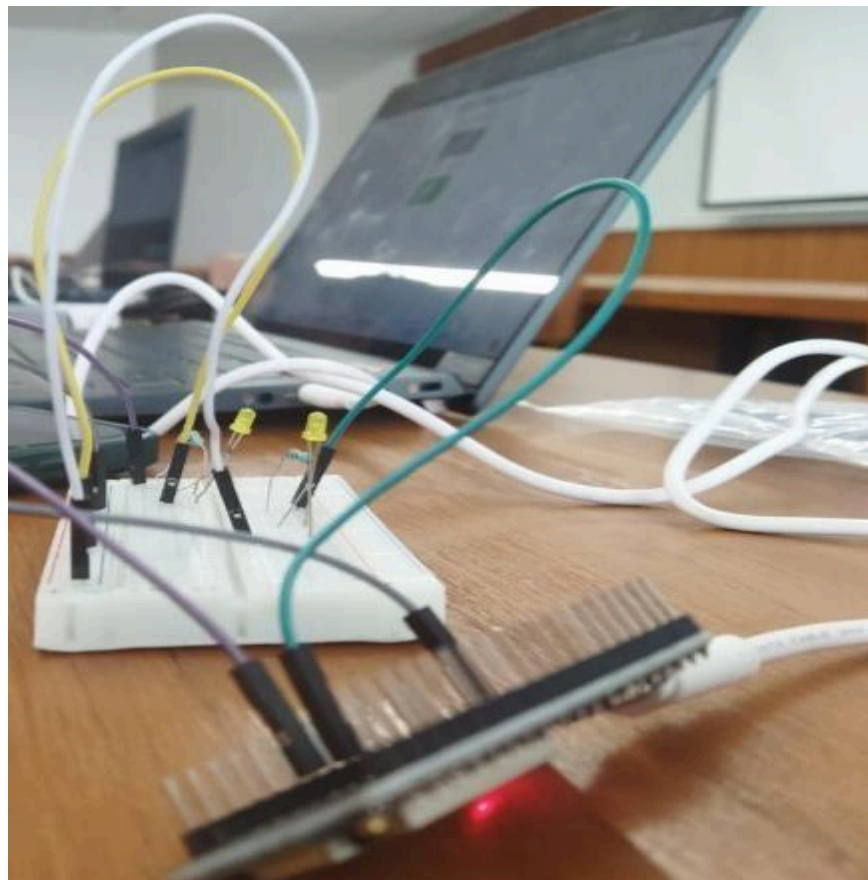
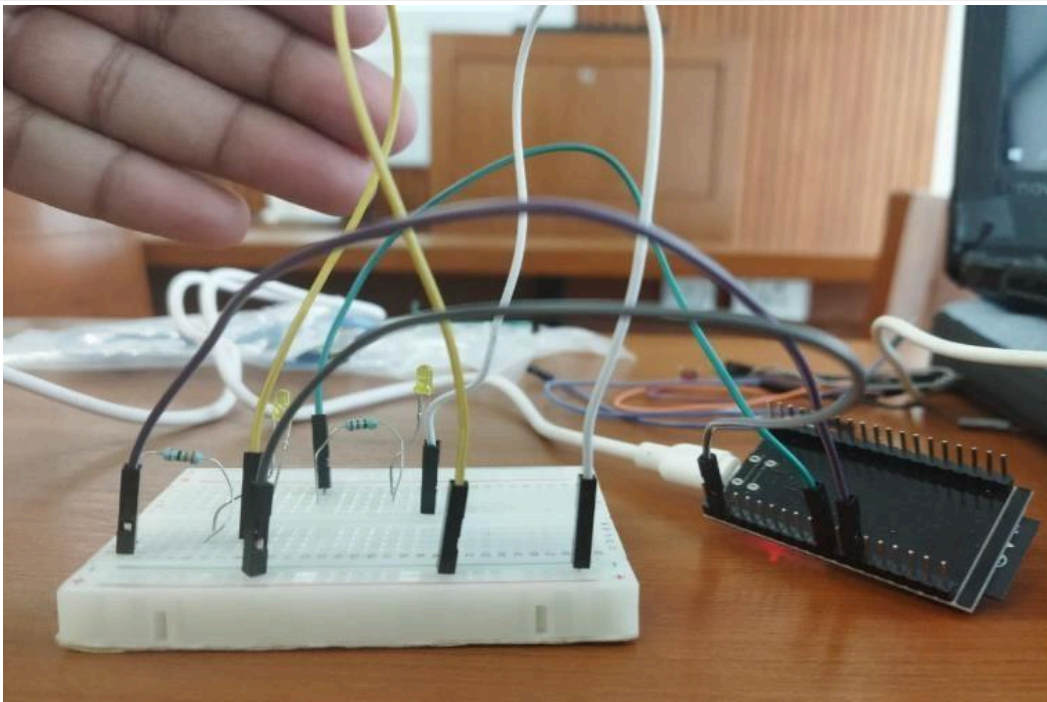


<b>Part A</b>	
<b>Class B Tech CSE 4<sup>th</sup> Year</b>	<b>Sub: Internet of Things Lab</b>
<b>Aim:</b> <i>M2M communication using WiFi:</i> Communication between two nodeMCU (ESP8266-based)/ ESP32 microcontroller board.	
<b>Prerequisite:</b> Basics of programming, microcontrollers and basic electronics	
<b>Outcome:</b> <ol style="list-style-type: none"> <li>1. Study and work of WiFi.</li> <li>2. Connecting microcontroller board with mobile hotspot.</li> <li>3. Establishing a connection using WiFi and exchange of messages between two devices (<i>Client-Server architecture</i>)</li> </ol>	
<b>Theory:</b> <ol style="list-style-type: none"> <li>1. <b>Study of WiFi and M2M communication.</b></li> <li>2. <b>Connect with the WiFi of your mobile phone and control the LED on/off</b></li> <li>3. <b>Connection and communication between two nodeMCU/ESP32 microcontroller boards.</b></li> </ol>	

<b>Part B (Write for an individual)</b>
<b>Steps:</b> <ol style="list-style-type: none"> <li>1. Set up the first NodeMCU/ESP32 as the WiFi Access Point (AP) by configuring it in AP mode and assigning it an SSID and password.</li> <li>2. Configure the second NodeMCU/ESP32 to connect to the first board's WiFi network by setting it up in Station mode and providing the SSID and password of the first board.</li> <li>3. Connect both boards to their respective power supplies.</li> <li>4. Write and upload code to the first NodeMCU/ESP32 to send data over WiFi to the second board using TCP or UDP protocols.</li> <li>5. Write and upload code to the second NodeMCU/ESP32 to receive the data from the first board and process it accordingly.</li> <li>6. Power both boards, and observe the communication between them, ensuring that the data sent from the first board is correctly received by the second.</li> </ol>
<b>Output:</b>

**Observation & Learning:**

The first NodeMCU/ESP32 successfully created a WiFi network as an Access Point, and the second NodeMCU/ESP32 connected to this network without issues. Data transmission

between the two boards was achieved using TCP/UDP protocols, with the second board accurately receiving and processing the data sent by the first.

Through this experiment, you learned how to set up WiFi-based M2M communication between two microcontroller boards. You gained practical experience in configuring one board as an Access Point and the other as a Station, as well as in implementing and troubleshooting TCP/UDP data transmission. This reinforced your understanding of wireless communication protocols and their application in IoT systems.

**Conclusion:**

In conclusion, the experiment successfully demonstrated M2M communication using WiFi between two NodeMCU/ESP32 boards. The first board effectively functioned as a WiFi Access Point, while the second board connected and communicated with it. The accurate data transmission between the boards highlighted the practical application of TCP/UDP protocols in wireless communication. This experiment enhanced your understanding of configuring microcontrollers for WiFi-based communication and the principles underlying IoT systems.