App Inventor + IoT: Temperature Sensor

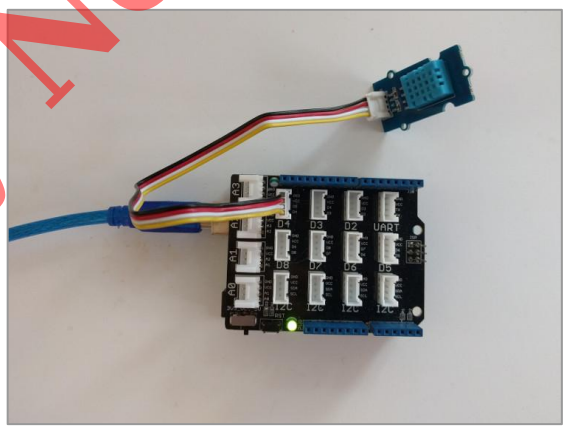
20 min

(with IoT Setup and Basic Connection tutorials completed)

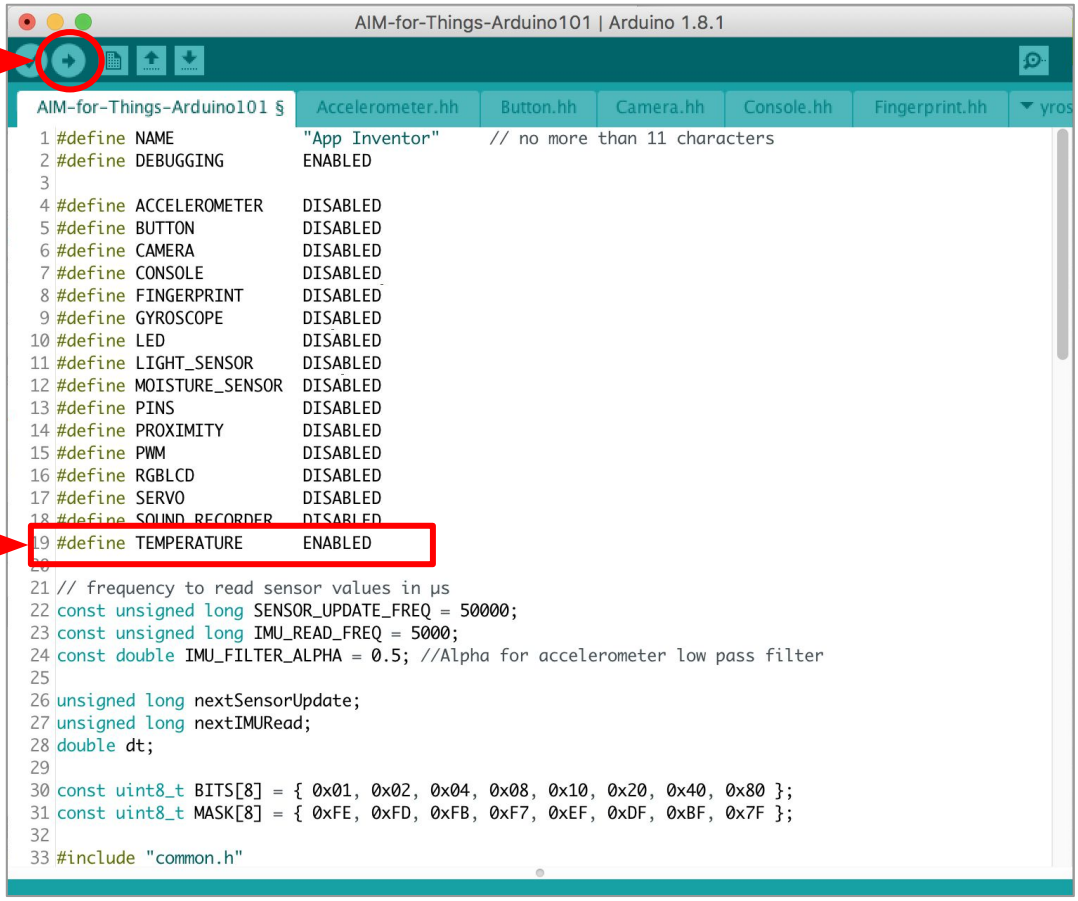
This tutorial will help you connect App Inventor + IoT with a temperature sensor on an Arduino 101 controller. We are also using a Seeed Grove shield for this tutorial. You do not need to use this board, but it does make things easier. The temperature sensor we recommend is the Grove temperature & humidity sensor.

Before you start you should first complete the App Inventor + IoT Setup tutorial to set up your Arduino device.

- Connect the temperature sensor to the Grove board in the D4 pin connector.



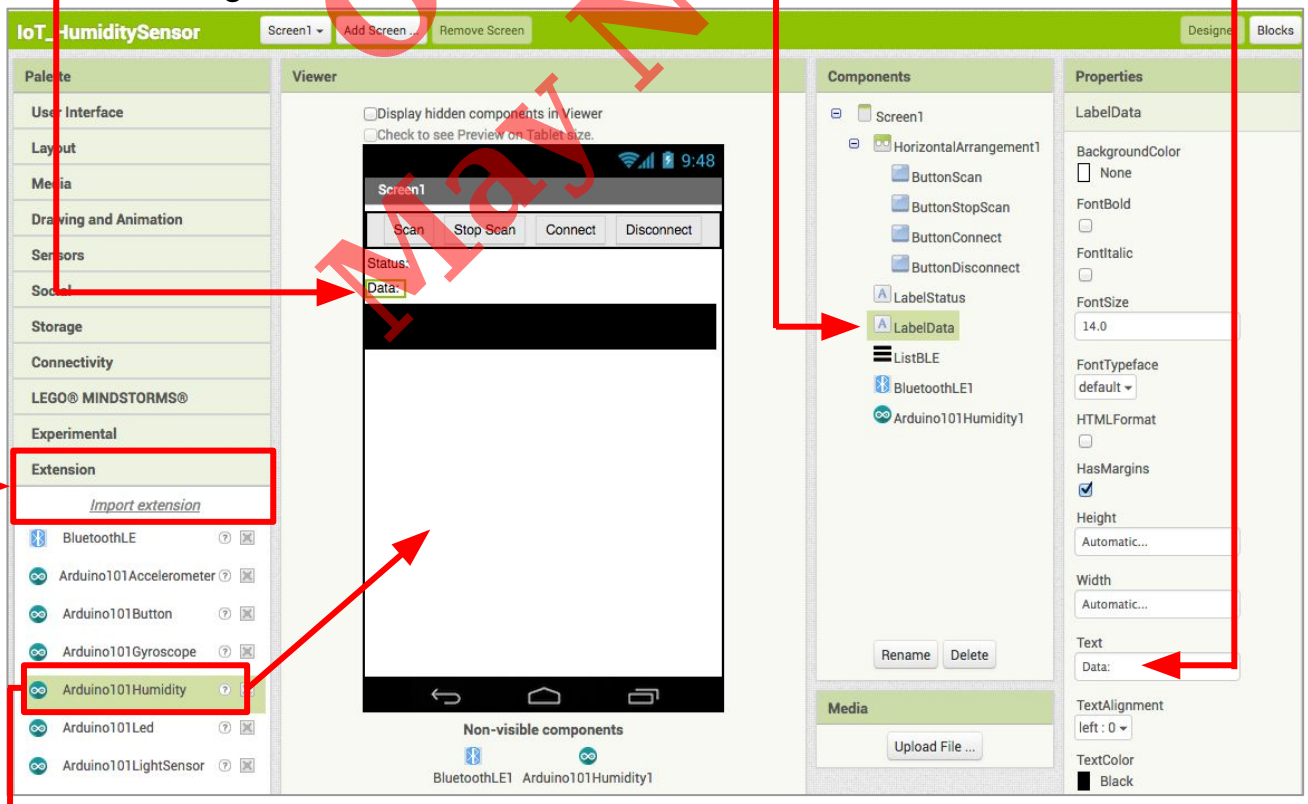
- For this tutorial make sure **TEMPERATURE** is set to **ENABLED** and all others are set to **DISABLED.**
- You should also click the arrow button in the top left to upload the code



Next, you should complete the App Inventor + IoT Basic Connection tutorial to make a basic connection to the Arduino device. If you prefer, you can download the completed .aia file here.

The remaining steps all build off of the the starter code for Basic Connection tutorial and .aia:

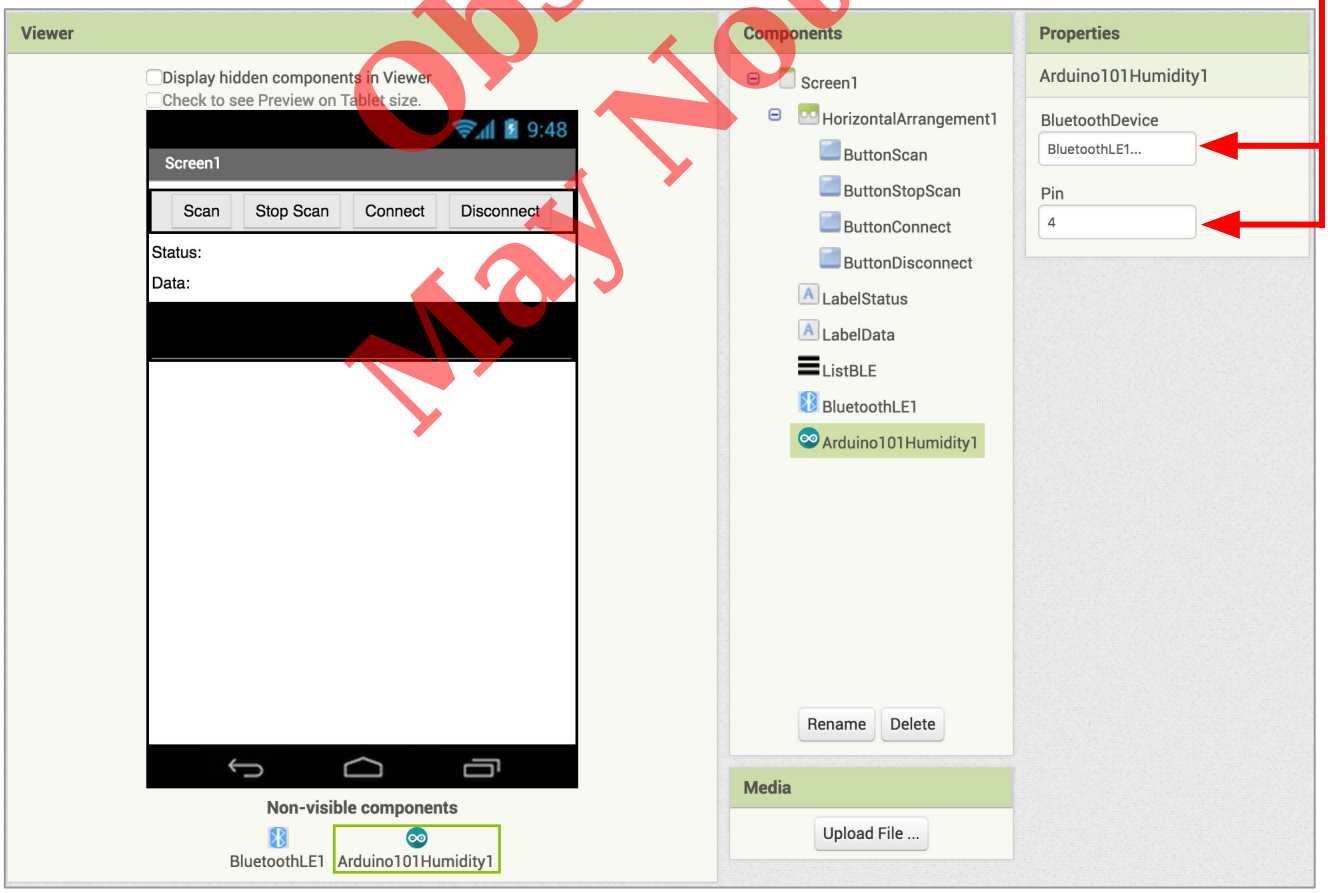
- Drag a **Label** from the User Interface Palette and drop it between **LabelStatus** and **ListBLE**
  - Rename the **Label** "LabelData".
  - Change its text to “Data: “.



- In the Palette window, click on Extension at the bottom and then on "Import extension" and click on "URL".
  - Paste in this URL: http://iot.appinventor.mit.edu/assets/resources/edu.mit.appinventor.iot.arduino101.aix
- Add the **Arduino101Humidity** extension to your app by dragging it onto the Viewer (the humidity sensor measures both humidity and temperature).

Next, we need to let App Inventor know which pin on the Grove board the temperature sensor is connected to.

- Click on **Ardunio101Humidity1** in the Components pane.
- In the Properties pane, click on BluetoothDevice and select **BlutetoothLE1**.
- Under **Pin**, enter the digital pin that matches the one the temperature sensor is plugged into on the Grove board (in this case D4).
    - *Note: You only need to put the number (4), not the letter 'D'*



Now switch to the Blocks Editor view

First, we want to request data updates when the sensor value on the Arduino changes.

- from Arduino101HumiditySensor1 in the Blocks pane, add **call Arduino101Humidity1.RequestTemperatureUpdates** to the existing **when BluetoothLE1.Connected** block from the Basic Connection tutorial.

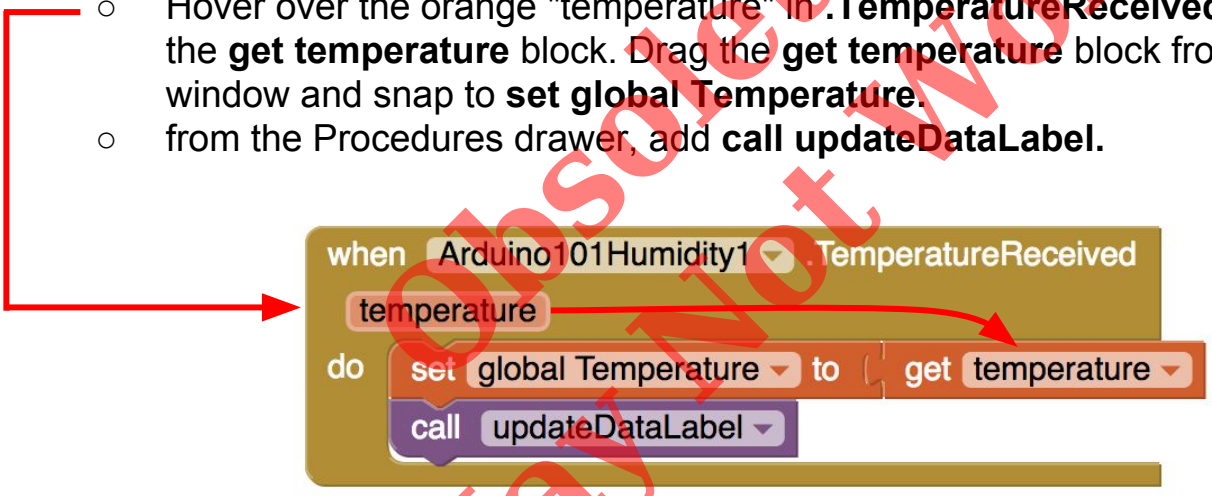
Next, we need to store the data we receive from the sensor. From the Variables drawer in the docs pane, drag an **initialize global name to** block and name it "Temperature". From the Math drawer add a number block and set it to "0". We'll use this to keep track of the sensor value.

Let's make a new procedure to display the current readings in the **LabelData** when we get new data. You can create a procedure by dragging out a purple procedure block from the Procedures drawer in the Blocks pane. Let's rename it **updateDataLabel.**

- from LabelData in the Blocks pane, add **set LabelData.Text to.**
- from the Text drawer connect a **join** block.
  - From the Text drawer, connect a text block and type **"Temperature: "**
  - From the Variables drawer connect a **get global Temperature.**

Finally, we need to call the procedure when this data is received.

- From the Arduino101Humidity1 drawer in the Blocks pane, drag **when Ardunio101Humidity1.TemperatureReceived**
  - from the Variables drawer, add **set global Temperature.**
  - Hover over the orange "temperature" in **.TemperatureReceived** to see the **get temperature** block. Drag the **get temperature** block from this window and snap to **set global Temperature.**
  - from the Procedures drawer, add **call updateDataLabel.**



Your app should now be working! Connect your Arduino device using the MIT AI2 Companion (if you haven't already). Test it out by closing your hand around the sensor, or placing it under a lamp. If it is working, you should see the data label change. If it is working, you should see the data label change (but probably very slowly).