



**SNS COLLEGE OF TECHNOLOGY**

**Coimbatore-35**

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**19ECT213- IoT SYSTEM ARCHITECTURE  
II ECE / IV SEMESTER**

**UNIT 2 – MICROCONTROLLER AND INTERFACING TECHNIQUES FOR  
IoT DEVICES**

**2.8 Application that uses sensor data for decision making  
process.**

**Need the following components:**

- Arduino board (e.g., Arduino Uno)
- DHT11 temperature and humidity sensor
- LED
- Resistor (220 ohms)
- Breadboard and jumper wires
- Hardware Setup:
- Connect the DHT11 sensor to the Arduino:
- VCC pin to Arduino 5V
- Data pin to Arduino digital pin 2
- Ground pin to Arduino ground
- Connect the LED to the Arduino:
- Anode (longer leg) to Arduino digital pin 13 through a resistor
- Cathode (shorter leg) to Arduino ground

```
#include <DHT.h>
```

```
#define DHTPIN 2 // Digital pin connected to the DHT sensor  
#define DHTTYPE DHT11 // DHT 11
```

```
DHT dht(DHTPIN, DHTTYPE);
```

```
const int ledPin = 13; // LED connected to digital pin 13  
const float tempThreshold = 25.0; // Temperature threshold in Celsius
```

```
void setup() {  
  Serial.begin(9600);  
  pinMode(ledPin, OUTPUT);  
  dht.begin();  
}
```

```

}

void loop() {
  // Read temperature and humidity
  float temperature = dht.readTemperature();
  float humidity = dht.readHumidity();

  // Check if any reads failed and exit early (to try again).
  if (isnan(temperature) || isnan(humidity)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  // Print temperature and humidity
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.print(" °C\t");
  Serial.print("Humidity: ");
  Serial.print(humidity);
  Serial.println(" %");

  // Decision making based on temperature
  if (temperature > tempThreshold) {
    digitalWrite(ledPin, HIGH); // Turn on LED
    Serial.println("Temperature above threshold. LED ON.");
  } else {
    digitalWrite(ledPin, LOW); // Turn off LED
    Serial.println("Temperature below threshold. LED OFF.");
  }

  delay(2000); // Delay between sensor readings
}

```

### Code Explanation:

- We include the DHT library for working with the DHT sensor.
- We define the pin connected to the DHT sensor and the sensor type.
- We initialize the DHT sensor and the LED pin in the setup() function.
- In the loop() function, we read temperature and humidity data from the sensor.
- If the readings are successful, we print them to the serial monitor.
- Based on the temperature reading, we decide whether to turn the LED on or off. If the temperature exceeds the threshold (tempThreshold), we turn on the LED; otherwise, we turn it off.
- We add a delay between sensor readings to prevent rapid switching.

### Testing:

- Connect your Arduino to your computer and upload the code.
- Open the Serial Monitor in the Arduino IDE to view temperature, humidity, and LED status.

- Observe the behavior of the LED as you change the temperature around the sensor. If the temperature exceeds the threshold, the LED should turn on, and if it falls below the threshold, the LED should turn off.

This example demonstrates a simple decision-making process based on sensor data. You can extend this concept by adding more sensors, defining additional thresholds, or controlling different actuators based on various environmental conditions.