Arduino Code Modification for Simulation

Introduction

This document explains the modifications made to an original Arduino code that involves Wi-Fi and ThingSpeak functionalities. The modified code is adapted for simulation on platforms like Tinkercad or Wokwi, where internet-based libraries cannot be used. In this modified version, we simulate sensor readings and output the results to the Serial Monitor.

Modified Arduino Code

The code below removes the dependencies on Wi-Fi and ThingSpeak, simulates current readings, and outputs them to the Serial Monitor.

Code:

```
/* Simulated version of your original code for Tinkercad or Wokwi */

// No need for WiFi and ThingSpeak libraries
// #include <WiFi.h>
// #include "ThingSpeak.h"

// Variables for sensor and data
float current = 0; // Variable to store simulated sensor data

void setup() {
  Serial.begin(9600); // Initialize Serial Monitor with baud rate 9600
  Serial.println("Simulation␣started...");
}

void loop() {
  // Simulate reading the current from a sensor
  current = readCurrent();  // Call the mock sensor reading function

  // Print the current value to the Serial Monitor (instead of sending to ThingSpeak)
  Serial.print("Current␣(simulated):␣");
  Serial.println(current);

  delay(2000);  // Simulate a delay of 2 seconds between readings
}

// Mock function to simulate sensor readings (replace this with real sensor code if needed)
```

```
float readCurrent() {
  // You can simulate the current with a random value or use a potentiometer to change it
  // For simplicity, we'll return a random value between 0 and 10 for simulation purposes
  return random(0, 1000) / 100.0; // Simulate a current between 0.0 and 10.0 amps
}
```

Key Modifications:

- **Wi-Fi and ThingSpeak Removed:** The `WiFi.h` and `ThingSpeak.h` libraries, along with the related functionality, are no longer necessary.
- **Simulating Sensor Data:** The `readCurrent()` function now generates a random current value between 0.0 and 10.0 amps. You can modify this function to simulate other sensor inputs or connect it to a real sensor in Tinkercad.
- **Output to Serial Monitor:** Instead of sending data to ThingSpeak, the code prints the current value to the Serial Monitor using `Serial.print()` and `Serial.println()`.
- **Simulating Time Delay:** A delay of 2 seconds (`delay(2000)`) simulates the interval between readings. You can adjust this delay to simulate different intervals.

How to Simulate This Code on Tinkercad

1. Create a new circuit in Tinkercad, add an **Arduino Uno** to the workspace.
2. Paste the modified code into the Tinkercad code editor.
3. Optionally, connect a **potentiometer** to simulate analog sensor input by modifying the `readCurrent()` function to use `analogRead(A0)`.
4. Start the simulation and observe the output in the Serial Monitor.

Conclusion

This modified version of the code allows you to simulate sensor readings and view them in the Serial Monitor without using Wi-Fi or ThingSpeak. This approach makes it suitable for platforms like Tinkercad or Wokwi that do not support internet-based functionalities. When moving to real hardware, the original Wi-Fi and ThingSpeak functionalities can be reintroduced.