

EE 536 - Internet of Things

Group - 07

Name of the project: Home automation 2

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Short description of problem: Automate 3 rooms each have several home appliances like Bulb, Fan and one room have washing machine that are automated through sensors. Each appliance is connected to WiFi module (NodeMCU i.e., base station for each room) and all three NodeMCUs are connected to each other via mesh network.

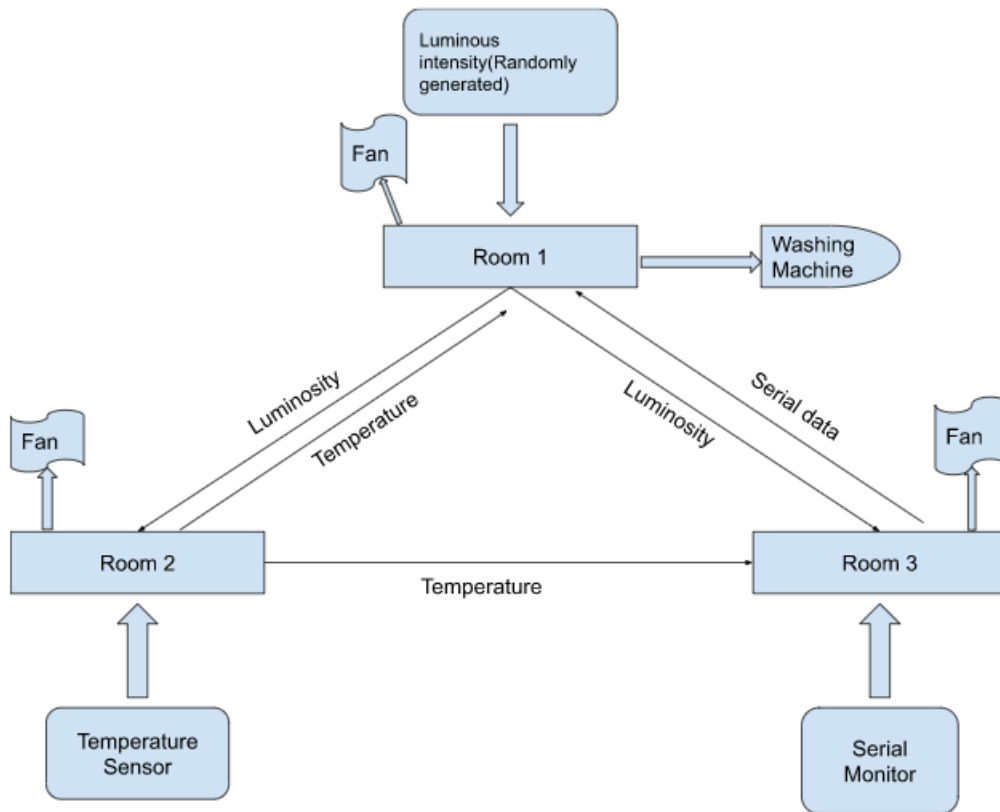
Components Required: 3 NodeMCU with connecting cable, 4 LEDs, 1 Temperature sensor.

Solution detail:

We have 3 NodeMCU in each room, each are connected to others via mesh network.

- NodeMCU 1 is broadcasting luminous intensity to other base stations (NodeMCU) based on that BUILTIN LED is ON or OFF.
- NodeMCU 2 have a Temperature sensor, and it broadcast Temperature data to other NodeMCU's based on that Fan is ON or OFF of respective room.
- We can give input to NodeMCU 3 via serial port, and it send that data to NodeMCU 2 which operates washing machine in Room 2.

Screenshot about the system:



Are you planning to use real sensors: Yes, Temperature sensor.

Milestone 1: Make a mesh network of three wifi module (NodeMCU's) working as base stations and send data from one module to another without using any router in between.

Milestone 2: Implement the idea of home automation. All the home appliance will be automated. Like Bulbs will be ON based on luminosity present. All the three fans will be ON if Temperature exceeds 28°C.

And we can operate washing machine in Room 2 from Room 3.

This IoT project is based on Home Automation and communication of devices is done wirelessly without any router in between. And this networking is called mesh networking.

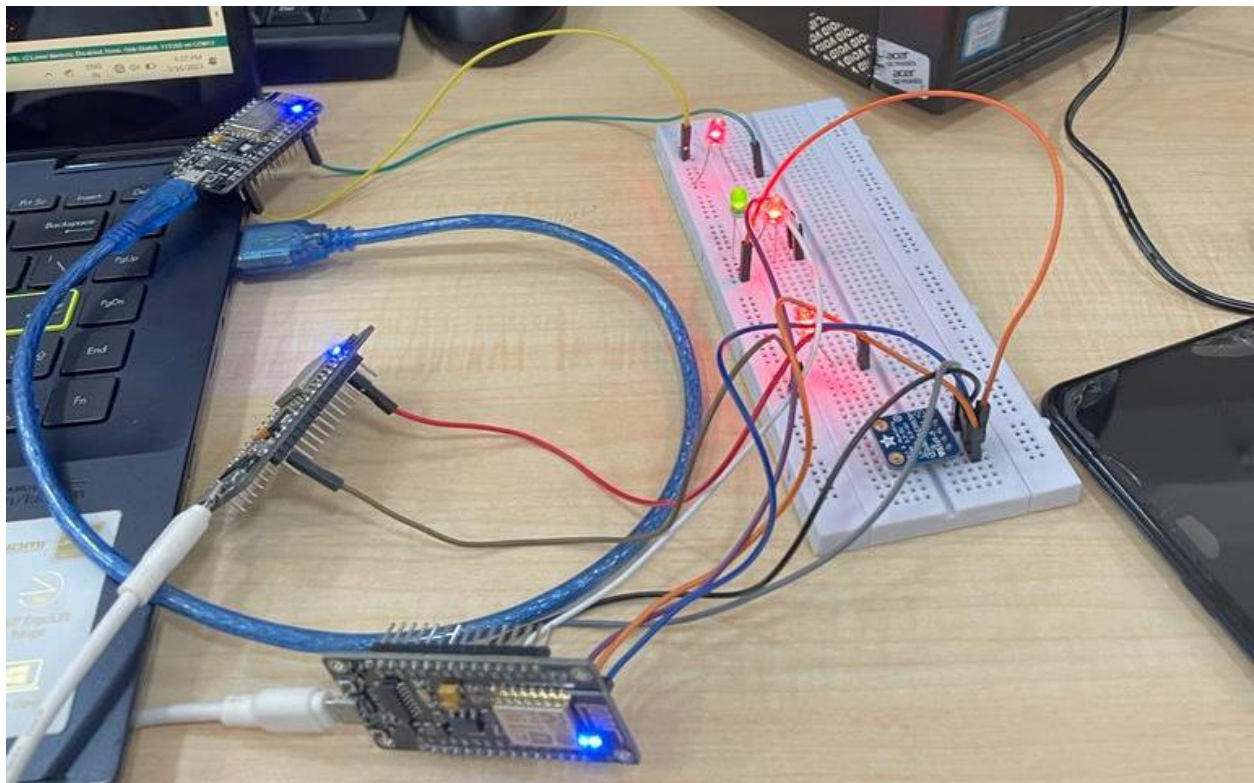
This is whole about communication protocol we are using.

So, for creating such network we are using NodeMCU(ESP 8266) as wifi module. This module will act as base station.

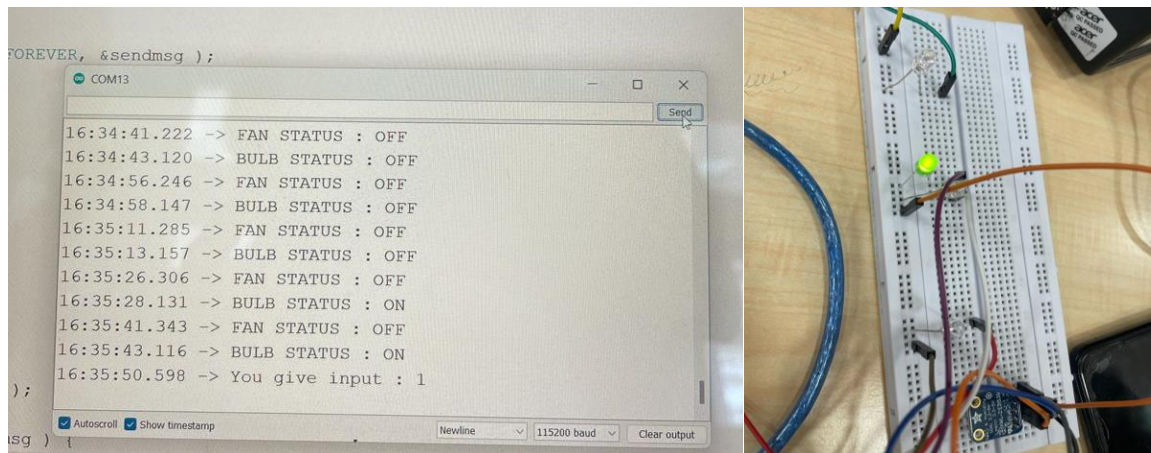
To create mesh network, we will use **painlessmesh** module in Arduino IDE.

PainlessMesh is an open-source library that provides a mesh networking framework specifically designed for Arduino-based IoT devices. **PainlessMesh** is built on top of the ESP8266WiFi and ESP32WiFi libraries.

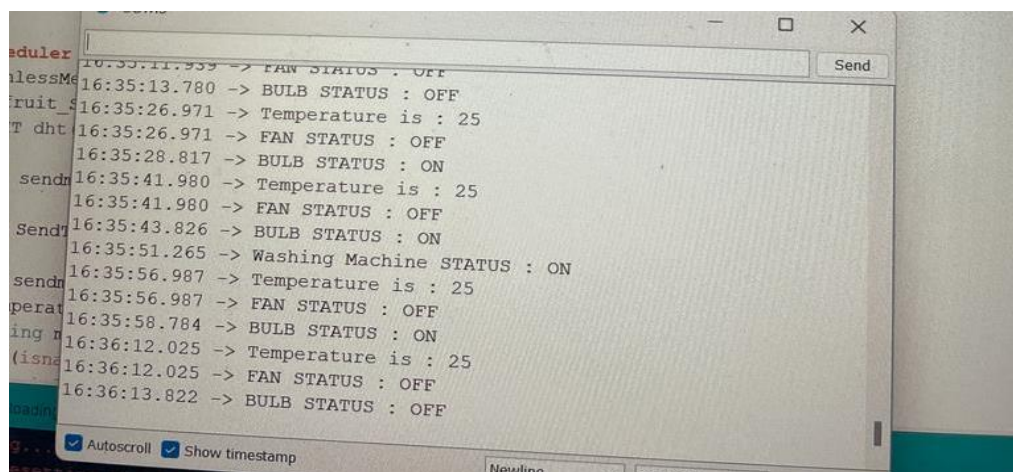
Circuit Diagram:



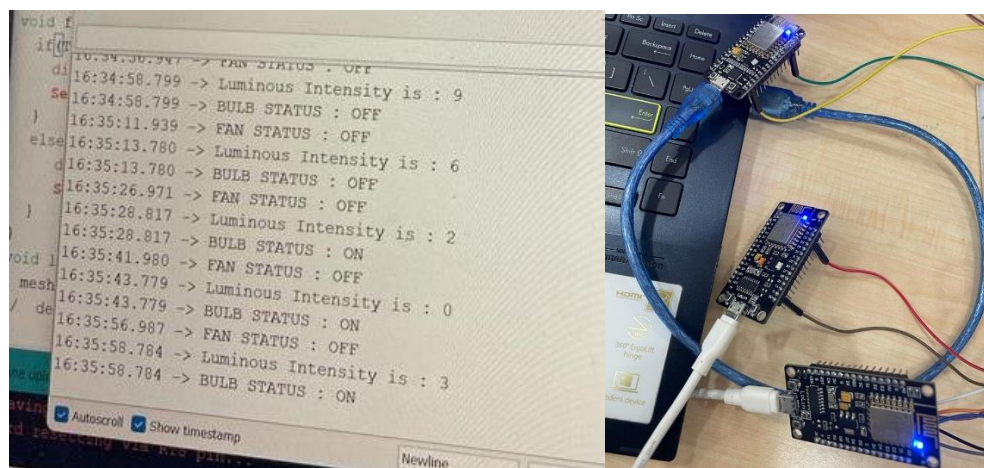
If we enter 1 in serial buffer of Room 3 port then Washing machine will be ON, if 0 then OFF.



And similarly STATUS can be seen on serial monitor of Room 2.

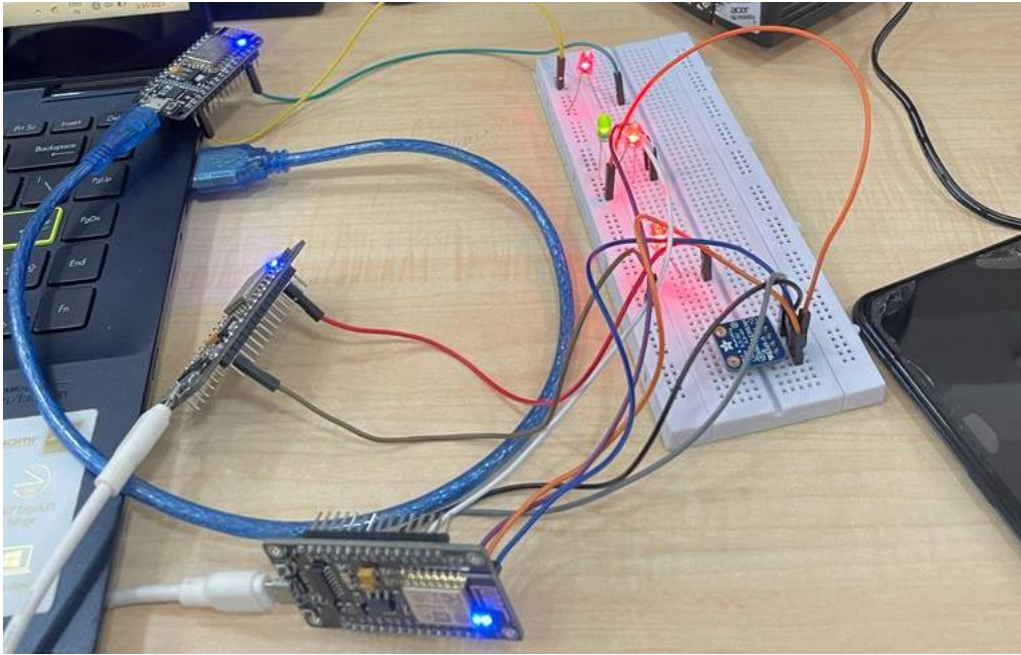


If luminosity is less than 5, then Builtin-LED of all NodeMCU will glow.



And similarly, that can be seen on serial monitor of all rooms.

If Temperature sensor reads more than 28°C then Fan(Red LEDs) will glow in all rooms.



That's all.

All the appliances are working fine and sensors are detecting correct data. And home automation is done with help of some sensors and modules.