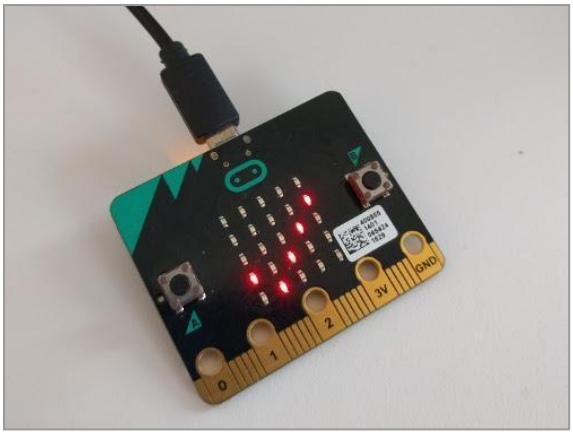
App Inventor + IoT: Micro:bit Magnetometer

This tutorial will help you get started with App Inventor + IoT and the magnetometer sensor on a micro:bit controller.



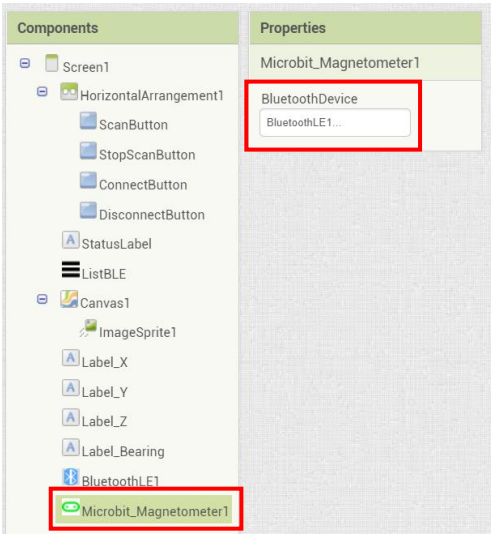
First, you will need to pair your phone or tablet to the micro:bit controller, using these directions. Your device must be paired with the micro:bit in order for the app to work.

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

App Inventor's micro:bit magnetometer component's document

The remaining steps all build off of the the starter code for Basic Connection tutorial and .aia.
First, we need to add the necessary extension.

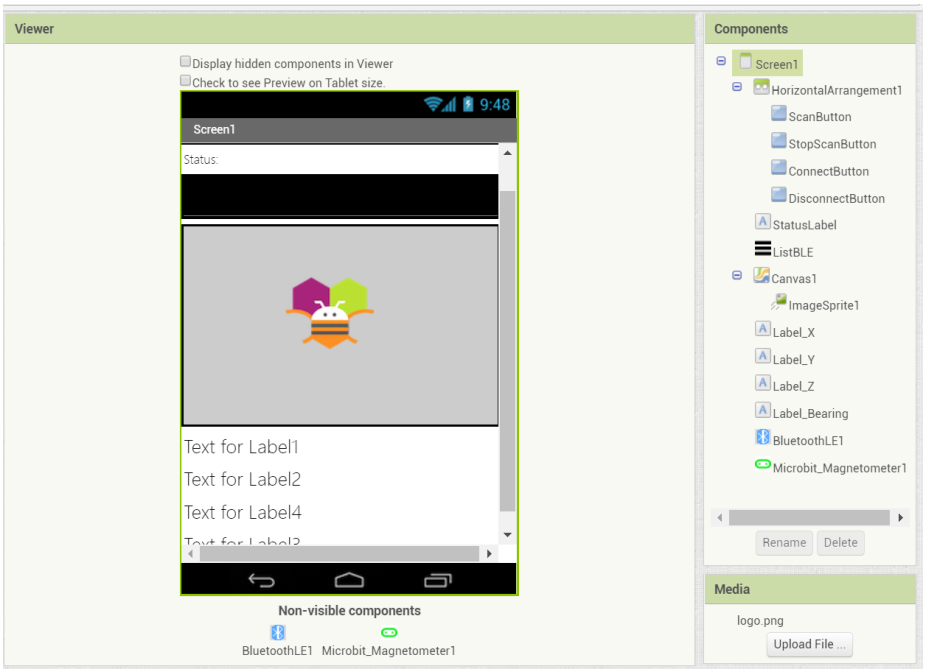
- In the Palette window, click on Extension at the bottom and then on "Import extension" and click on "URL".
    - Paste in this URL: http://iot.appinventor.mit.edu/assets/com.bbc.micro:bit.profile.aix
- Add a **Microbit_Magnetometer** extension to your app by dragging it onto the Viewer, set its *BluetoothDevice* to "BluetoothLE1"(Don't forget!).



Let’s add more components to our app to receive the magnetometer status.

- From the Drawing and animation drawer in the Palette, drag in a **Canvas** and a **ImageSprite**. Set Canva’s height to 320 pixels, width to fill parent (or any parameters you like).
    - Set **ImageSprite**’s Picture to some cute image (not bigger than the canvas).
- Add four Label to show Magnetometer’s X, Y, Z axis and bearing value.

Your designer page should seem like this:



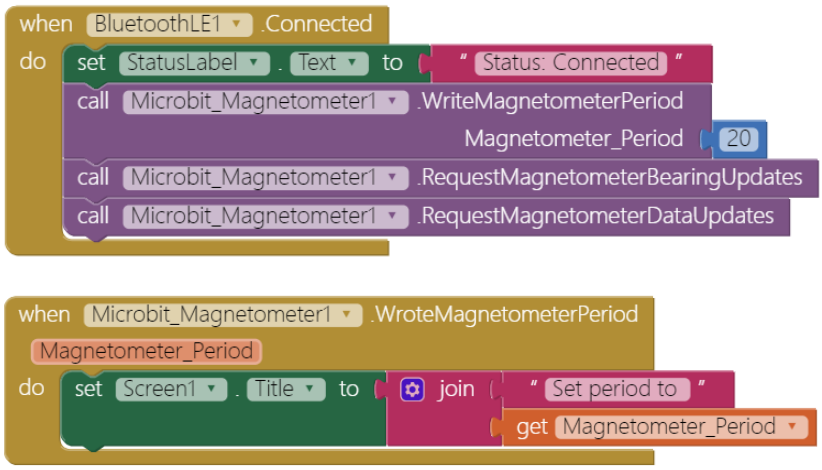
Now switch to the Blocks Editor view

We would like to control ImageSprite's heading by the Z-aixs movement of magnetometer on Micro:bit controller. Let's begin:

STEP1: Request updates when connected

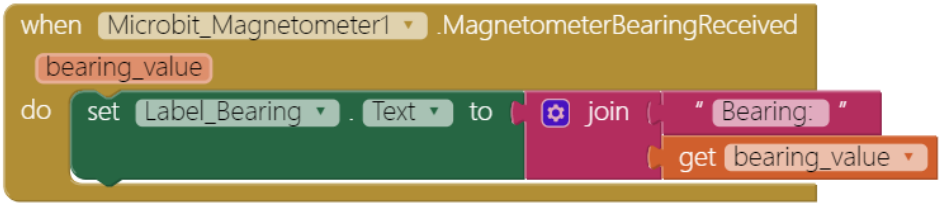
In BluetoothLE1.Connected event, we show message and request Microbit to update magnetometer's state.

And in **Microbit_Magnetometer1.WroteMagnetometerPeriod** event, we show related message and the period value just set.



STEP2: Show bearing value

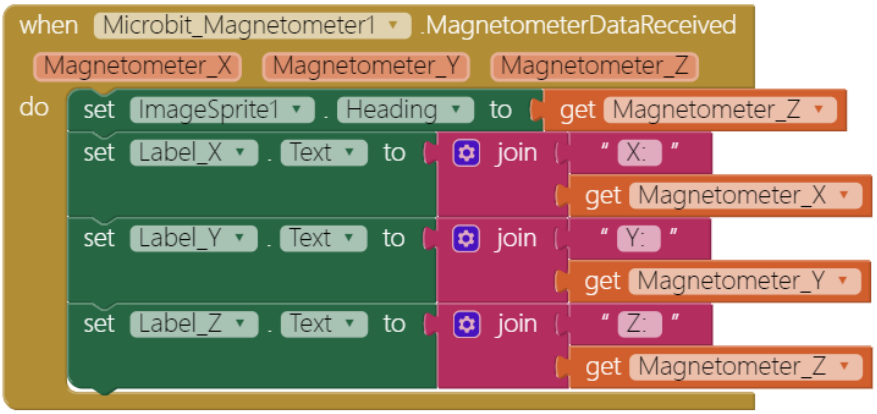
In **Microbit_Magnetometer1.MagnetoBearingReceived** event, we simply show bearing value on the label.

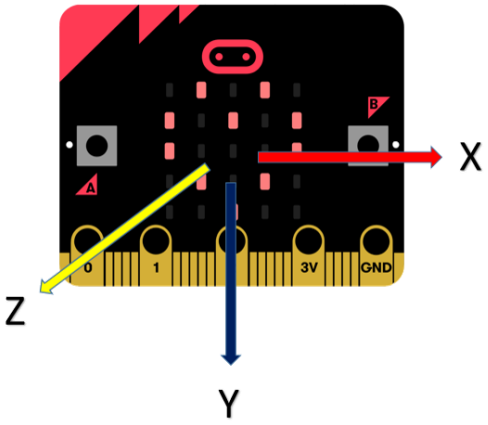


STEP3: Show XYZ data and control ImageSprite

In **Microbit_Magnetometer1.MagnetoDataReceived** event:

- Set ImageSprite's heading to Magnetometer_Z value.
- Show X, Y Z axis value on corresponding label, check image below for Micro:bit's axis.





(From https://makecode.microbit.org)

Your app should now be working! Test it out by connecting your micro:bit device using the MIT AI2 Companion (if you haven't already) or install by .apk. Make sure you have paired the Bluetooth on your Android device to your micro:bit first! Try to shake or flip around your Micro:bit, you should see the App Inventor logo turning and turning!

Try to add more cute movement into your app, for example, you can use X, Y axis value to make ImageSprite moving leftward and rightward and show something when it bumped to Canvas' edges.

(Refer to our Micro:bit button tutorial).