**FIRMWARE ASSIGNMENT SOLUTION**

#include <TimerOne.h> // Include the TimerOne library

#define ADC\_VREF\_mV 5000.0 // in millivolts

#define ADC\_RESOLUTION 1024.0 //defines constants for the ADC reference voltage

#define PIN\_LM35 A0 //sensor connected to analog A0 pin

#define ONBOARD\_LED 13 // Built-in LED on Arduino Uno board

enum LedState {

LED\_OFF,

LED\_LOW\_TEMP\_BLINK,

LED\_HIGH\_TEMP\_BLINK

};

LedState currentLedState = LED\_OFF; //declare global variable

unsigned long previousMillis = 0;

const unsigned long intervalLowTemp = 250; // Blink interval for low temperature (250 ms)

const unsigned long intervalHighTemp = 500; // Blink interval for high temperature (500 ms)

void setup() {

Serial.begin(9600); //begin serial monitor

pinMode(ONBOARD\_LED, OUTPUT);

// Initialize Timer1 with the desired interval

Timer1.initialize(intervalLowTemp \* 1000); // Convert to microseconds

Timer1.attachInterrupt(handleTimerInterrupt);

}

void loop() {

// Get the ADC value from the temperature sensor

int adcVal = analogRead(PIN\_LM35);

// Convert the ADC value to voltage in millivolts

float milliVolt = adcVal \* (ADC\_VREF\_mV / ADC\_RESOLUTION);

// Convert the voltage to the temperature in Celsius

float tempC = milliVolt / 10;

// Update LED state based on temperature

if (tempC < 30) {

currentLedState = LED\_LOW\_TEMP\_BLINK;

} else {

currentLedState = LED\_HIGH\_TEMP\_BLINK;

}

}

void handleTimerInterrupt() {

switch (currentLedState) {

case LED\_OFF:

digitalWrite(ONBOARD\_LED, LOW); // LED OFF

break;

case LED\_LOW\_TEMP\_BLINK:

digitalWrite(ONBOARD\_LED, !digitalRead(ONBOARD\_LED)); // Toggle LED state

break;

case LED\_HIGH\_TEMP\_BLINK:

digitalWrite(ONBOARD\_LED, !digitalRead(ONBOARD\_LED)); // Toggle LED state

break;

}

}

// Print the temperature in the Serial Monitor

void printTemperature(float tempC) {

Serial.print("Temperature: ");

Serial.print(tempC);

Serial.print("°C");

float tempF = tempC \* 9 / 5 + 32;

Serial.print(tempF);

Serial.println("°F");

}