CONNECT TO Wi-Fi

INTERNET OF THINGS

Time: 60 mins

Introduction

In this class, the students will learn to program the ESP32 board to connect to Wi-Fi.

New Commands Introduced

● #include <WiFi.h>	Imports the WiFi library
● const char* variableName	Creates a pointer to a character array whoes value cannot be modified.
● WiFi.begin(ssid, password)	Connects to the network with the sssid with the password.
● WiFi.status()	Gets the status of the Wi-Fi connection.
● WL_CONNECTED	Holds the status of the connection.
● WiFi.localIP()	Gets the IP address of the device.
● WiFi.scanNetworks()	Gets the number of networks available.
● WiFi.SSID()	Gets the SSID of the network the device is connected to.
● WiFi.RSSI()	Gets the signal strength of the network the device is connected to.

Vocabulary

- **Wi-Fi** is a wireless networking technology that is used to access high-speed internet wirelessly.
- Service Set IDentifier or **SSID** is the name of the Wi-Fi network.
- **RSSI** is an estimated measurement of how well a device can hear, detect, and receive signals from any wireless access point or Wi-Fi router.

Learning Objectives

Student/s should be able to:

- ***Recall*** how to program the LCD.
- ***Explain*** the need to alter the address of the additional I2C.

- ***Demonstrate*** the connection of ESP32 board to Wi-Fi.

Activities

1. **Class Narrative:** *(3 mins)*
    - Brief the student/s that the next challenge is to connect ESP32 board to Wi-Fi.
2. **Concept Introduction Activity:** *(4 mins)*
    - Let the student/s undertake the explore-activity to observe how the board connects to Wi-Fi.
    - Using the slides, explain that the student/s will learn:
        - to connect another LCD
        - to configure the LCD
        - to connect to Wi-Fi
3. **Activity 1: Connect Another LCD** *(10 mins)*
    - Help the students recall how to connect the LCD.

      Student Activity: *(10 mins)*
    - Guide the student/s to connect another LCD to the circuit.
4. **Activity 2: Configure the LCD** *(15 mins)*

      Teacher Activity: *(7 mins)*
    - Explain how in real life the jumpers are soldered to change the address of additional I2Cs.
    - Inform the student/s that on Wokwi hexa numbers ranging from 0x1 to 0x7F can be used as addresses for I2C.
    - Demonstrate how to program the board to configure the additional LCD

      Student Activity: *(8 mins)*
    - Guide the student/s to set the address of the additional LCD on the diagram.json, configuring the LCD, and displaying a message.
5. **Activity 3: Connect to Wi-Fi (***12 mins)*

      Teacher Activity: *(6 mins)*
    - Inform the students what SSID is and how signal strength influences the connection to Wi-Fi.

- Demonstrate how the board is connected to Wi-Fi.

  Student Activity: *(6 mins)*

- Guide the students to import the Wi-Fi library, connect to the network, and display the network's SSID and signal strength.

6. **Introduce the Post class project:** *(2 min)*
   - Add and configure an additional LCD to display the status of the air conditioner.
7. **Test and Summarize the class learnings:** *(5 mins)*
   - Check for understanding through quizzes and summarize learning after respective activities.
   - Summarize the overall class learning towards the end of the class.
8. **Additional activities:**
   - Encourage the student/s to debug the code to display the Wi-Fi status and sensor reading on separate LCDs.
   - Encourage the student/s to add one more LCD to display humidity separately.
9. **State the Next Class Objective:** *(1 min)*
   - In the next class, student/s will learn how to send the temperature and humidity values as messages using the MQTT protocol.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table		
Activity	**Activity Name**	**Link**
Class Presentation	Connect to Wi-Fi	https://s3-whjr-curriculum-uploads.whjr.online/da9bcb6c-3ff6-4f71-a509-f52a9bf0fa73.html
Explore Activity	Connect to Wi-Fi	https://wokwi.com/projects/386518535949187073
Student Activity 1	Connect Another LCD	https://wokwi.com/projects/386519052135946241
Teacher Reference: Student Activity 1 Solution	Connect Another LCD	https://wokwi.com/projects/386518871311090689

Teacher Activity 2	Configure the LCD	https://wokwi.com/projects/388403122202677249
Teacher Reference: Teacher Activity 2 Solution	Configure the LCD	https://wokwi.com/projects/388403132194564097
Student Activity 2	Configure the LCD	https://wokwi.com/projects/386526500091593729
Teacher Reference: Student Activity 2 Solution	Configure the LCD	https://wokwi.com/projects/386526179232541697
Teacher Activity 3	Connect to Wi-Fi	https://wokwi.com/projects/388403173459183617
Teacher Reference: Teacher Activity 3 Solution	Connect to Wi-Fi	https://wokwi.com/projects/388403178670607361
Student Activity 3	Connect to Wi-Fi	https://wokwi.com/projects/386526854716892161
Teacher Reference: Student Activity 3 Solution	Connect to Wi-Fi	https://wokwi.com/projects/386526583785793537
Student's Additional Activity 1	Debug the Code	https://wokwi.com/projects/386527070552660993
Teacher Reference: Student's Additional Activity 1 Solution	Debug the Code	https://wokwi.com/projects/386526934149685249
Student's Additional Activity 2	Humidity Display	https://wokwi.com/projects/386527105099051009
Teacher Reference: Student's Additional Activity 2 Solution	Humidity Display	https://wokwi.com/projects/386527149969718273
Post Class Project	Temperature Monitor-Connect Additional Display	https://wokwi.com/projects/386527235410846721
Teacher Reference: Post Class Project Solution	Temperature Monitor-Connect Additional Display	https://wokwi.com/projects/386527188660078593