SIT315 Programming Paradigms
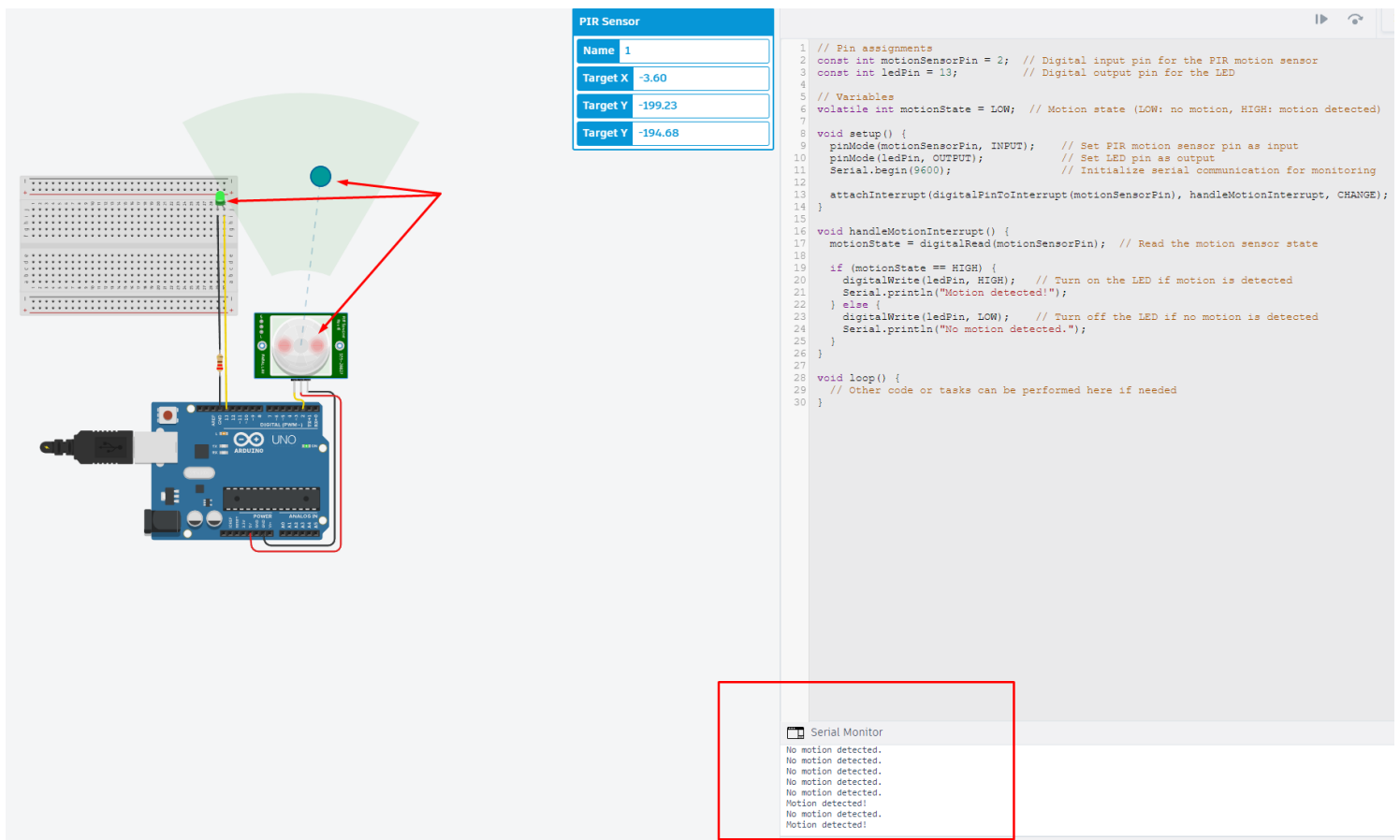
Module1 Real-time and Embedded Systems

TaskM1.T2P: Interrupt-driven Board

System Monitoring Log:


```cpp
1   // Pin assignments
2   const int motionSensorPin = 2;  // Digital input pin for the PIR motion sensor
3   const int ledPin = 13;          // Digital output pin for the LED
4
5   // Variables
6   volatile int motionState = LOW;  // Motion state (LOW: no motion, HIGH: motion detected)
7
8   void setup() {
9     pinMode(motionSensorPin, INPUT);    // Set PIR motion sensor pin as input
10    pinMode(ledPin, OUTPUT);            // Set LED pin as output
11    Serial.begin(9600);                // Initialize serial communication for monitoring
12
13    attachInterrupt(digitalPinToInterrupt(motionSensorPin), handleMotionInterrupt, CHANGE);
14  }
15
16  void handleMotionInterrupt() {
17    motionState = digitalRead(motionSensorPin);  // Read the motion sensor state
18
19    if (motionState == HIGH) {
20      digitalWrite(ledPin, HIGH);    // Turn on the LED if motion is detected
21      Serial.println("Motion detected!");
22    } else {
23      digitalWrite(ledPin, LOW);     // Turn off the LED if no motion is detected
24      Serial.println("No motion detected.");
25    }
26  }
27
28  void loop() {
29    // Other code or tasks can be performed here if needed
30  }
```

Serial Monitor
```
No motion detected.
No motion detected.
No motion detected.
No motion detected.
No motion detected.
Motion detected!
No motion detected.
Motion detected!
```

Source Code (Added Interrupt):

```
// Pin assignments
const int motionSensorPin = 2;  // Digital input pin for the PIR motion sensor
const int ledPin = 13;          // Digital output pin for the LED

// Variables
volatile int motionState = LOW;  // Motion state (LOW: no motion, HIGH: motion detected)

void setup() {
  pinMode(motionSensorPin, INPUT);    // Set PIR motion sensor pin as input
  pinMode(ledPin, OUTPUT);            // Set LED pin as output
  Serial.begin(9600);                 // Initialize serial communication for monitoring

  attachInterrupt(digitalPinToInterrupt(motionSensorPin), handleMotionInterrupt, CHANGE);
}

void handleMotionInterrupt() {
  motionState = digitalRead(motionSensorPin);  // Read the motion sensor state

  if (motionState == HIGH) {
    digitalWrite(ledPin, HIGH);    // Turn on the LED if motion is detected
    Serial.println("Motion detected!");
  } else {
    digitalWrite(ledPin, LOW);     // Turn off the LED if no motion is detected
    Serial.println("No motion detected.");
  }
}

void loop() {
  // Other code or tasks can be performed here if needed
}
```

GitHub Repository:

https://github.com/bradewalder/SIT315