Microbit Robotics Beginner Level 1

Lesson 5

Infrared Warning Device & Human body detection

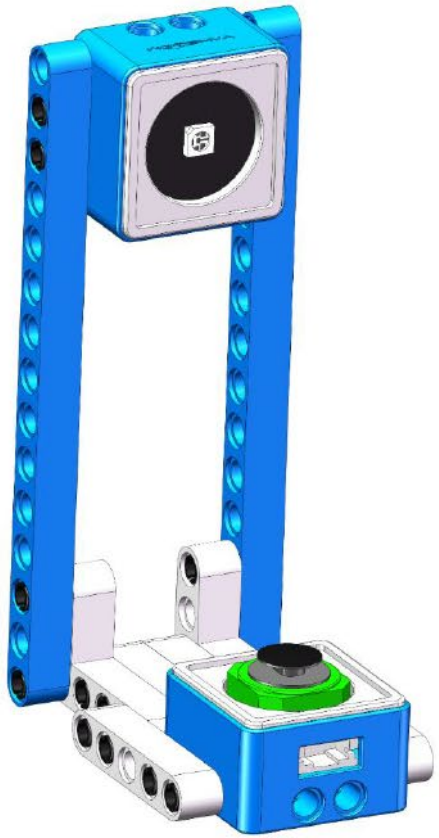
Presented by Advanced Superlogic Team

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Review previous lesson

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Rocker Control Light



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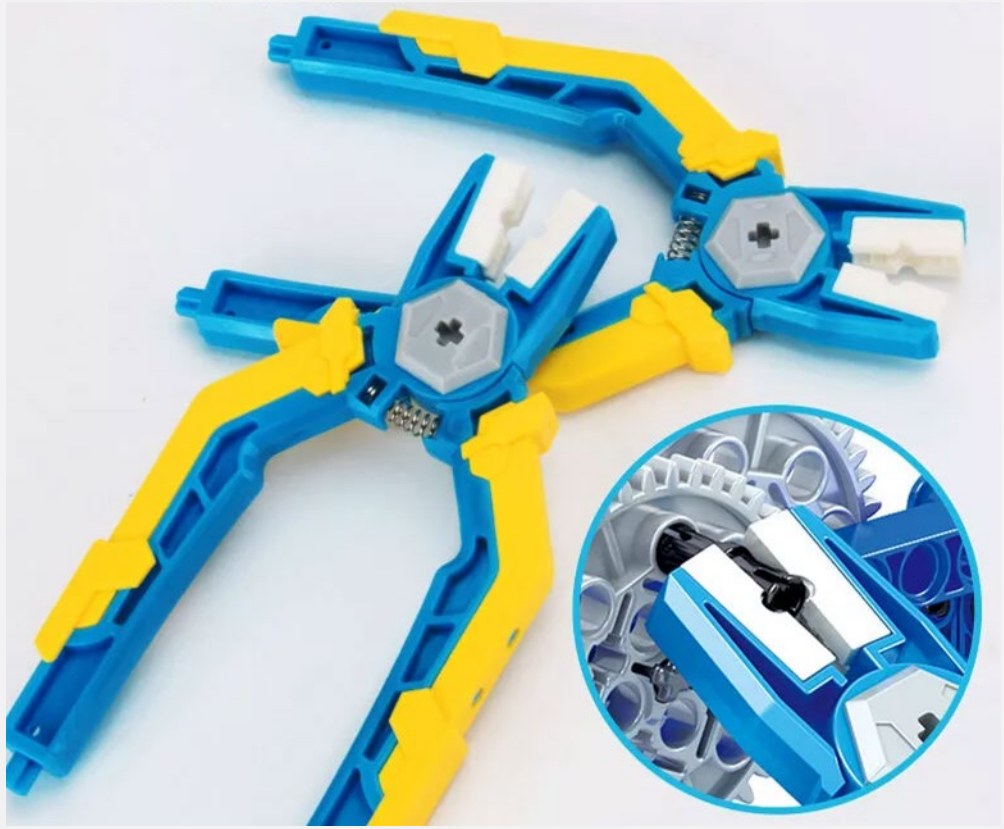
Emergency Light



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Please help to take care of the WOM Set



This is the lego plier, remember to put back into the box after use.

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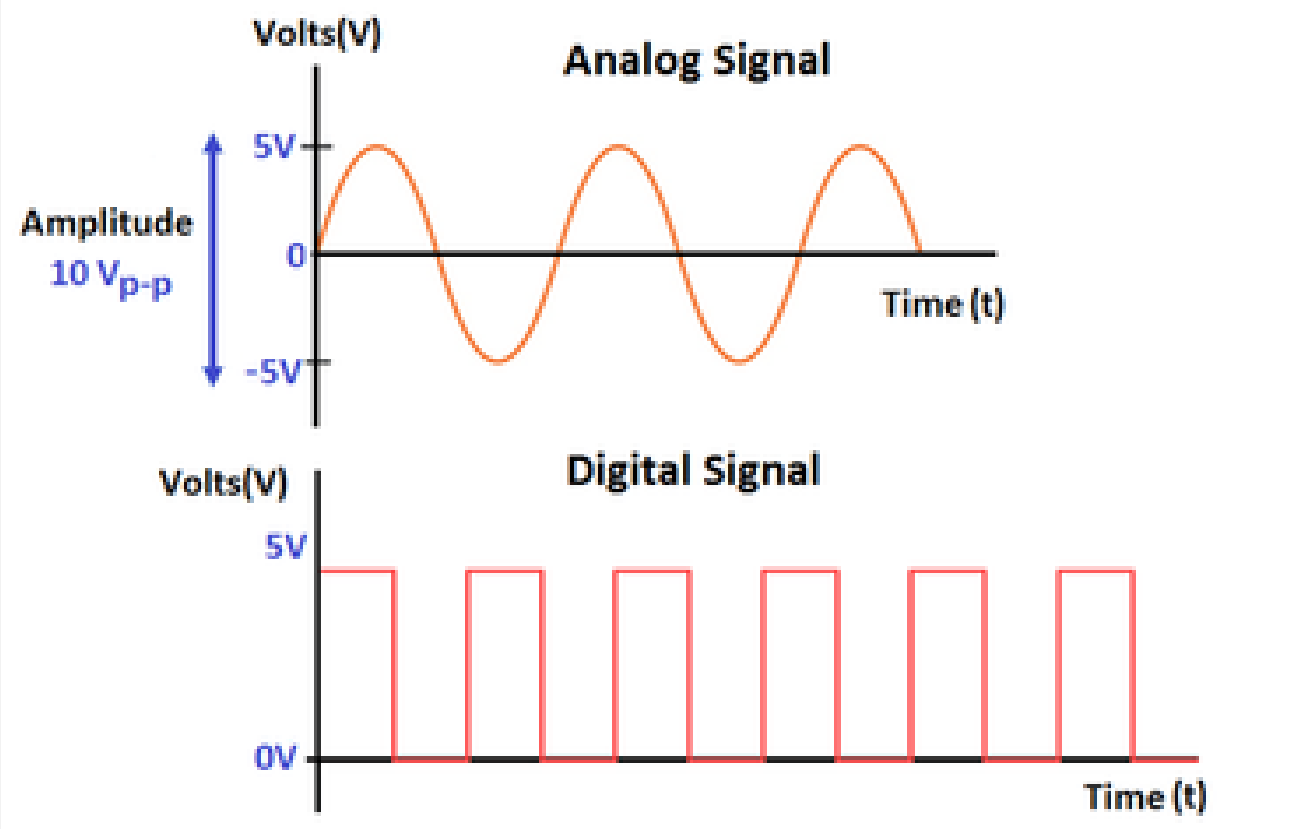
Please help to take care of the modules





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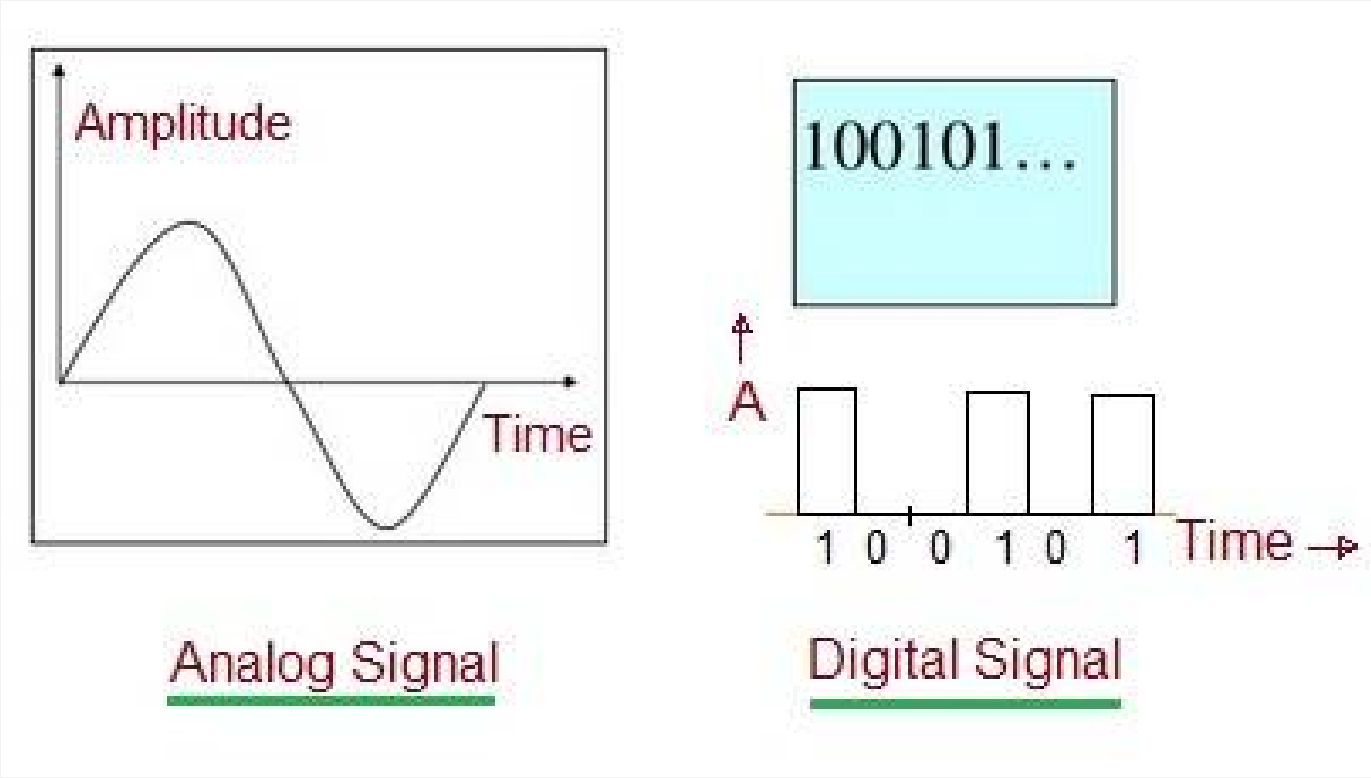
Digital vs Analog Signal



The major difference between both signals is that the **Analog signals** have **continuous electrical signals**, while **Digital signals** have **non-continuous electrical signals**.

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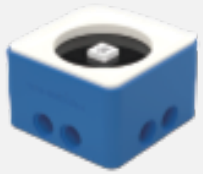
Digital vs Analog Signal



When doing conditional programming, since Analog signal is with range value, we will use more than or less than to do comparison check, while digital signal is with 1 or 0, we will use equal comparison for the conditioning.

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Digital vs Analog Signal - Module



RGB Light Module



Color Recognition Module



Digital Tube Module

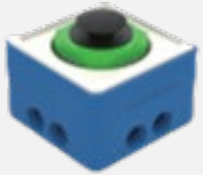


Photosensitive Module



Temperature
Humidity Module

Analog Signal

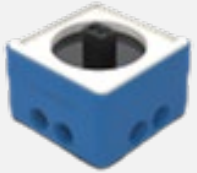


Rocker Module



Ultrasonic Module

Digital Signal



Infrared Module



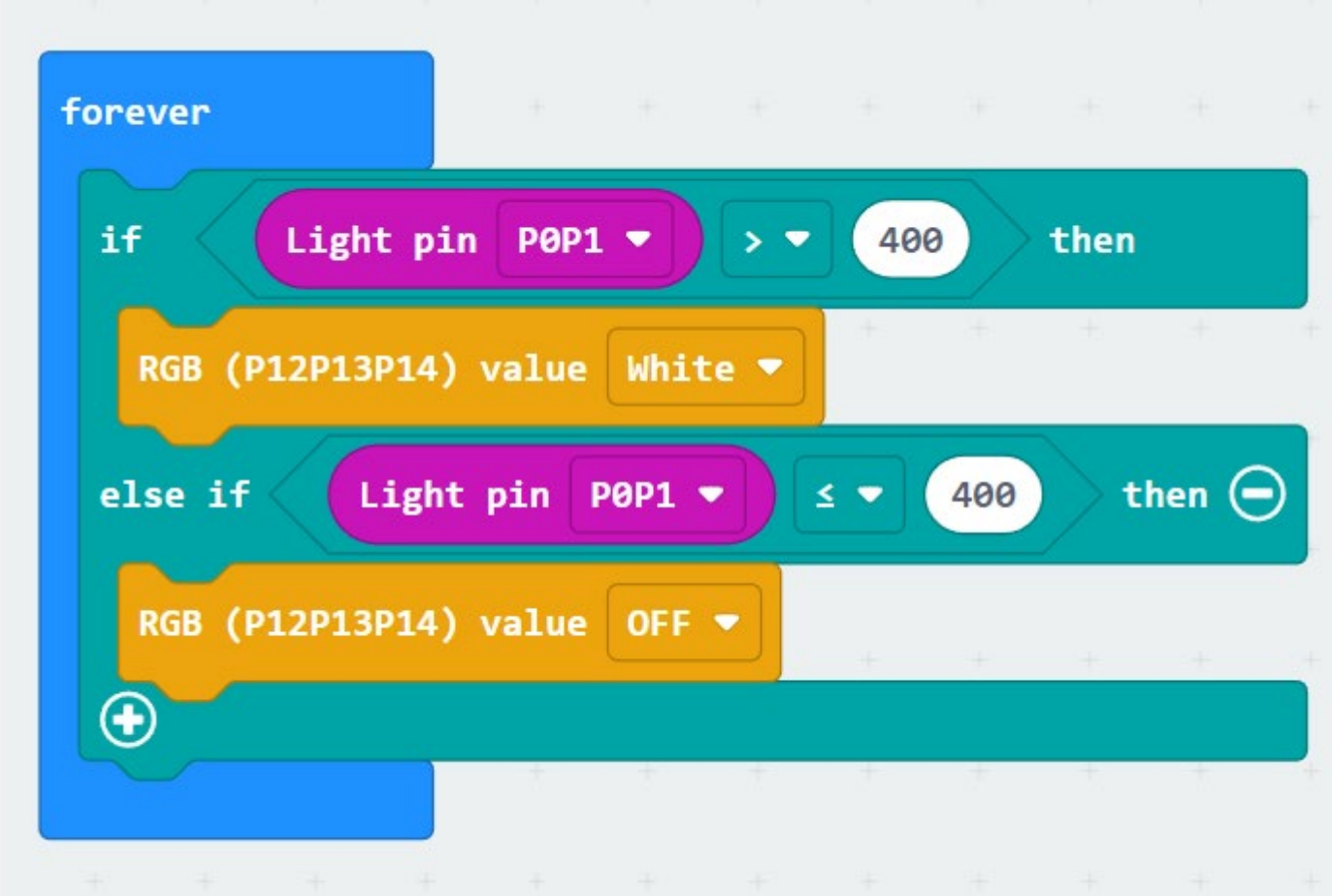
Button Module



Human body
Infrared Module

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Combine Blocks



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L5 – Challenge

Automatic Light:

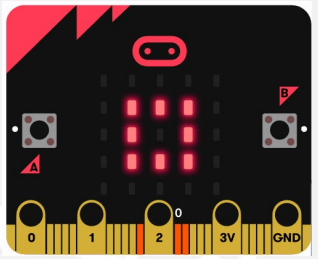
After the program is downloaded successfully.

When photosensitive **does not** detect light,

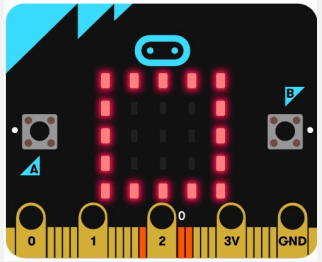
LED will show icon **small rectangle** and RGB will switch **off**,

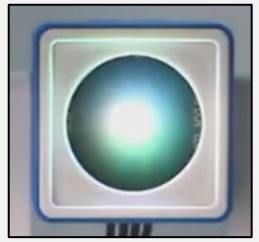
When photosensitive **detects** light,

LED will show icon **big rectangle** and RGB will switch **on**.



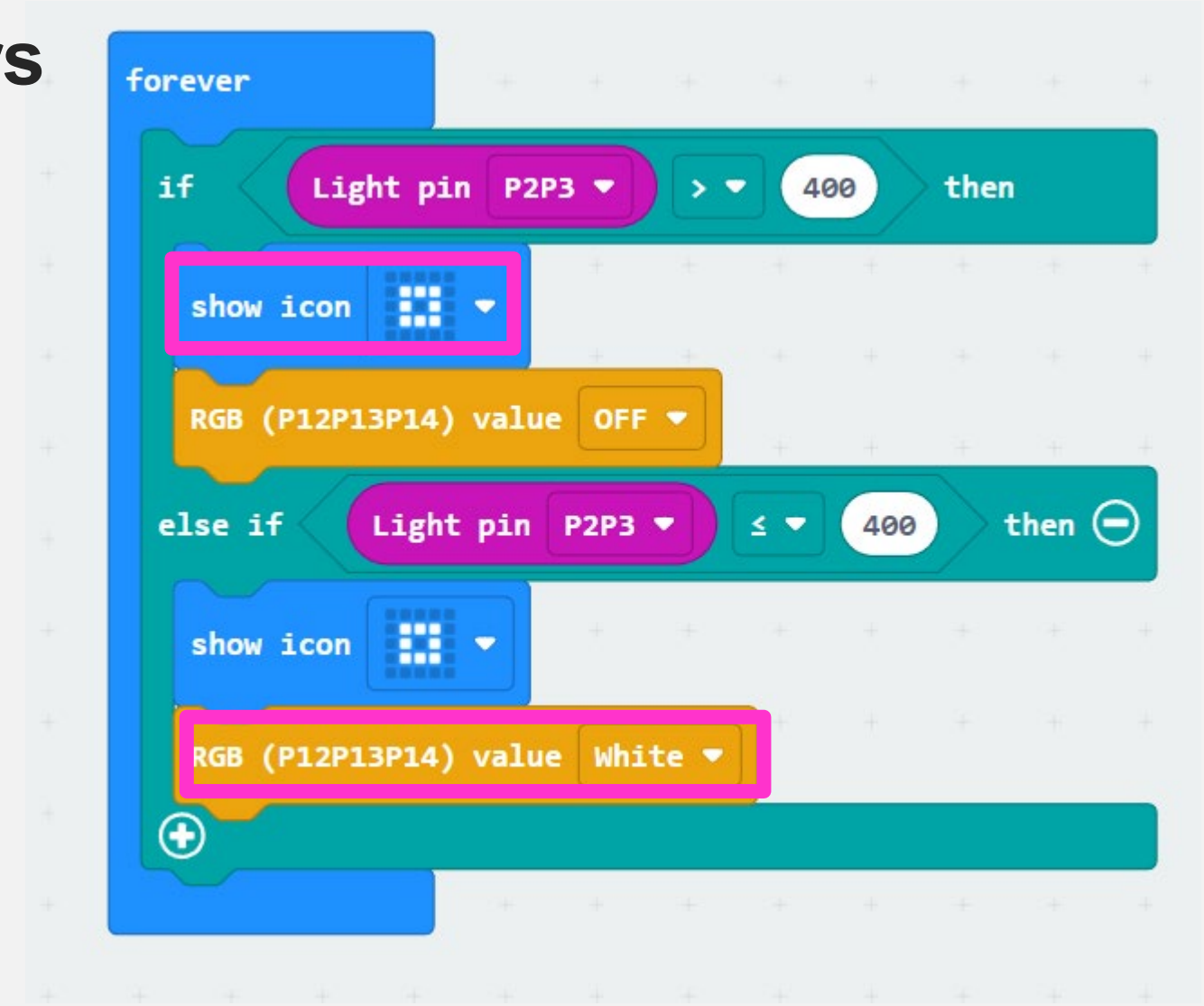






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Answers



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Do a quick self-check of your learning outcome…

1. What is the possible signals to be received with rocker module?
2. What is the difference between Analog signal and digital signal?
3. Which modules are with Analog signal and which are taking digital signal?
4. Give 2 example of the application of photosensitive module in real-life

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Real Life Application – Photosensitive Sensor



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Today's Topic

1. Build Infrared Warning device with World of Modules
2. Infrared module connection method
3. Infrared Programming
4. Human body infrared module connection method
5. Human body infrared Programming

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Learning Outcome

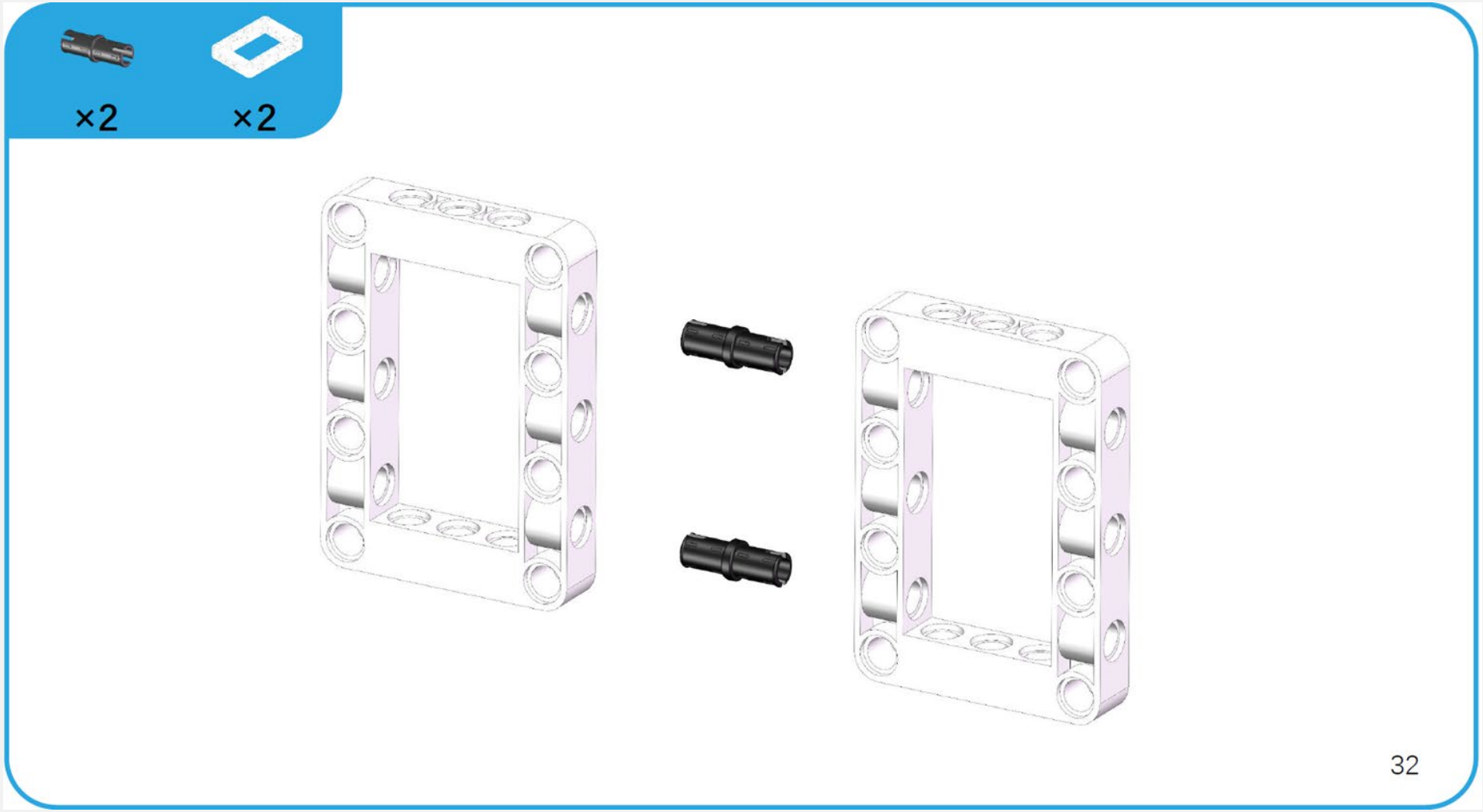
1. Able to Infrared Warning device with instruction manual
2. Understand how Infrared programming work
3. Understand how Human body infrared programming work
4. Able to program Infrared and Human body infrared module

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Infrared Warning device

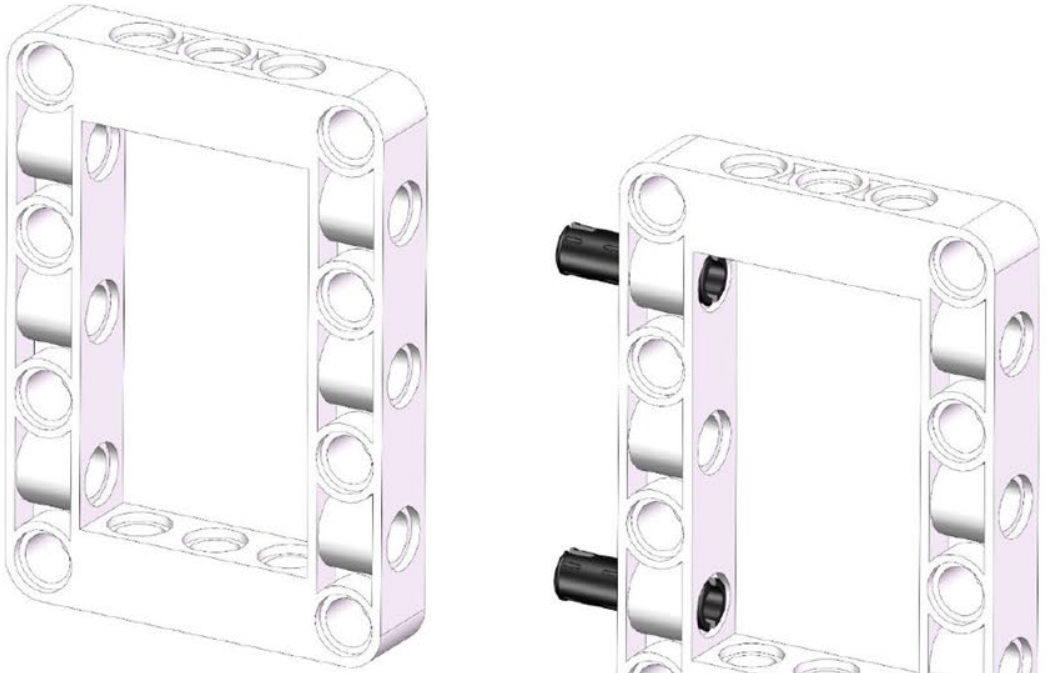
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Step 1



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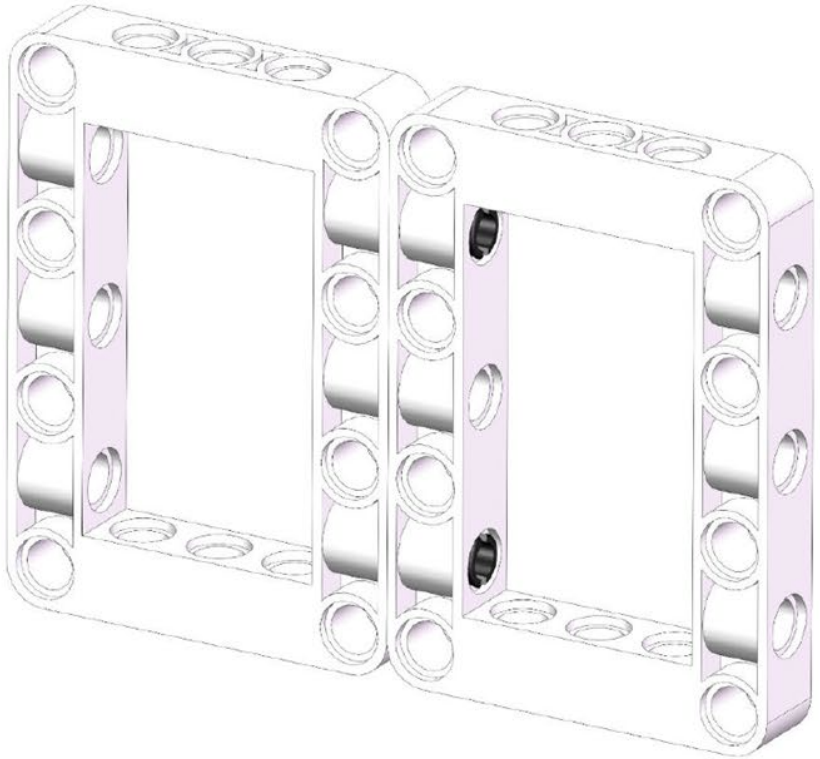
Step 2



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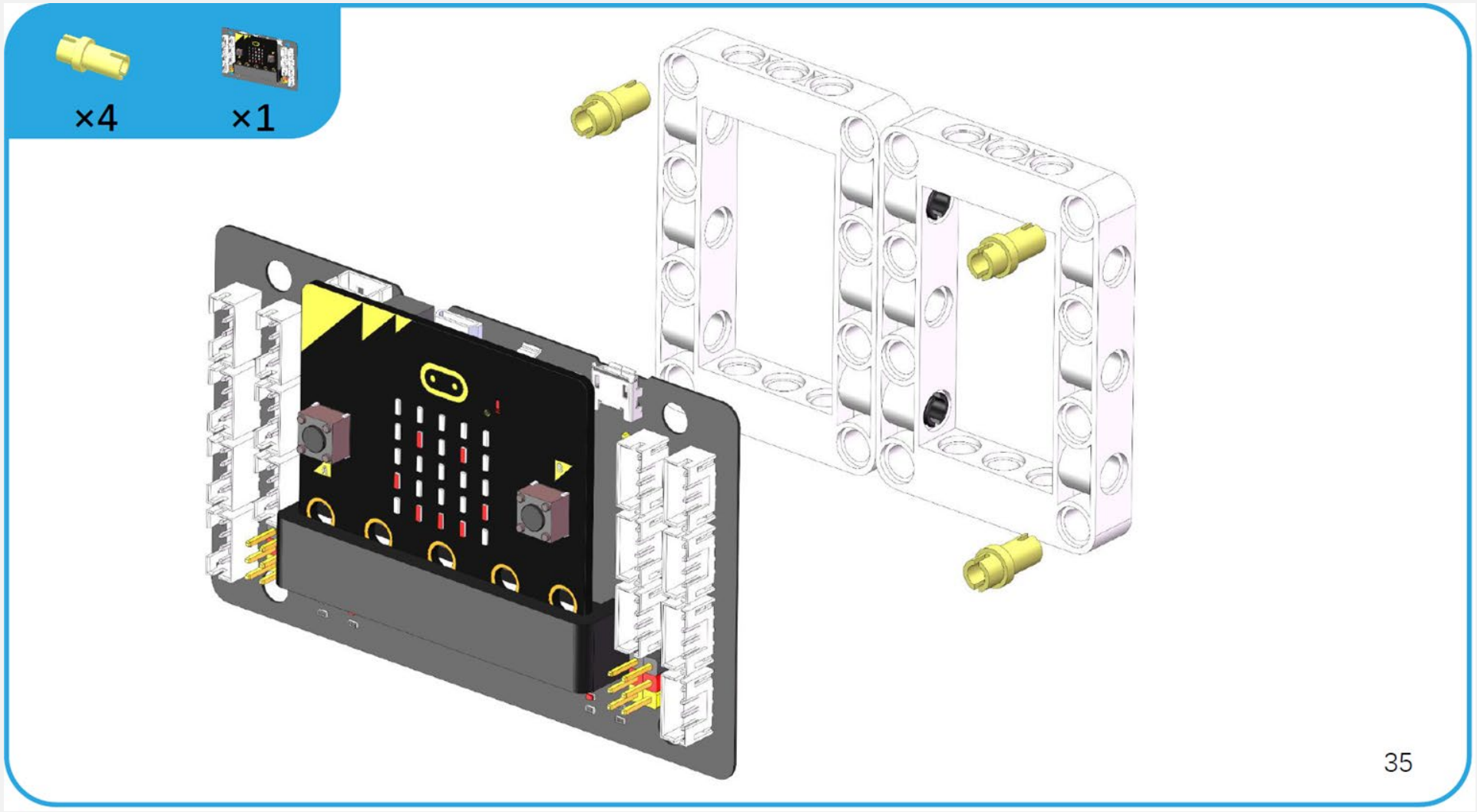
Step 3



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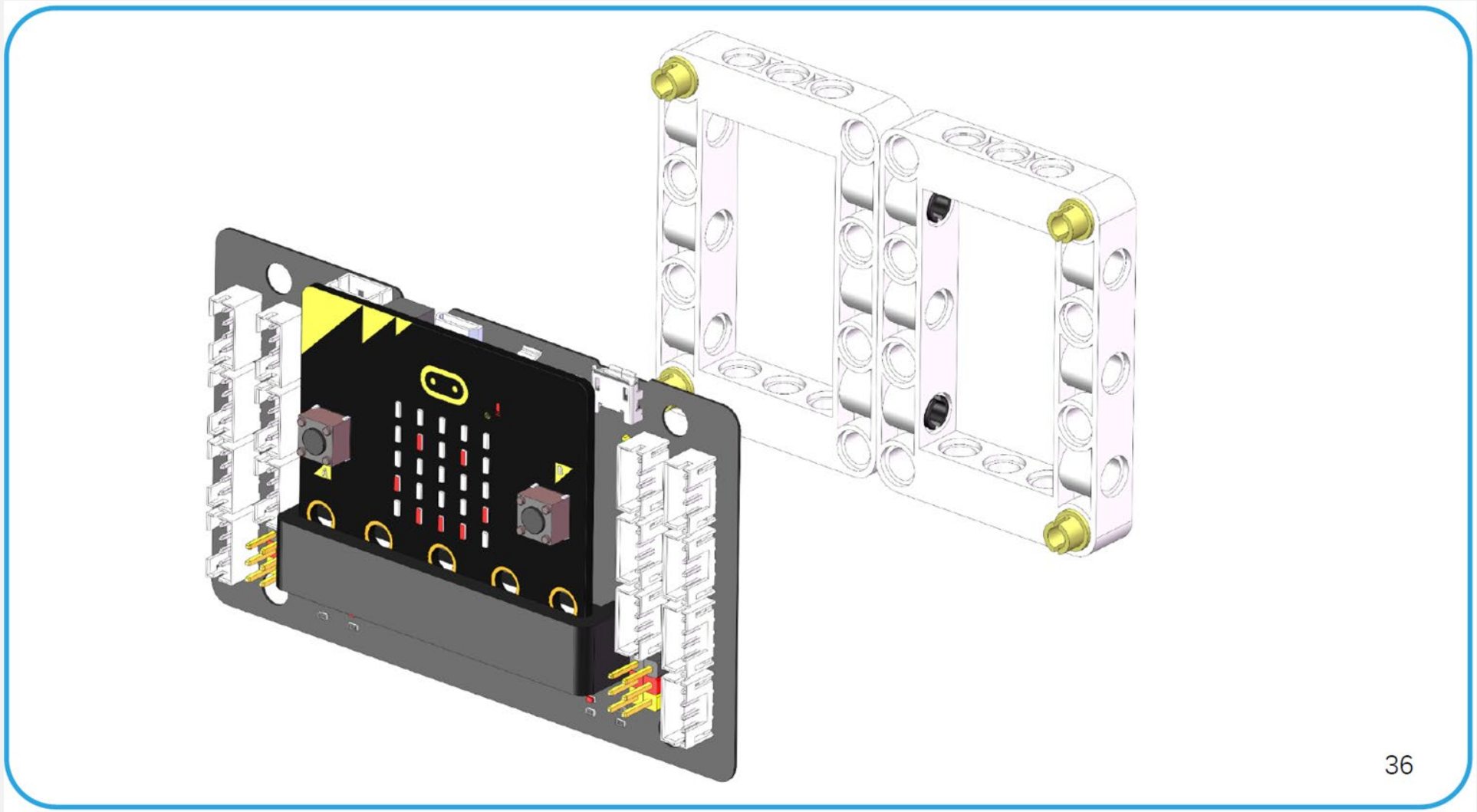
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Step 4



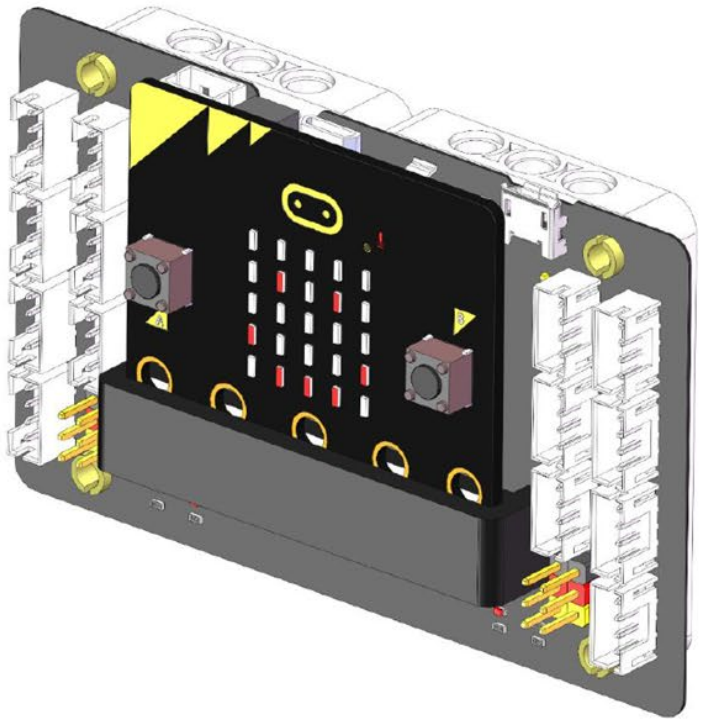
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Step 5



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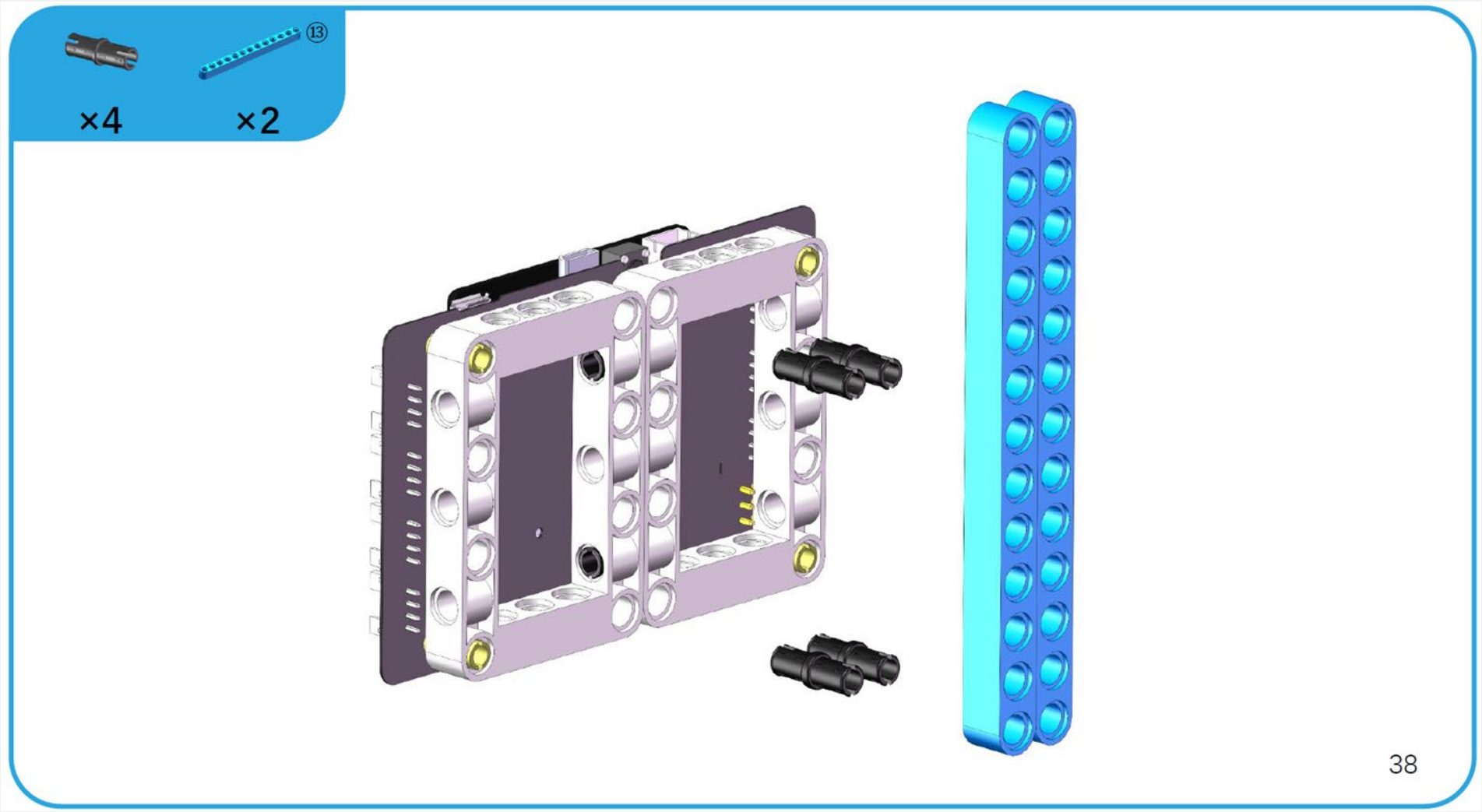
Step 6



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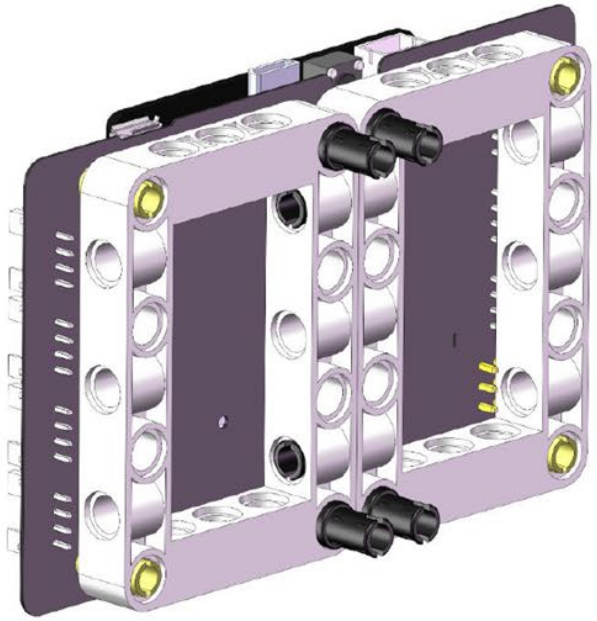
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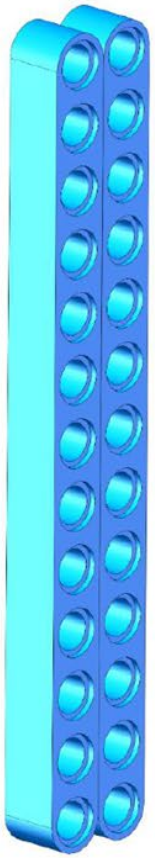
Step 7



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Step 8

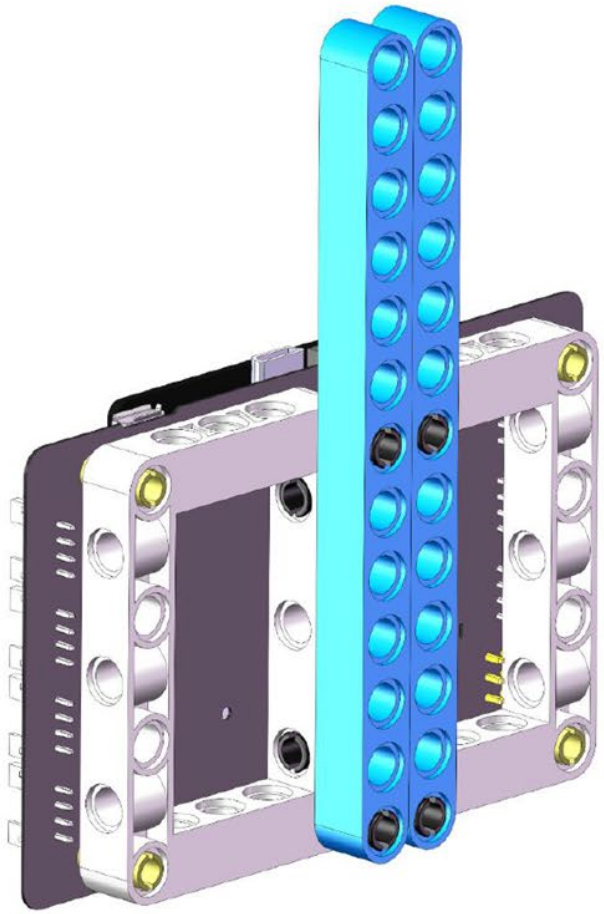




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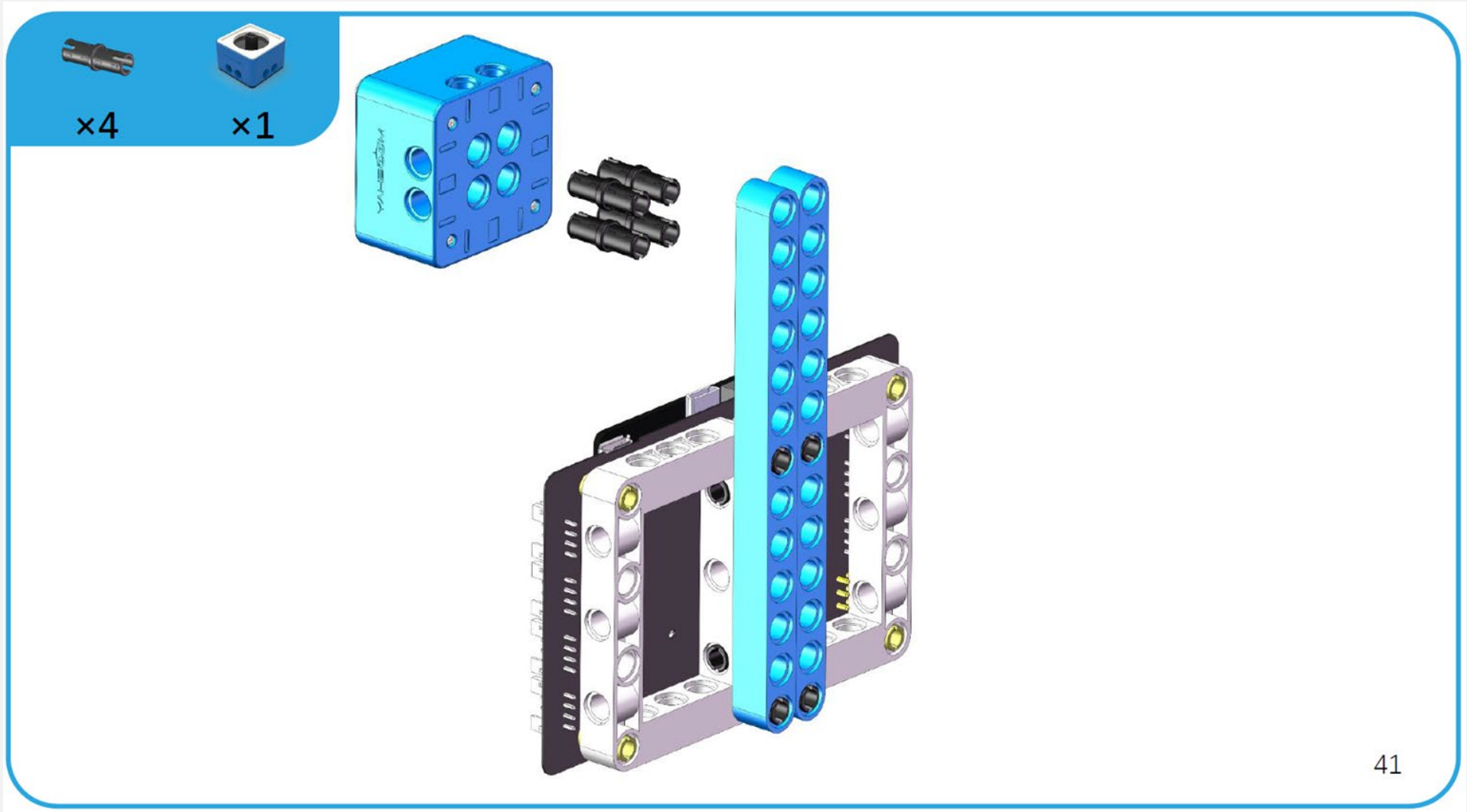
Step 9



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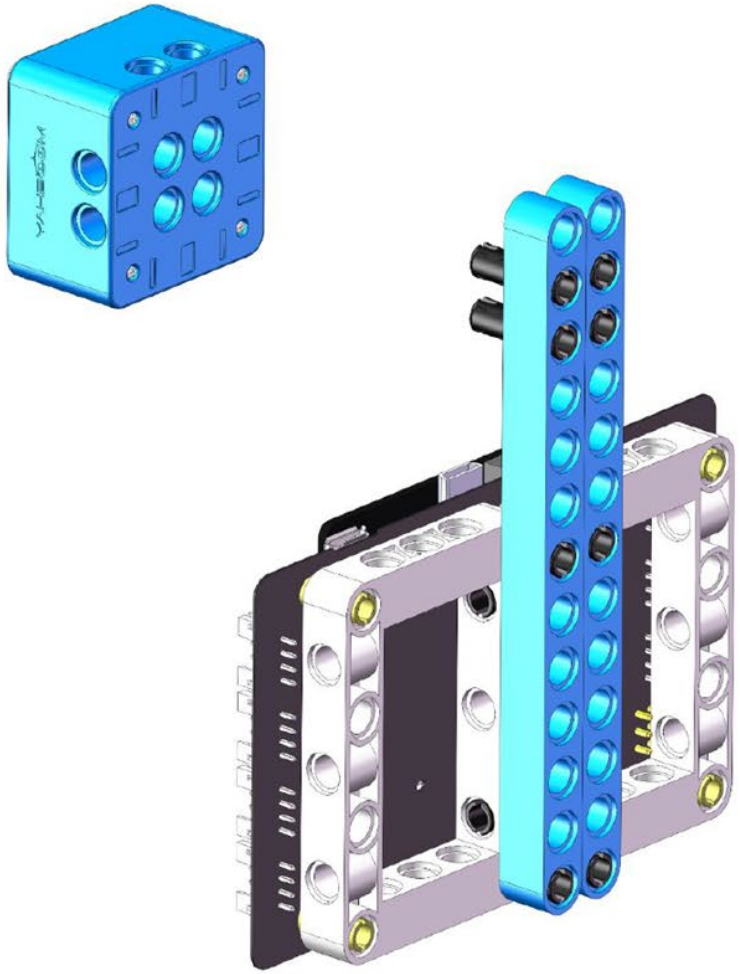
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Step 10



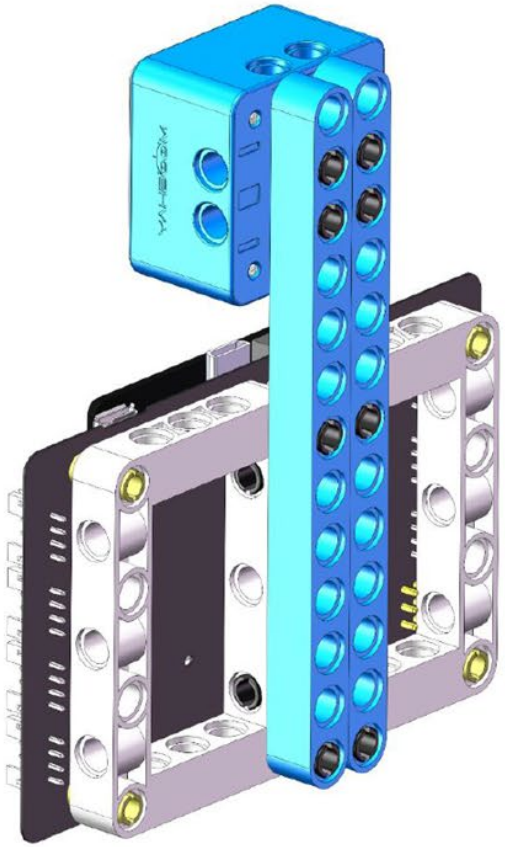
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Step 11



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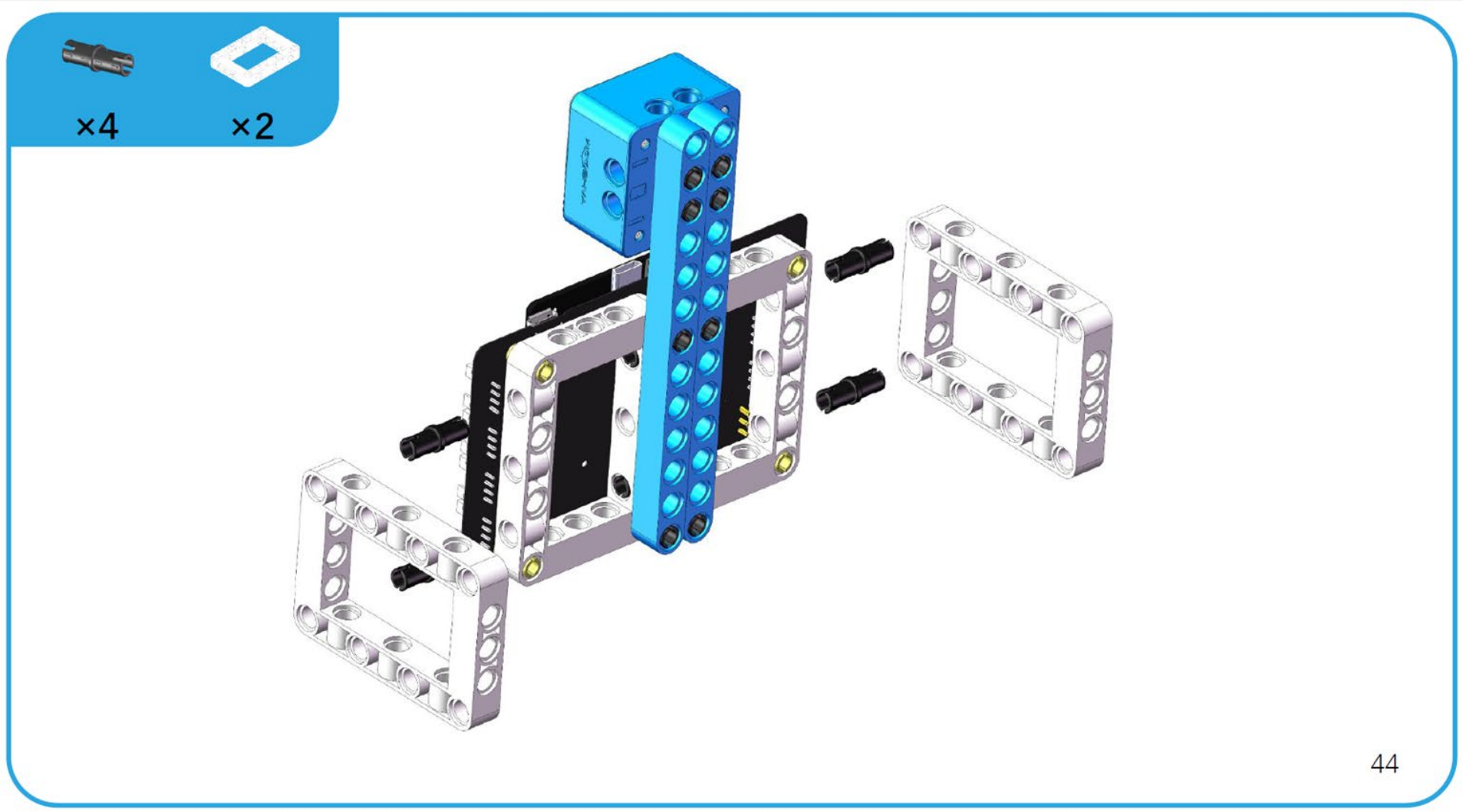
Step 12



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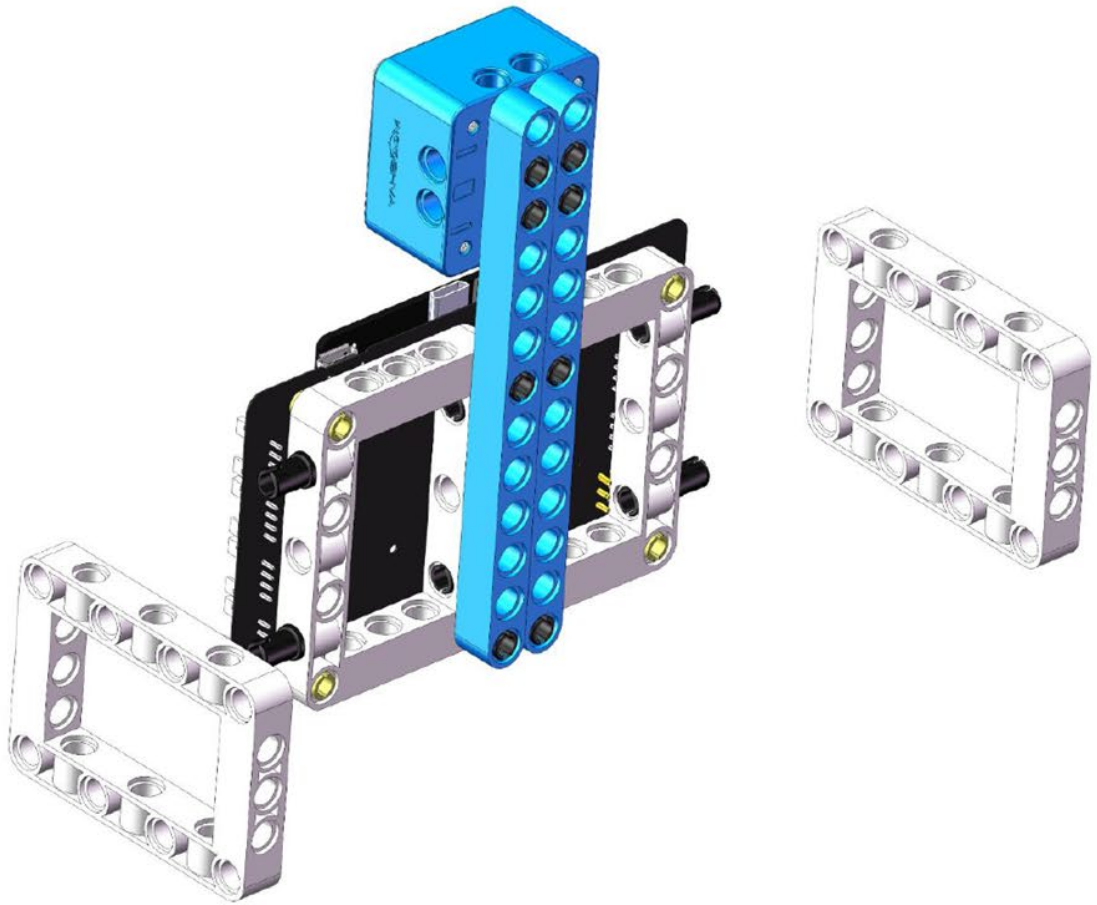
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Step 13



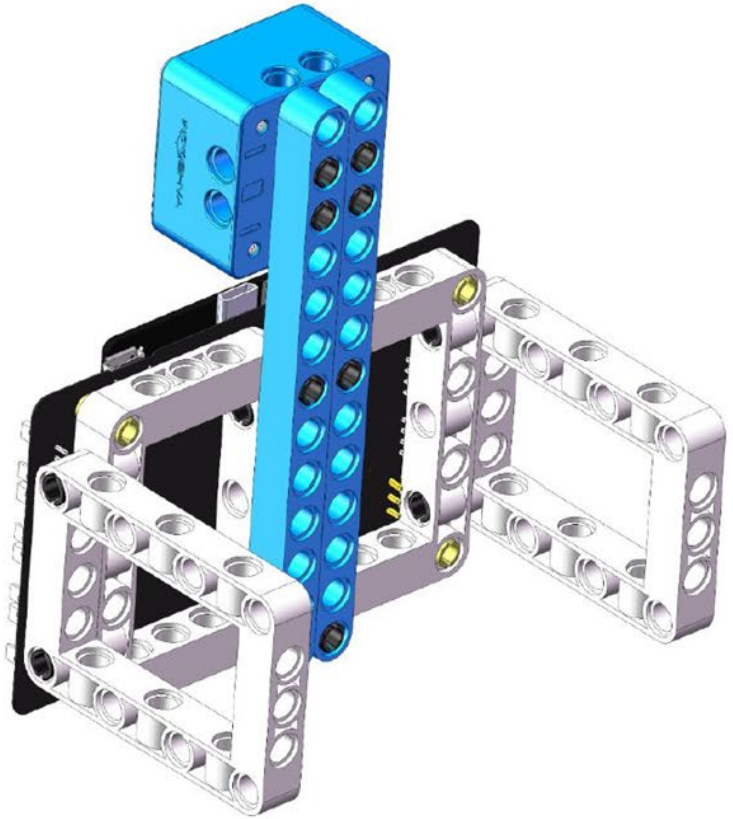
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Step 14



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Step 15



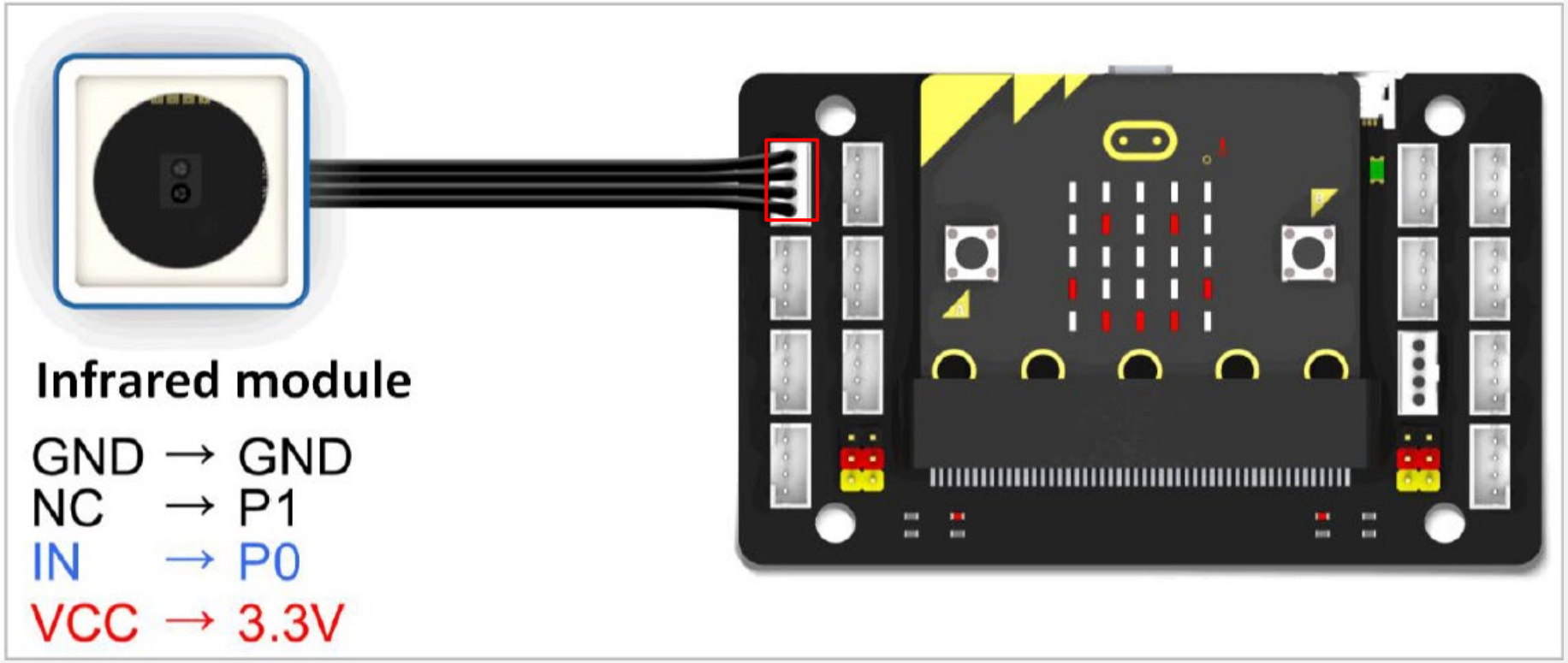
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Wire Connection

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Connect the modules

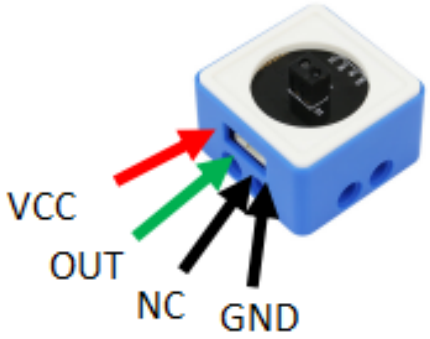


Let's connect the module like this.

https://www.youtube.com/watch?v=AGUM70iMr_0

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Infrared Sensor Module



GND: connect gnd	VCC: Power supply interface, can be connected to 3.3V, 5V
OUT:Digital signal output	NC： no need connect
Working voltage：3.3V/5V	Size： 29.4mm*28.8mm

The basic principle of the infrared sensor is to use the reflective nature of the object. Within a certain range, if there is an obstacle, the infrared rays will encounter obstacle and will be reflected to reach the sensor receiving pin.

After processing, the signal is returned to the micro-controller through the digital sensor interface, and the micro-controller can use the return signal to identify changes in the surrounding environment.

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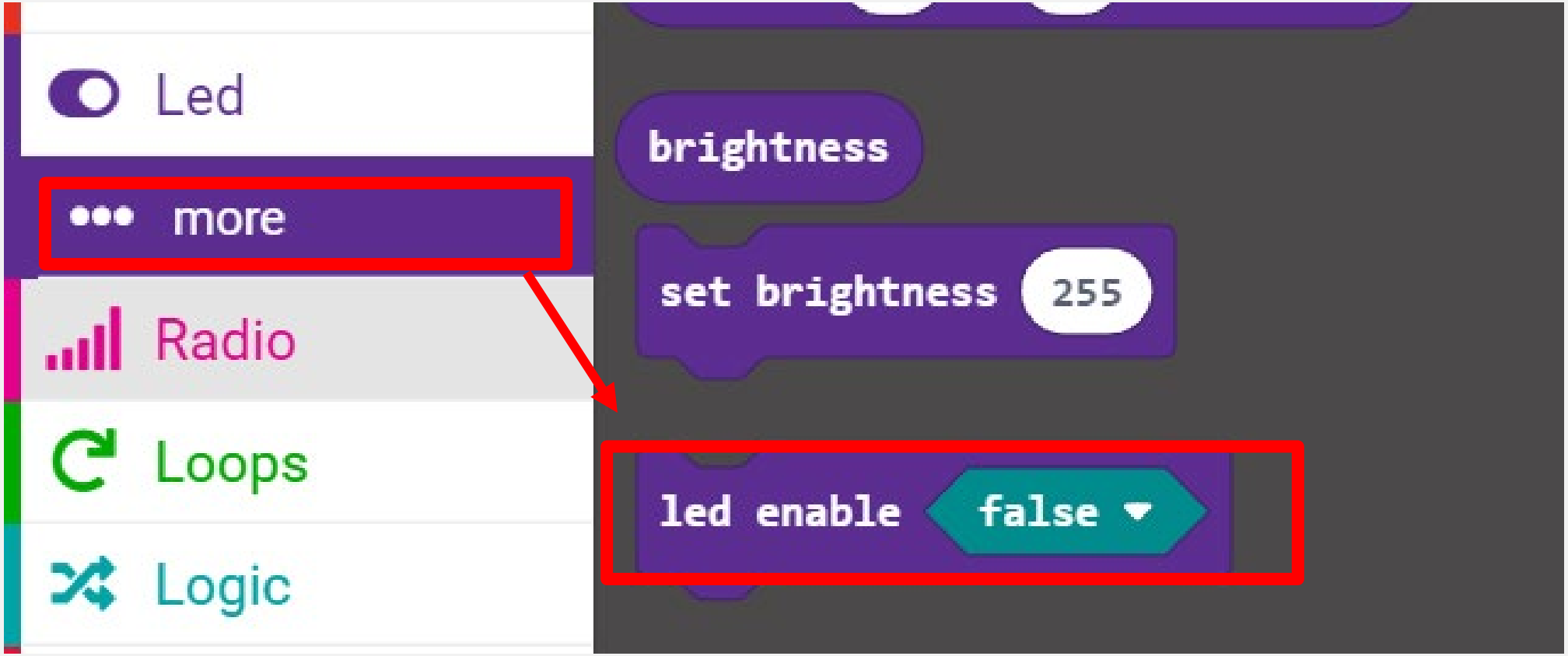
MakeCode Programming

https://github.com/YahboomTechnology/Module-World.

Or search YahboomTechnology/Module-World in the extension block

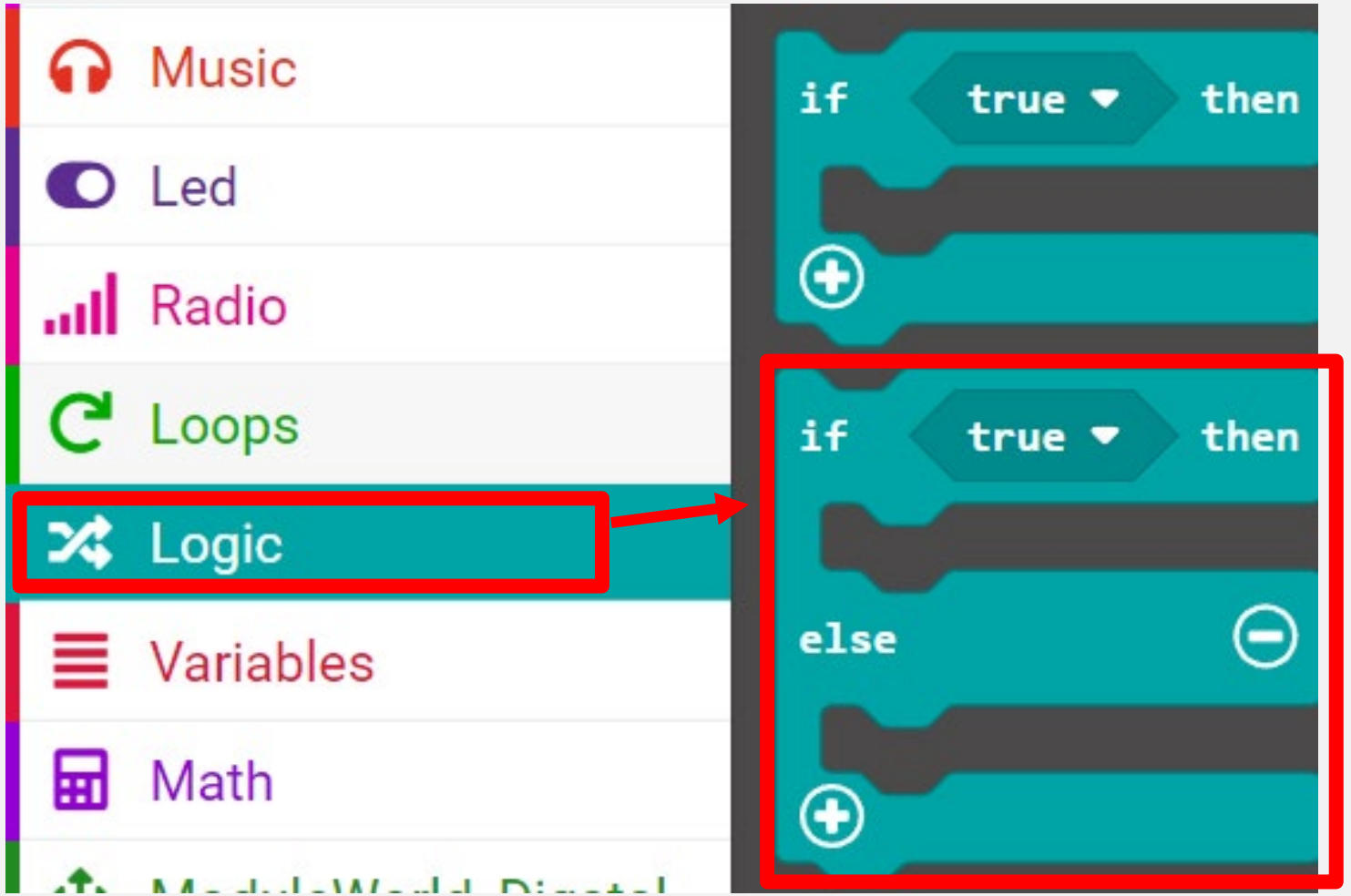
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Coding – LED, … more



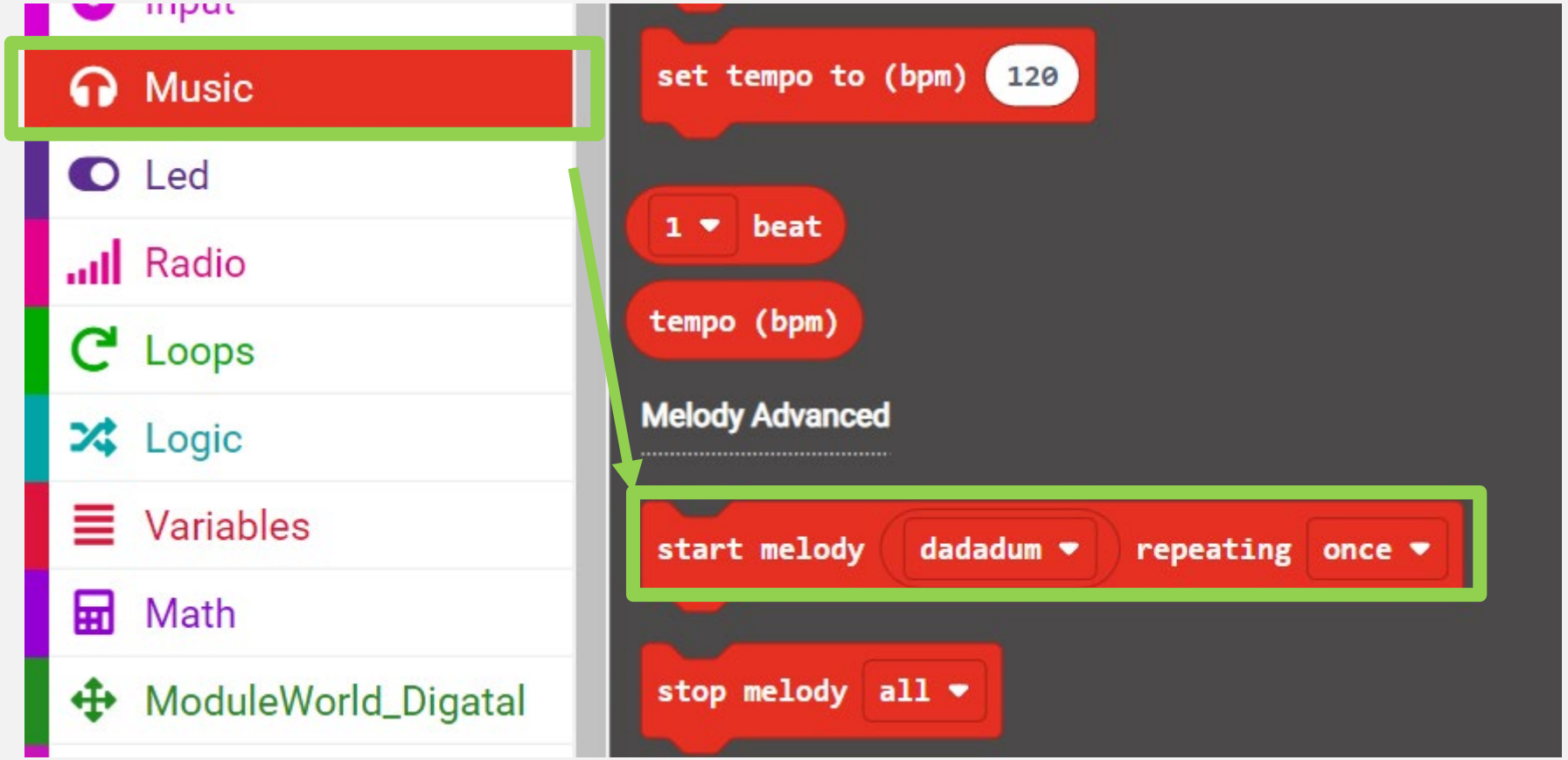
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Coding - Logic



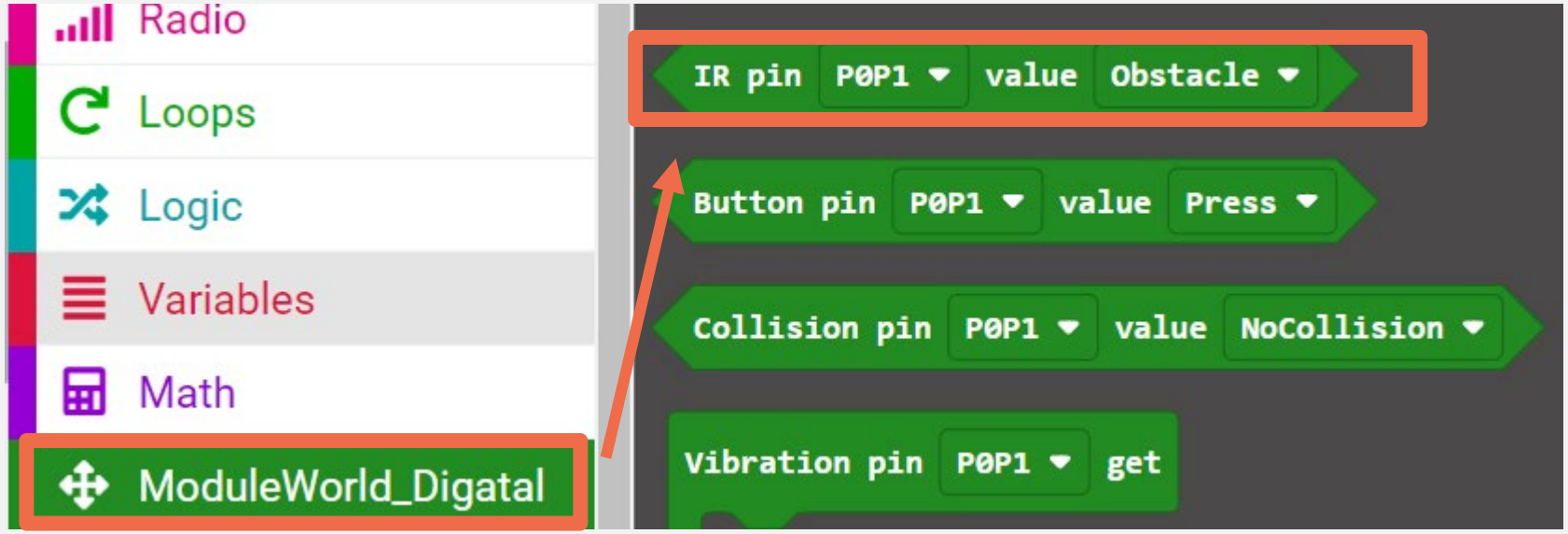
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Coding - Music



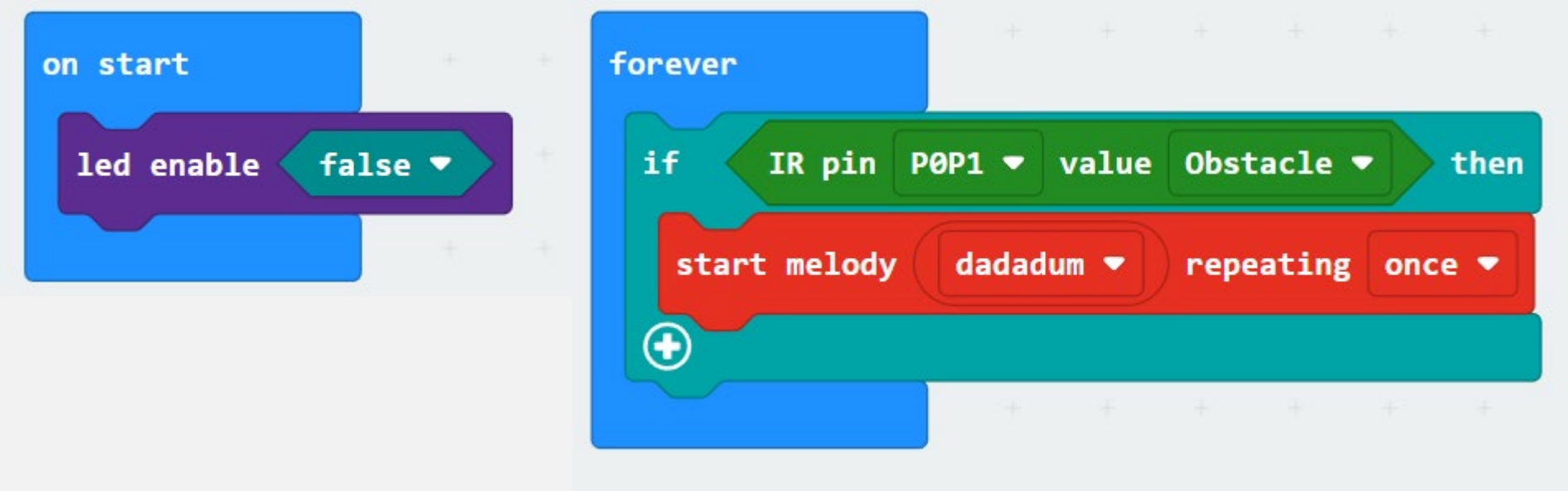
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Coding – ModuleWorld_Digatal



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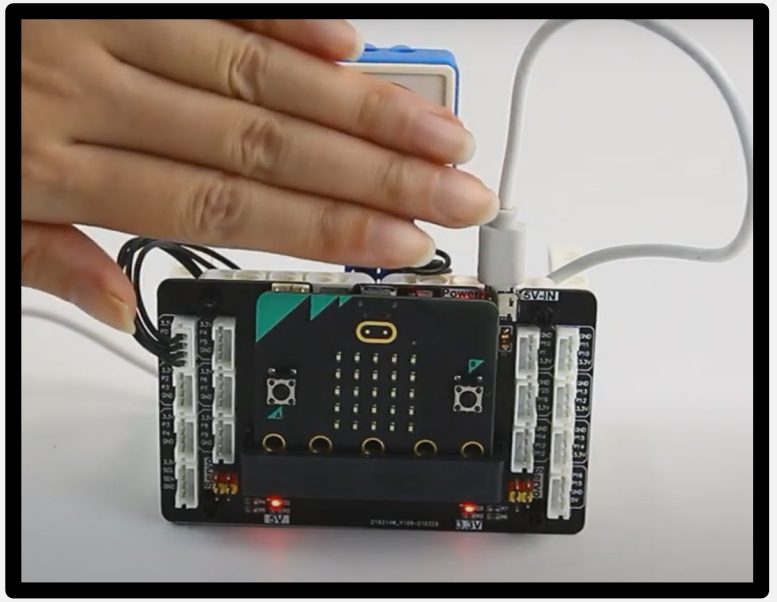
Combine Blocks



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Phenomenon

After the program is downloaded successfully.
When the infrared sensor detects an obstacle, the buzzer will sound.

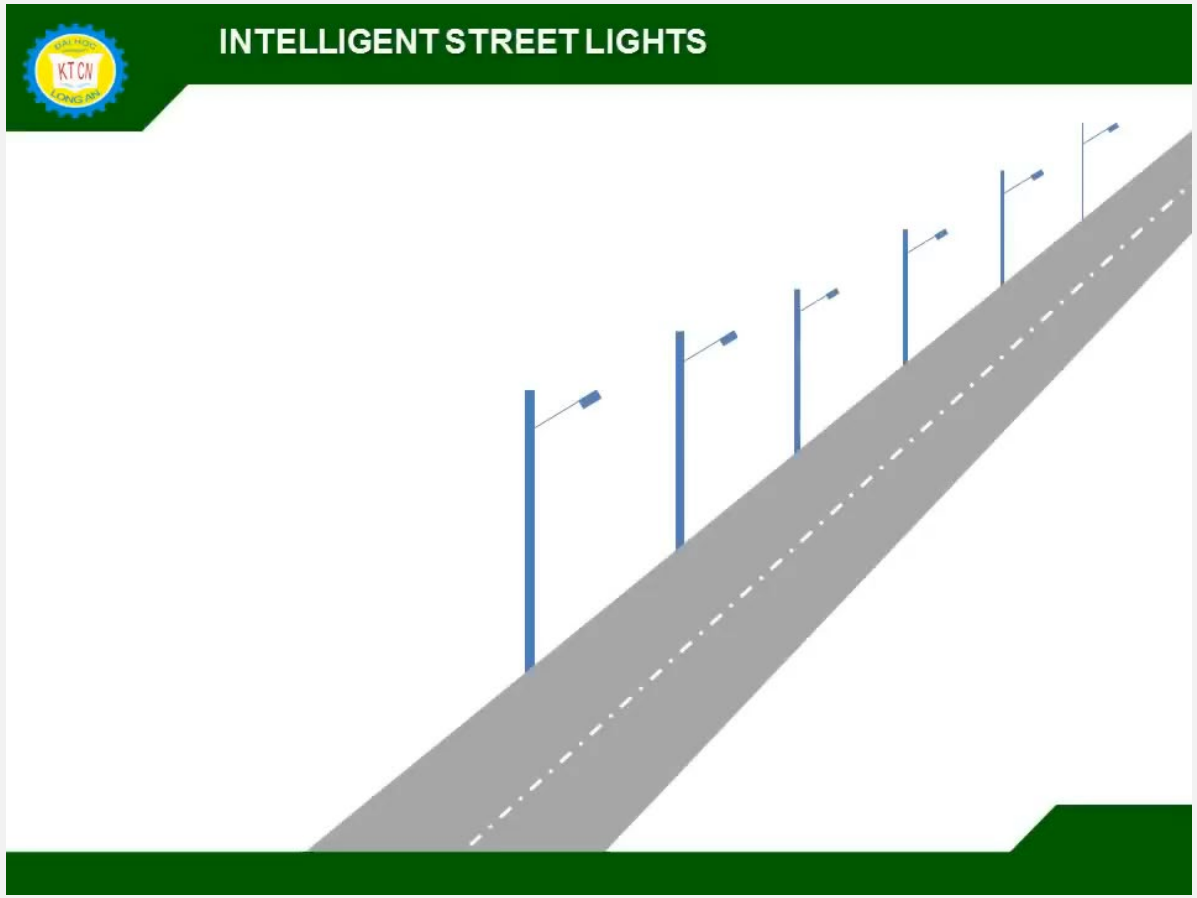


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What can Infrared Sensor do in real life?

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Real Life Application – Infrared Sensor



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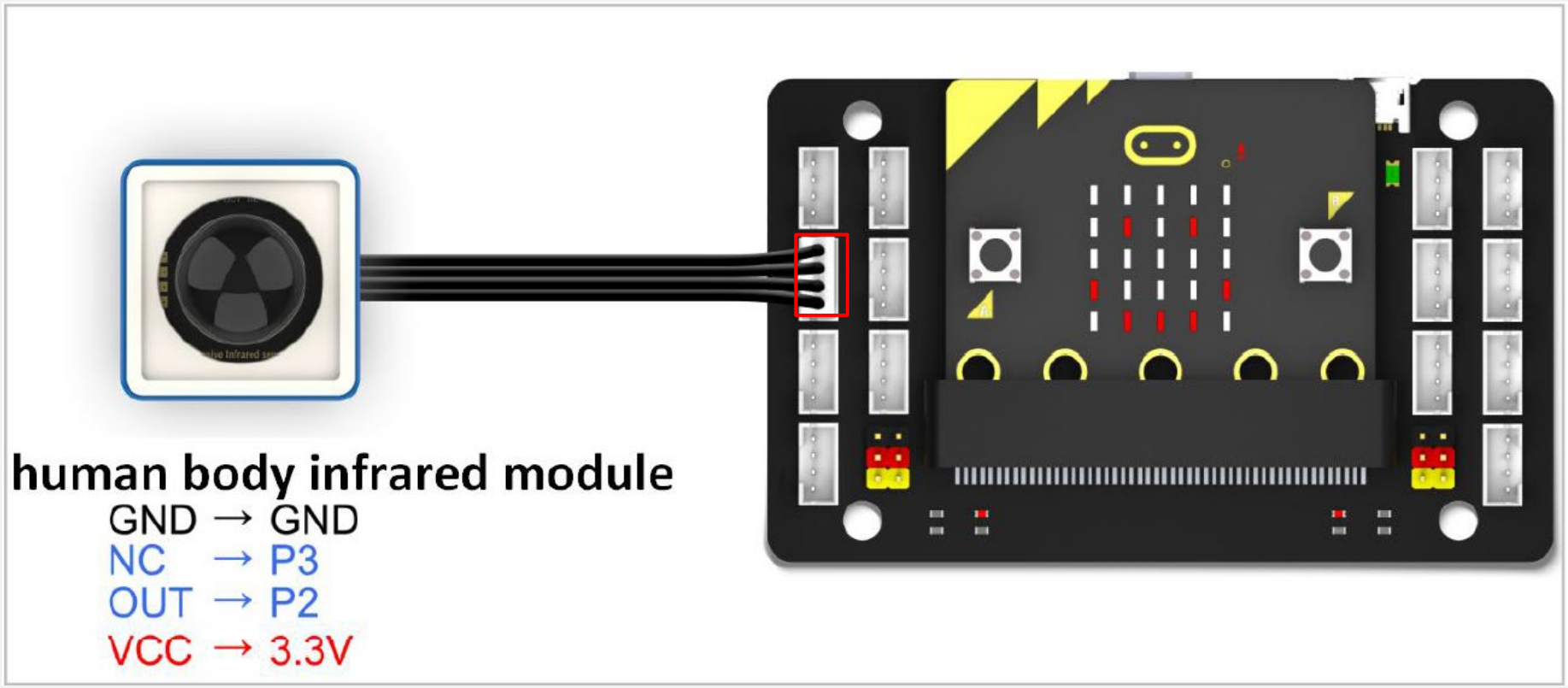
Human body warning device

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Wire Connection

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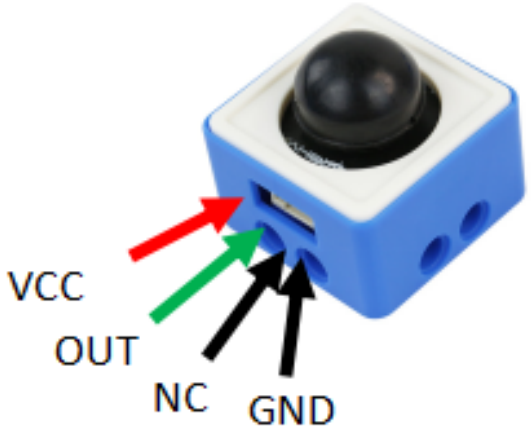
Connect the modules



Let's connect the module like this.

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Human body infrared sensor



GND: connect gnd	VCC: Power supply interface, can be connected to 3.3V, 5V
OUT: signal output	NC: No need connect
Working voltage: 3.3V/5V	Size: 29.4mm*28.8mm

The human body infrared sensor module, which works by detecting the infrared rays of about 10 um emitted by the human body. A Fresnel lens filter is attached to the surface to reduce the interference of the external environment on the detection.

Once a person enters the detection area, the infrared radiation of the human body is focused by a part of the mirror, and an alarm signal is generated after processing, and the pin outputs a high level, otherwise it outputs a low level.

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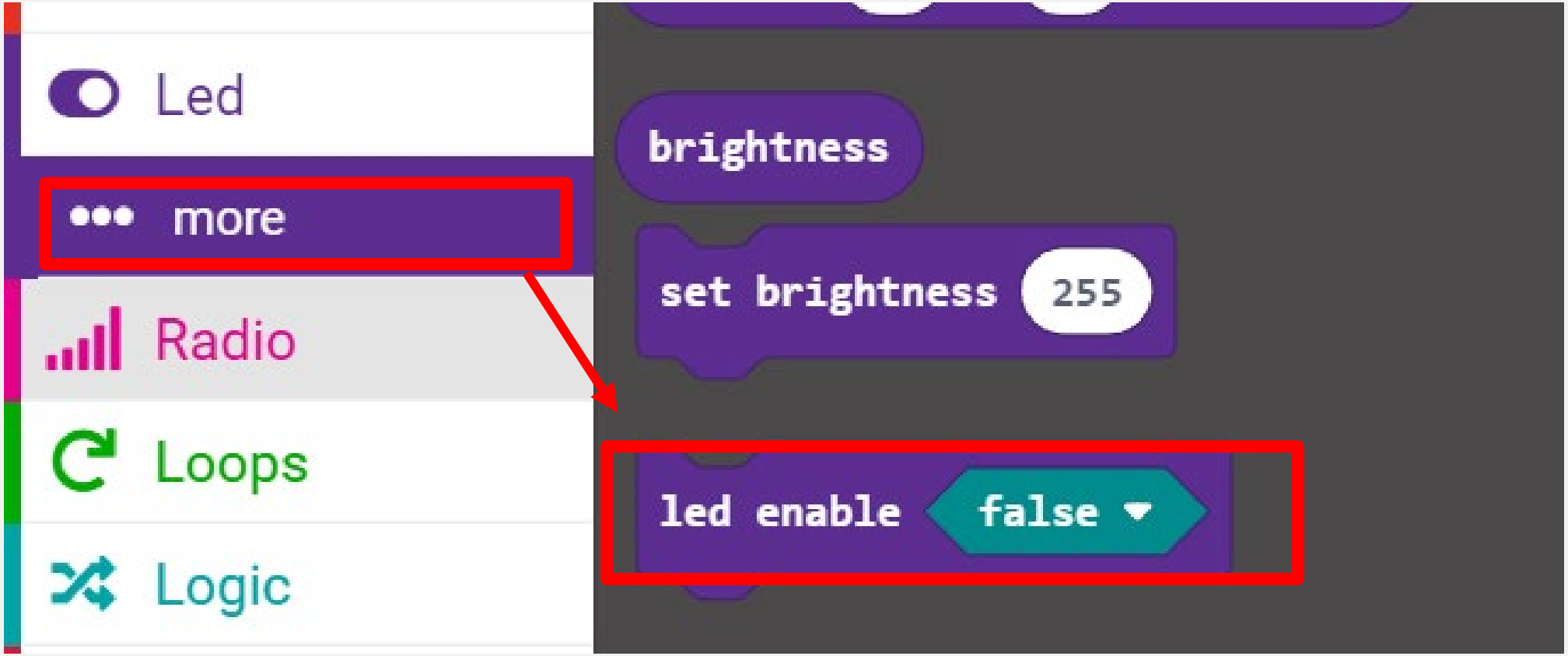
MakeCode Programming

https://github.com/YahboomTechnology/Module-World.

Or search YahboomTechnology/Module-World in the extension block

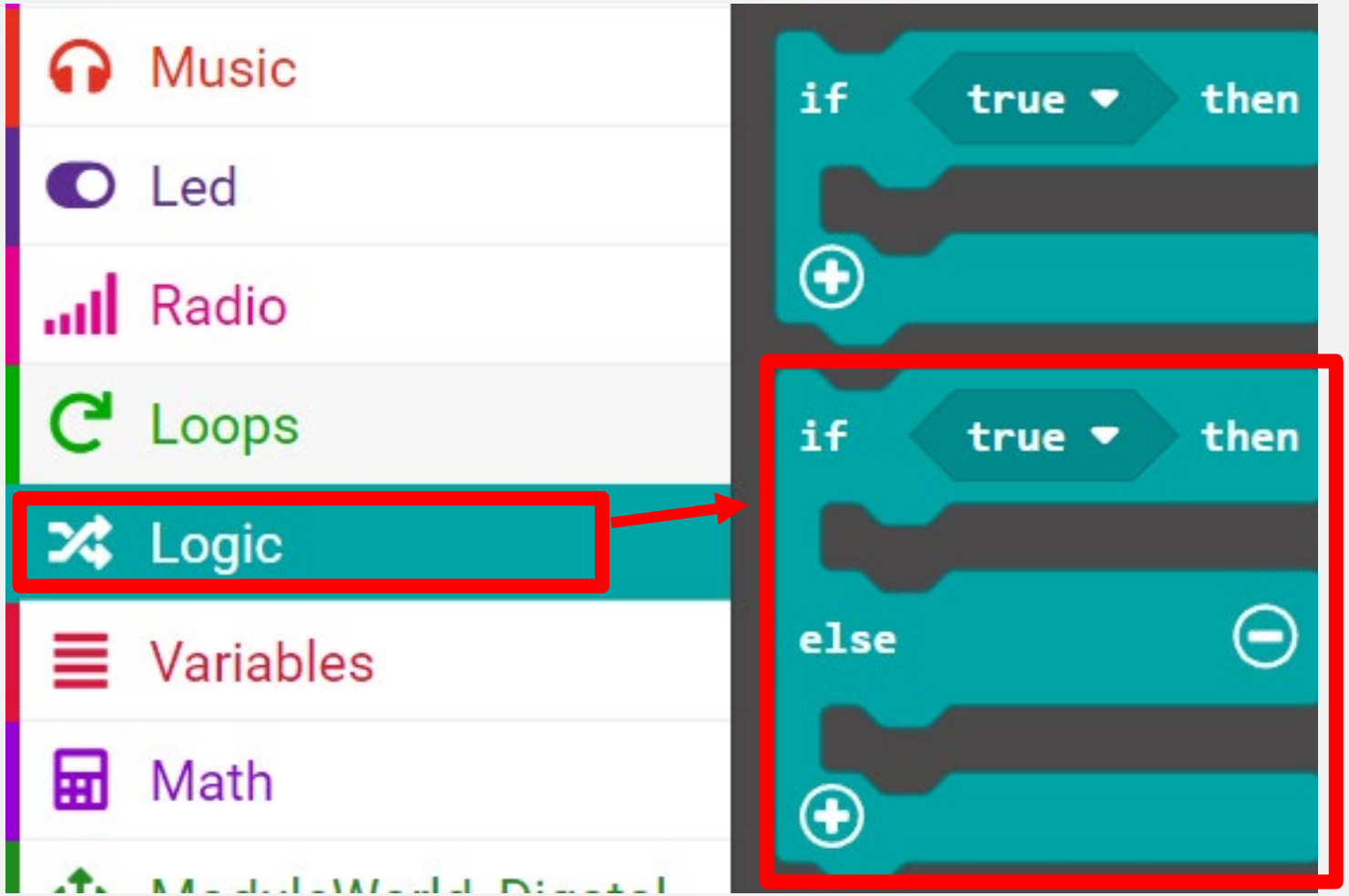
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Coding – LED, … more



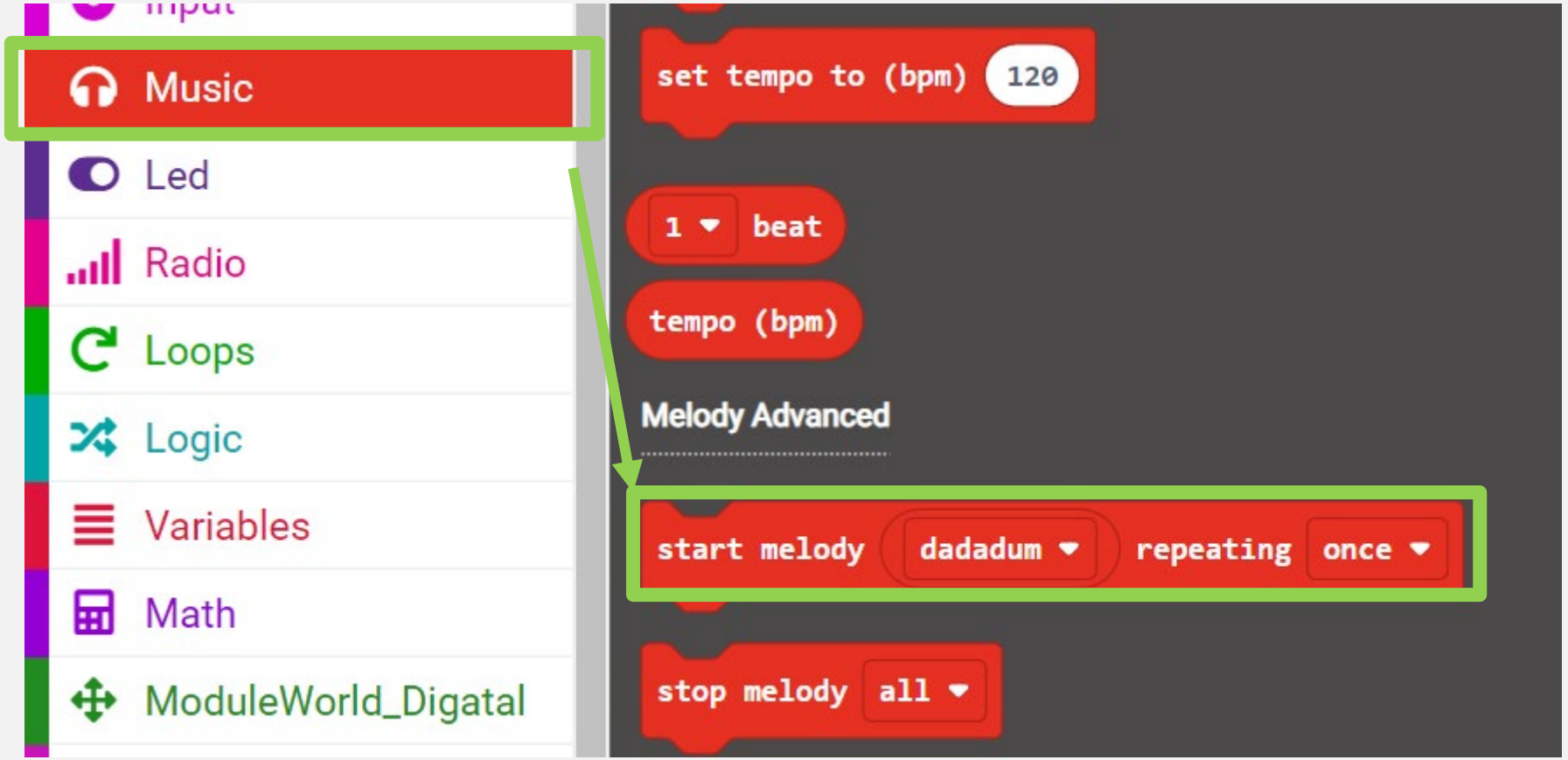
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Coding - Logic



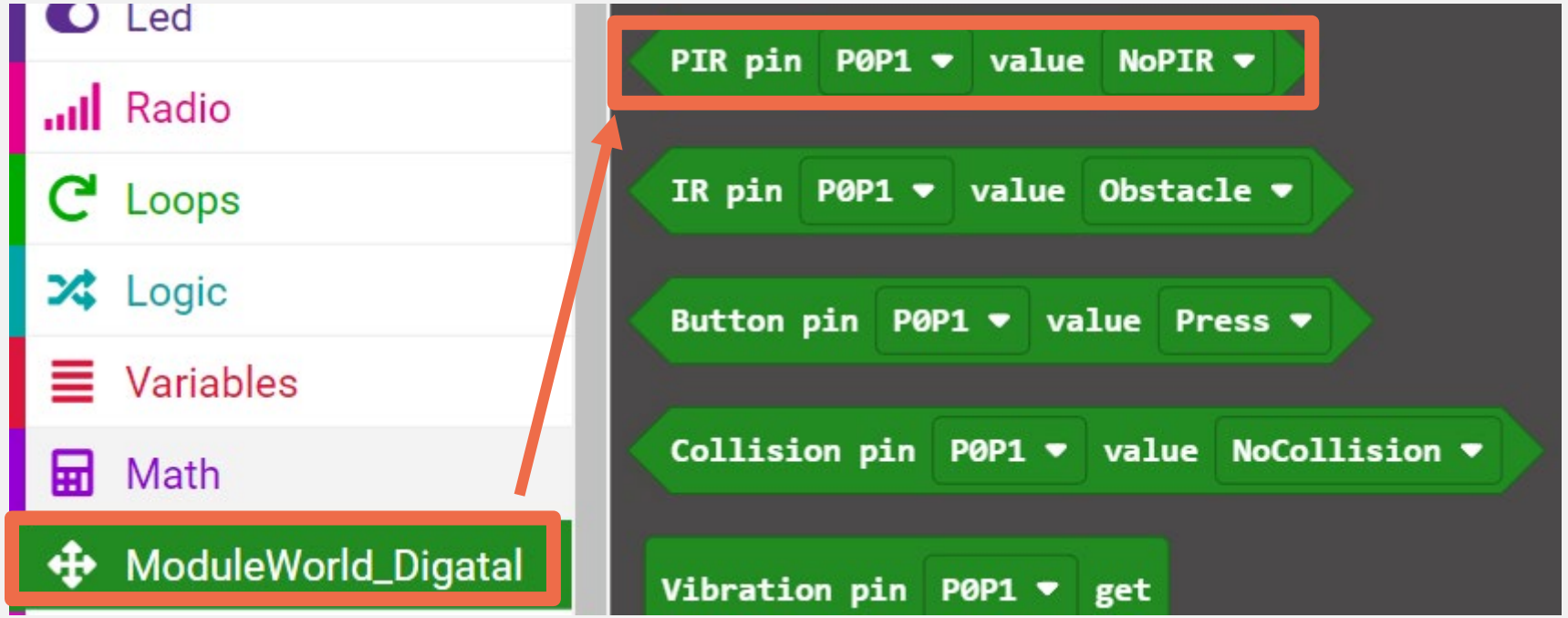
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Coding - Music



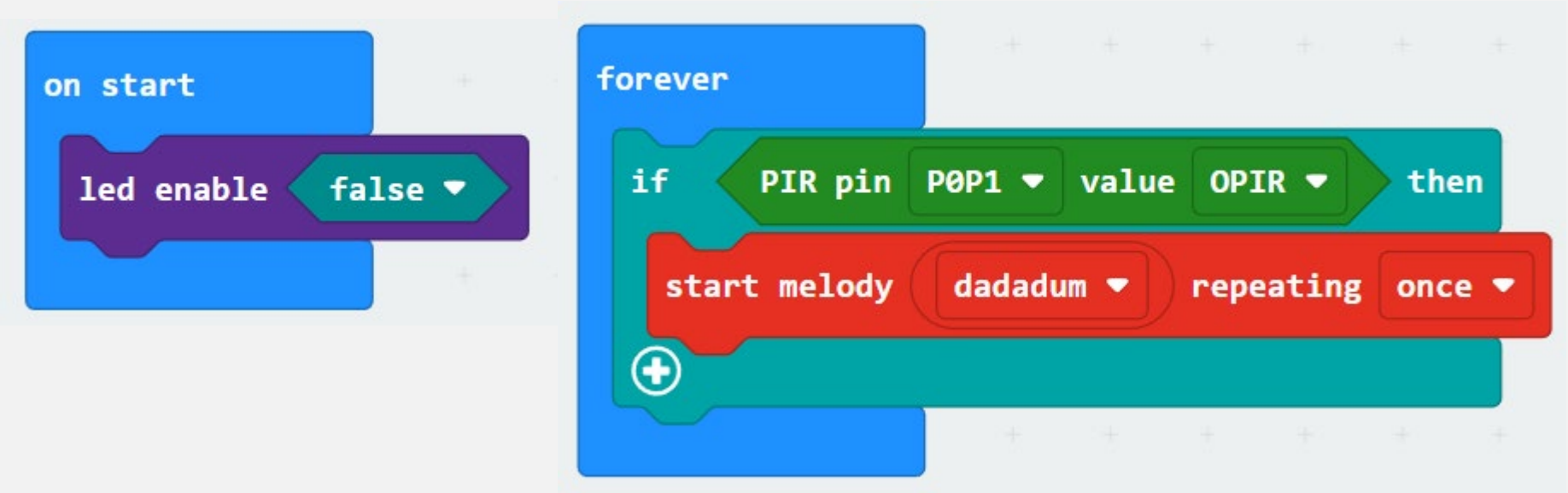
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Coding – ModuleWorld_Digatal



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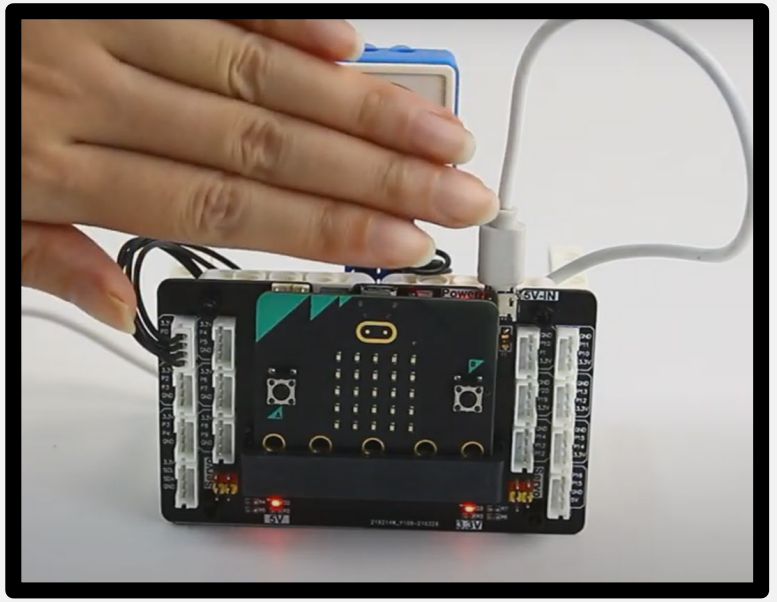
Combine Blocks



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Phenomenon

After the program is downloaded successfully. When a human body is detected, the buzzer will make a sound



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What can Human Body Infrared use in real life?

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Real Life Application – Human Body Infrared Sensor



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Do a quick self-check of your learning outcome…

1. What does IR stand for?
2. What is the difference between Infrared sensor and Human body infrared sensor?
3. What application can we use on Infrared sensor in real life?
4. What application can we use on Human body infrared sensor in real life?

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CHALLENGE

for : Lesson 6

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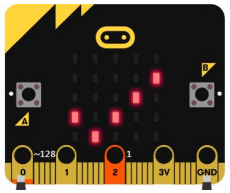
L6 – Challenge

Obstacle detecter:

After the program is downloaded successfully.

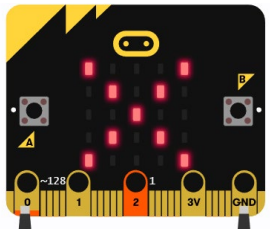
When Infrared does not detect obstacle,

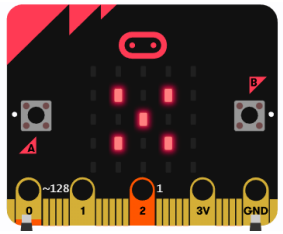
LED will show icon



When Infrared detects obstacle,

LED will show icon





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L5 – Mission

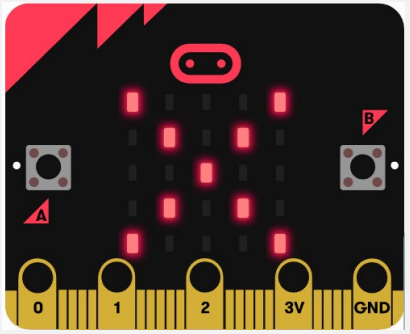
Using 3 modules Infrared, Button, and RGB:

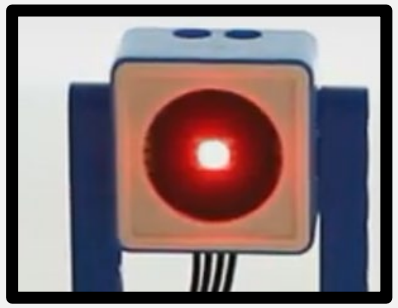
Make a controlled pedestrian crossing light that changes red when button is pressed, pause for 10 seconds for pedestrian crossing, then changes to green.

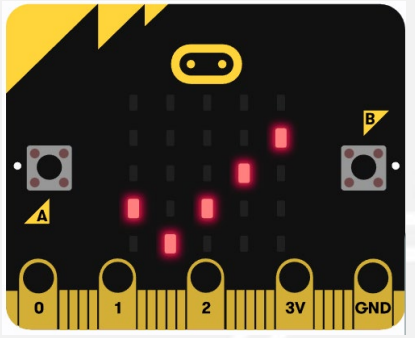
Condition:

1. **RGB will changes light to red when button is pressed and there is no obstacle. If button is pressed and there is obstacle, RGB will not turn to red.**
2. **Show LED for pedestrian. When green light, LED will show stop . When red light, LED will show safe to cross**









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Any Questions?

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Thank you :)

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