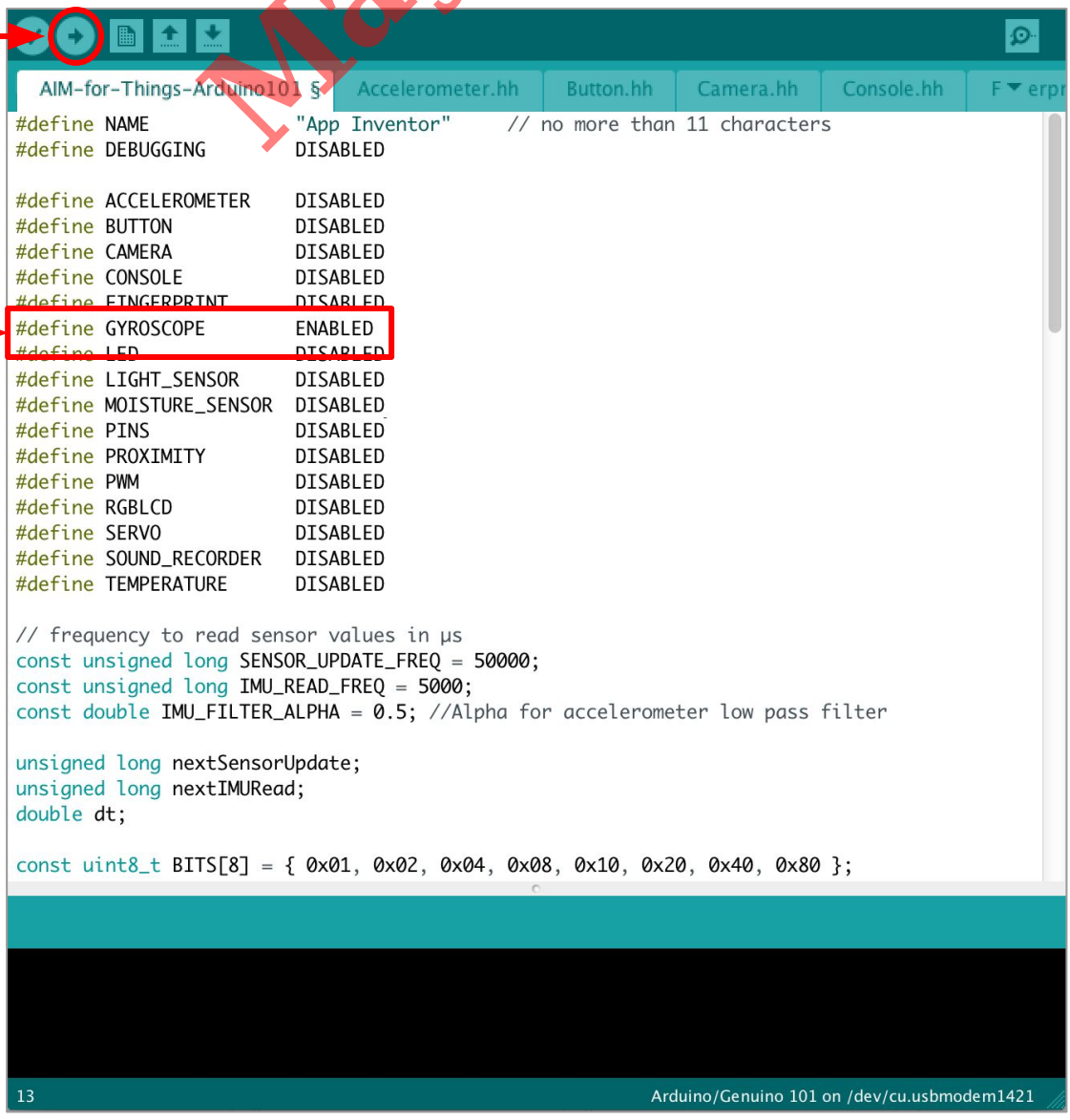
App Inventor + IoT: Gyroscope

20 min

(with IoT Setup and Basic Connection tutorials completed)

This tutorial will help you get started with App Inventor + IoT and the built-in gyroscope on the Arduino 101 controller. A gyroscope measure angular velocity, which measures the speed of rotation of an object (the Arduino).
Before you start you should first complete the App Inventor + IoT Setup tutorial to set up your Arduino device.

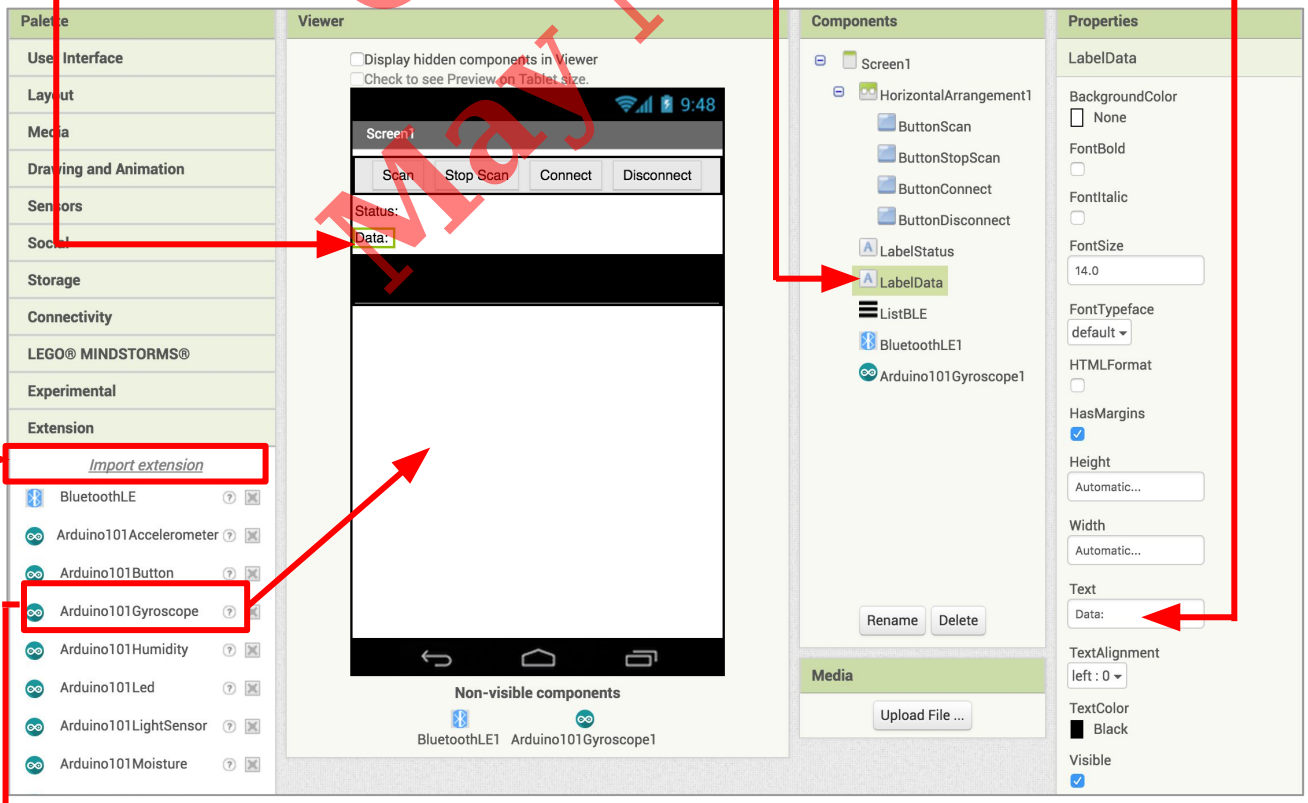
- For this tutorial make sure **GYROSCOPE** is set to **ENABLED** and all others are set to **DISABLED.**
- You should also click the arrow button in the top left to upload the code.



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:

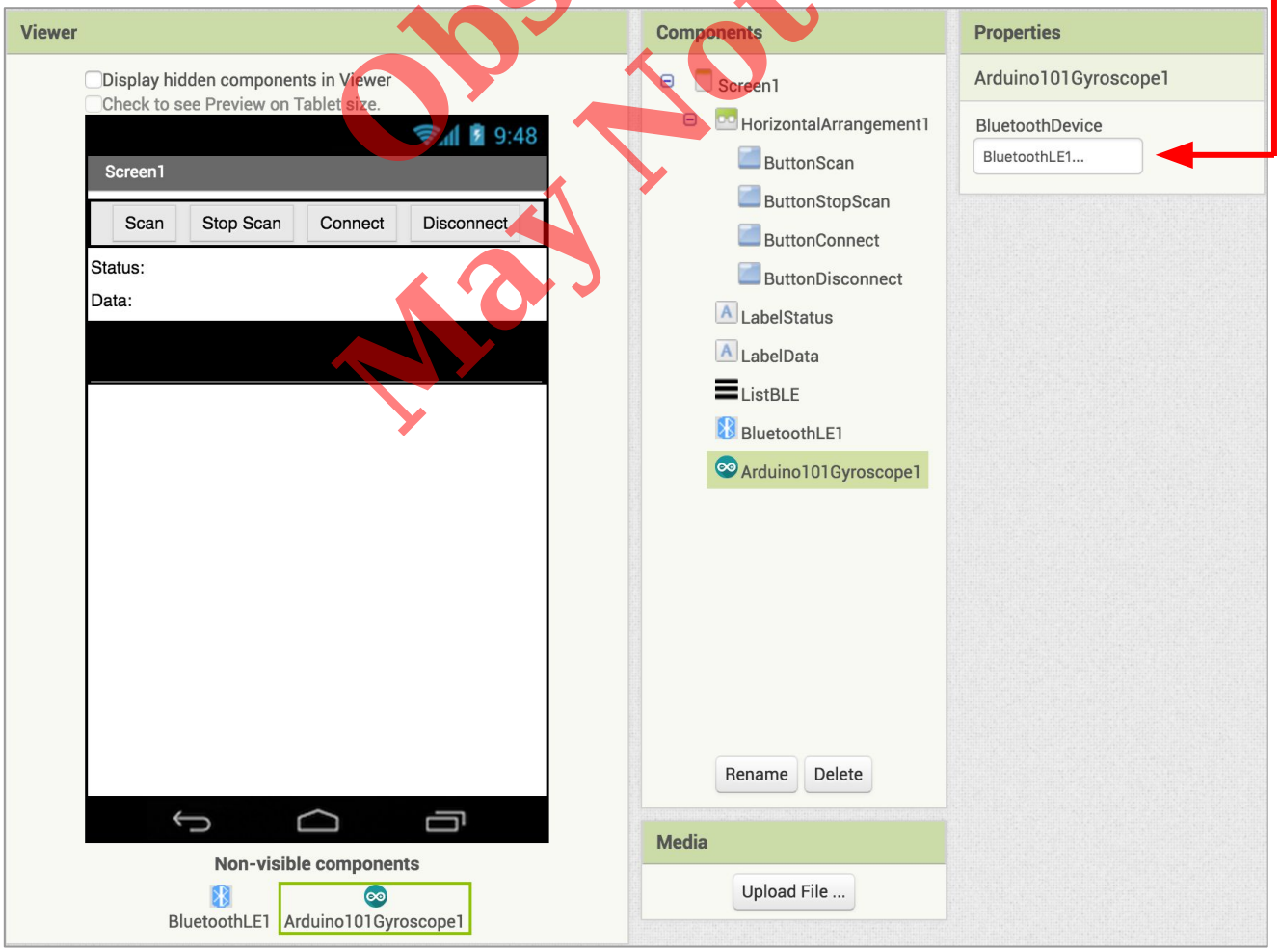
- Drag a **Label** from the User Interface Palette and drop it between **LabelStatus** and **ListBLE**
  - Rename the **Label** "LabelData".
  - Change its text to “Data: “.



- 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/edu.mit.appinventor.iot.arduino101.aix
- Add the **Arduino101Gyroscope** extension to your app by dragging it onto the Viewer.

Next, we need to let App Inventor know which BLE device is reading the gyroscope data.

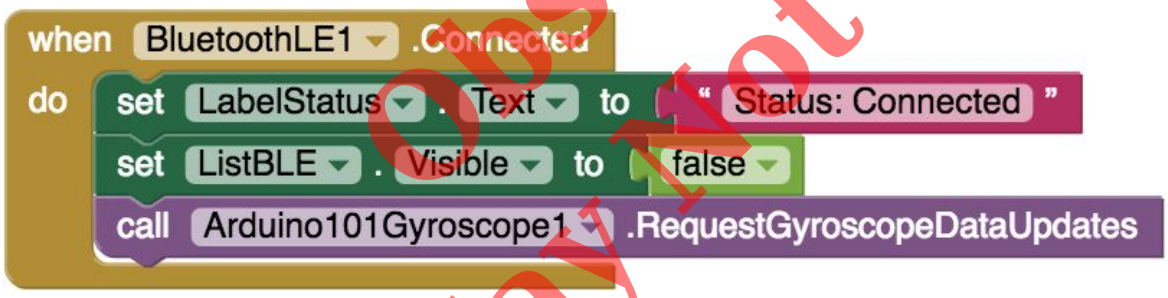
- Click on **Ardunio101Gyroscope1** in the Components pane.
- In the Properties pane, click on BluetoothDevice and select **BluetoothLE1**.



Now switch to the Blocks Editor view

First, we want to request data updates when the gyroscope sensor values on the Arduino change.

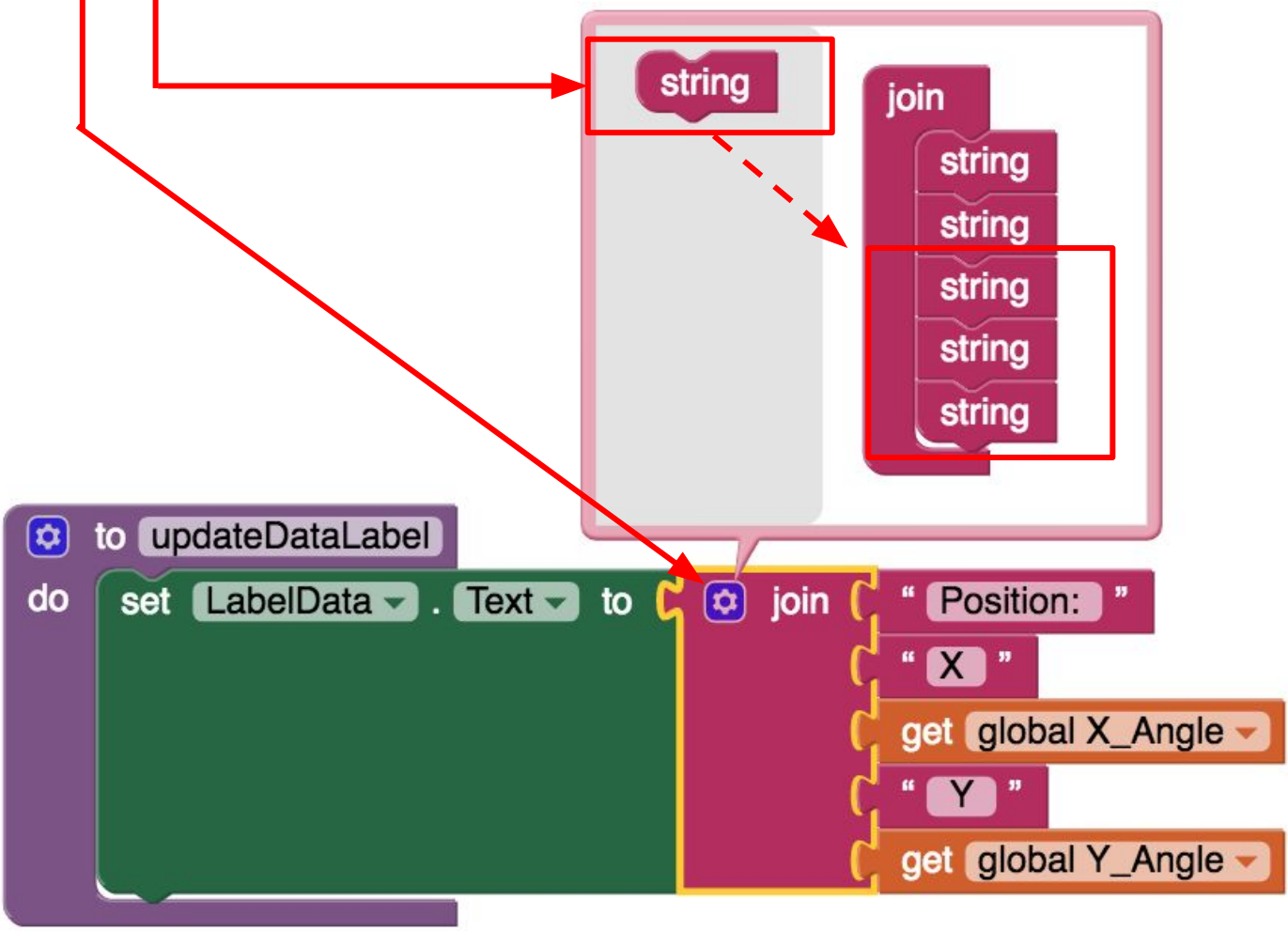
- from **Arduino101Gyroscope1** in the Blocks pane, add **call Arduino101Gyroscope1.RequestGyroscopeDataUpdates** to the existing **when BluetoothLE1.Connected** block from the Basic Connection tutorial.



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

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 **"Position: "**
  - From the Text drawer, connect a text block and type **"X "**
    - (note the extra space after the X)
  - We need three more slots in the **join** block.
    - Hover over the blue *gear* on the **join** block
    - In the popup, attach three of the **string** blocks the the two already there
  - From the Variables drawer, connect a **get global X_Angle** block
  - From the Text drawer, connect a text block and type **" Y "**
    - (note the spaces before and after the Y)
  - From the Variables drawer, connect a **get global Y_Angle** block



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

- From the **Arduino101Gyroscope1** drawer in the Blocks pane, drag **when Ardunio101Gyroscope1.GyroscopeDataReceived**
  - from the Variables drawer, add **set global X_Angle to**
  - Hover over the orange "X_Anxle" in **.GyroscopeDataReceived** to see the **get X_Angle** block. Drag the **get X_Angle** block from this window and snap to **set global X_Angle.**
  - Do the same thing for **Y_Angle**.
  - 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 moving the Arduino around in the air. If it is working, you should see the data labels change.