD8232 sensors with an ESP32 to measure heart rate, SpO_2 levels, and ECG signals, and monitor the health parameters in real time through the Serial Monitor and Serial Plotter.

What it Does:

The ESP32 continuously reads data from the pulse oximeter sensor and ECG sensor to monitor heart rate, SpO_2 levels, and ECG signals. The system processes the sensor readings and displays the health parameters in real time through the OLED display, Serial Monitor, and Serial Plotter.



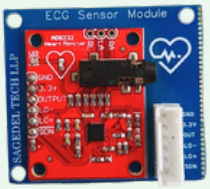
Modules & Components used:

ESP Expansion Board

Lego board

OLED Module

Pulse Oximeter



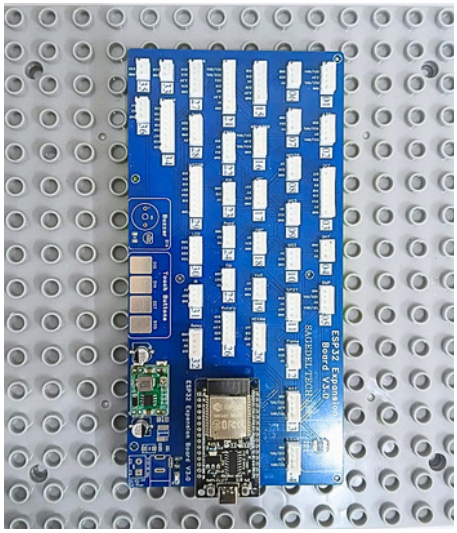
ECG Sensor Module

Connector

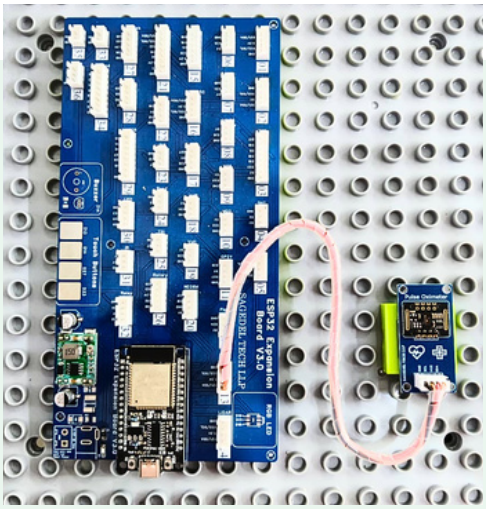
USB cable

Step-by-Step Assembly & Connections

Step 1: Place the ESP32 Expansion Board securely on the lego plate and align it with the mounting holes.



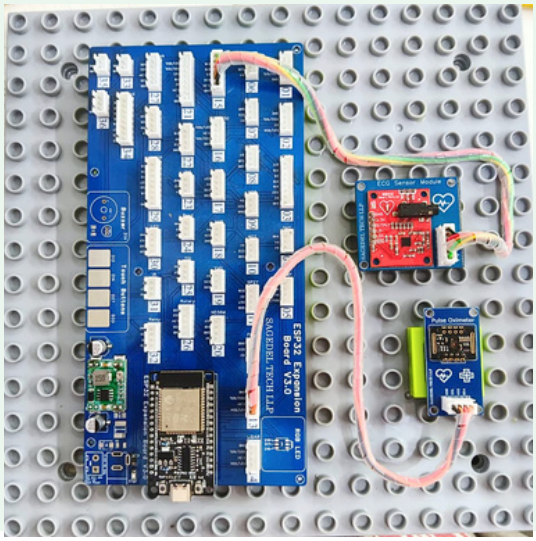
Step 1



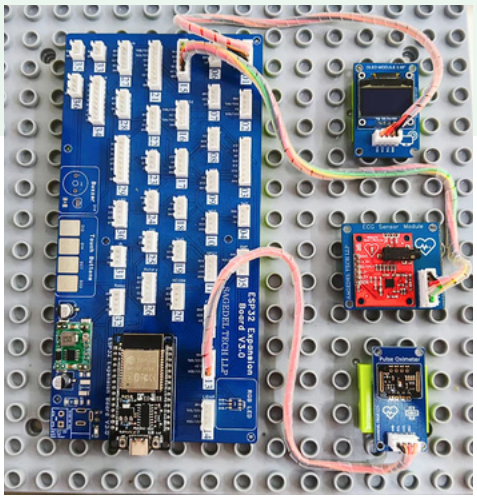
Step 2

Step 2: Connect the Pulse oximeter to **Port No. 13** on the ESP32 Expansion Board.

Step 3: Connect ECG to **Port No. 31** on the ESP32 Expansion Board.



Step 3



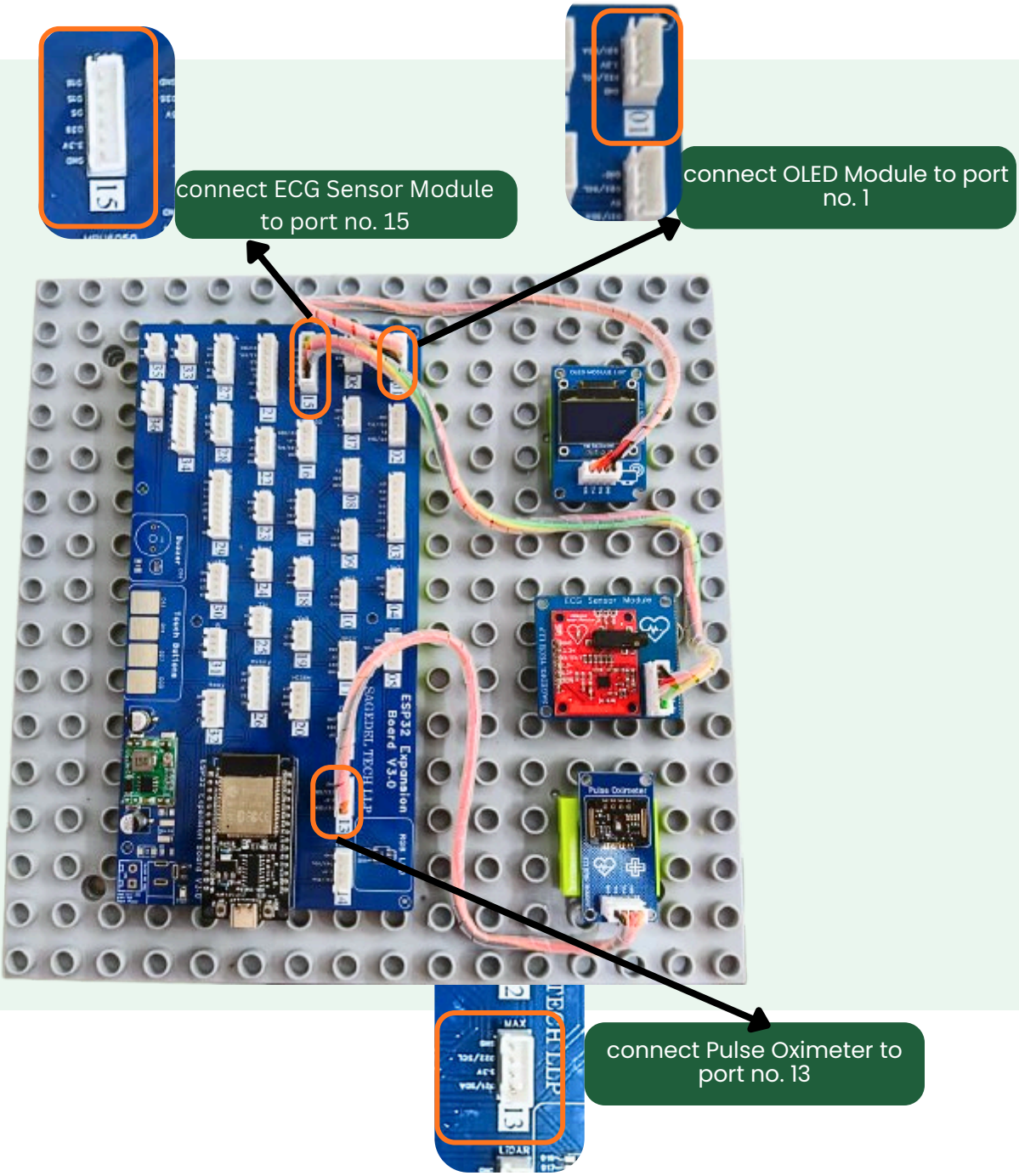
Step 4

Step 4: Connect IR Sensor 2 to **Port No. 9** on the ESP32 Expansion Board.

Step 3

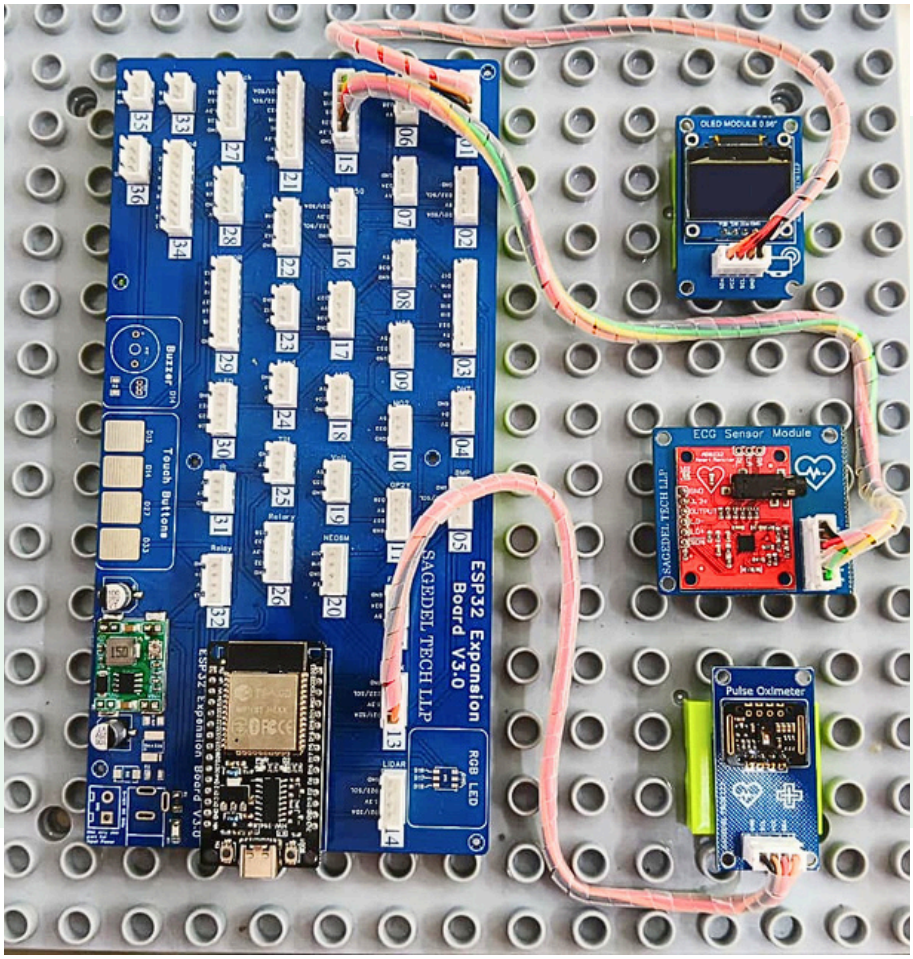
Specific Port Connections

- **OLED Module** → port no. 1
- **ECG Sensor Module** → port no. 15
- **Pulse Oximeter** → port no. 13



Final Management

- Power on the ESP32 and observe the health monitoring graphs on the OLED display. The pulse sensor measures heart rate and SpO_2, while the ECG sensor captures the ECG signal, with the readings and graphs updated in real time.



Calibration:

It involves monitoring heart rate, SpO_2 levels, and ECG signals using health sensors and displaying the corresponding readings and graphs on the OLED display in real time.