

Microbit Robotics Beginner Level 1

Lesson 5

Rocker Control & Emergency Light

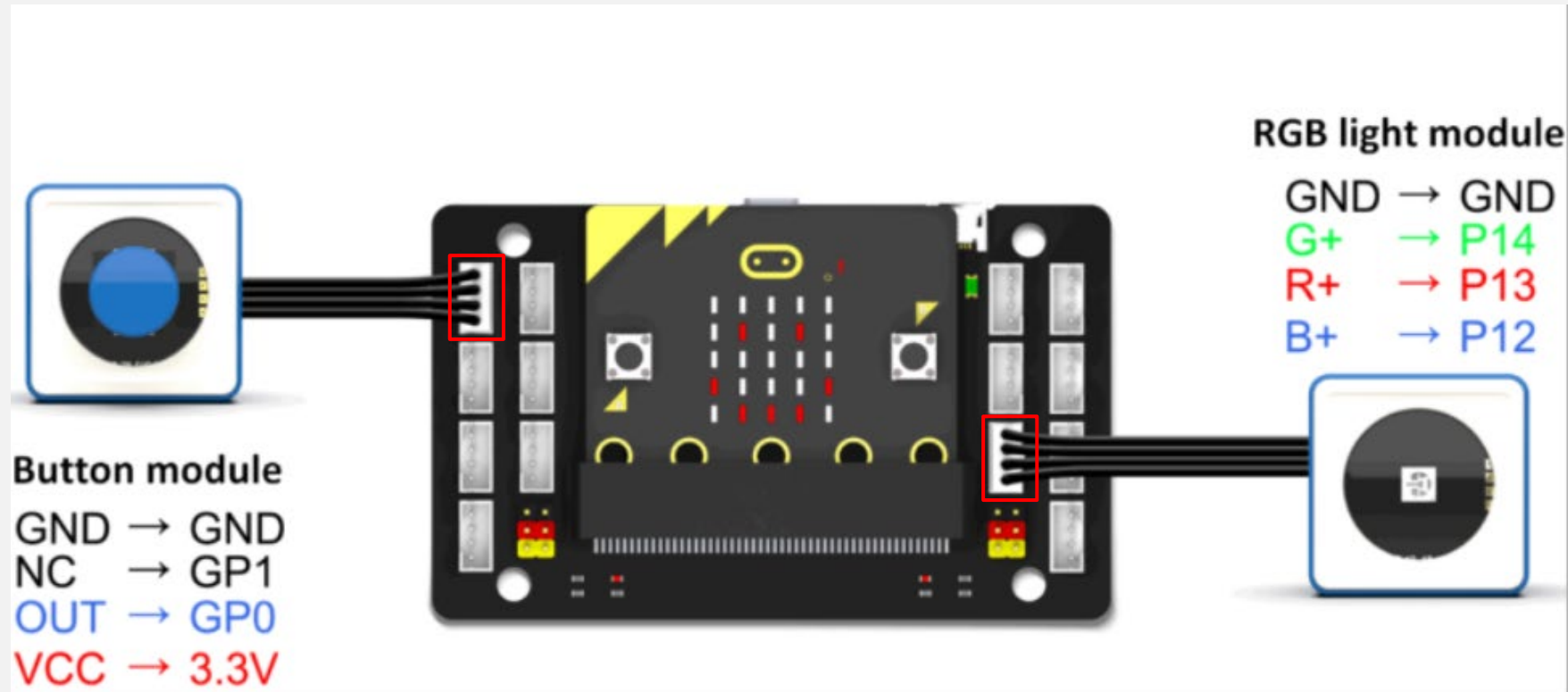
Presented by Advanced Superlogic Team

Review previous lesson

Step 9



Connect the modules



Let's **connect** the module like this.

Combine Blocks

```

on start
  set temp to 0
  
```

```

forever
  if Button pin P0P1 value Press then
    pause (ms) 100
    while Button pin P0P1 value Press
      do
        pause (ms) 1
    change temp by 1
    if temp > 1 then
      set temp to 0
    if temp = 0 then
      RGB (P12P13P14) value OFF
    else if temp = 1 then
      RGB (P12P13P14) value White
  
```

L4 -

Make the table lamp behaves like below:

After the program is downloaded successfully.

When we **press button module at the first time, RGB light will become **white**;**

when we **press button module at the second time, RGB light will become **red**;**

when we **press button module at the third time, RGB light will become **blue**;**

when we **press button module at the fourth time, RGB light will become **green**;**

when we **press button module at the fifth time, RGB light will off;**

Condition: If we don't release the button, the light will **always keep changing (blink with 100 milliseconds)**

Answers

```

forever
  if Button pin P0P1 value Press then
    pause (ms) 100
    while Button pin P0P1 value Press
    do
      pause (ms) 1
    change temp by 1
    if temp > 7 then

```

```

forever
  if Button pin P0P1 value Press then
    pause (ms) 100
    change temp by 1
    if temp > 5 then
      set temp to 0
    if temp = 0 then
      RGB (P12P13P14) value OFF

```

```

if temp = 0 then
  RGB (P12P13P14) value OFF
else if temp = 1 then
  RGB (P12P13P14) value White
else if temp = 2 then
  RGB (P12P13P14) value Red
else if temp = 3 then
  RGB (P12P13P14) value Blue
else if temp = 4 then
  RGB (P12P13P14) value Green

```

Do a quick self-check of your learning outcome...

- 1. How to make a toggle switch button to switch on the RGB light?**
- 2. What is a variable?**
- 3. What is the difference between “set variable” to and “change variable by”?**
- 4. How to use conditional (if then else) for different RGB state?**

Today's Topic

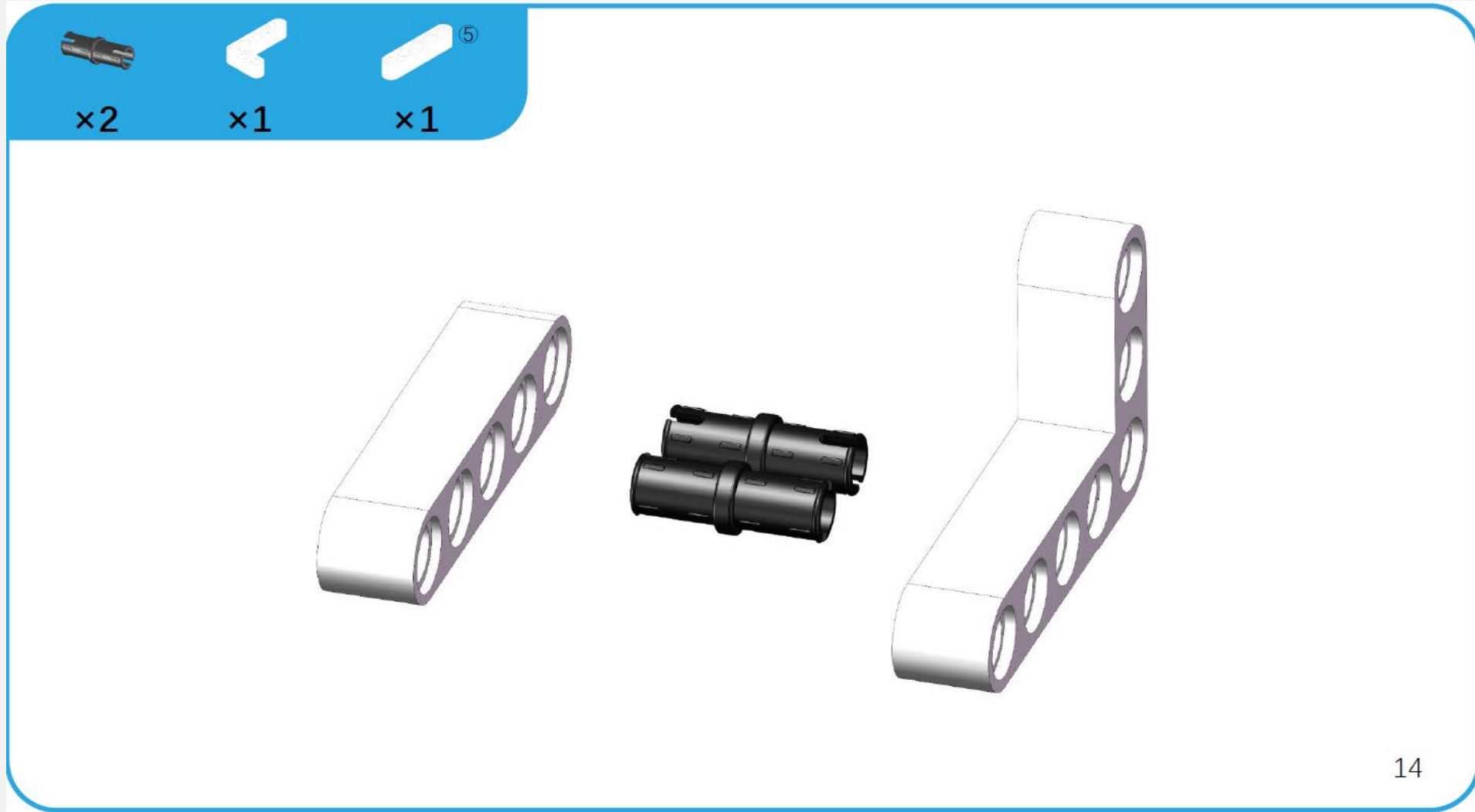
- 1. Build Rocker Control Light with World of Modules**
- 2. Rocker and RGB module connection method**
- 3. Rocker Programming**
- 4. RGB Light Programming**

Learning Outcome

- 1. Able to build Rocker control light with instruction manual**
- 2. Understand how Rocker programming work**
- 3. Able to program the lamp switching light color with rocker module**
- 4. Able to program photosensitive with RGB**

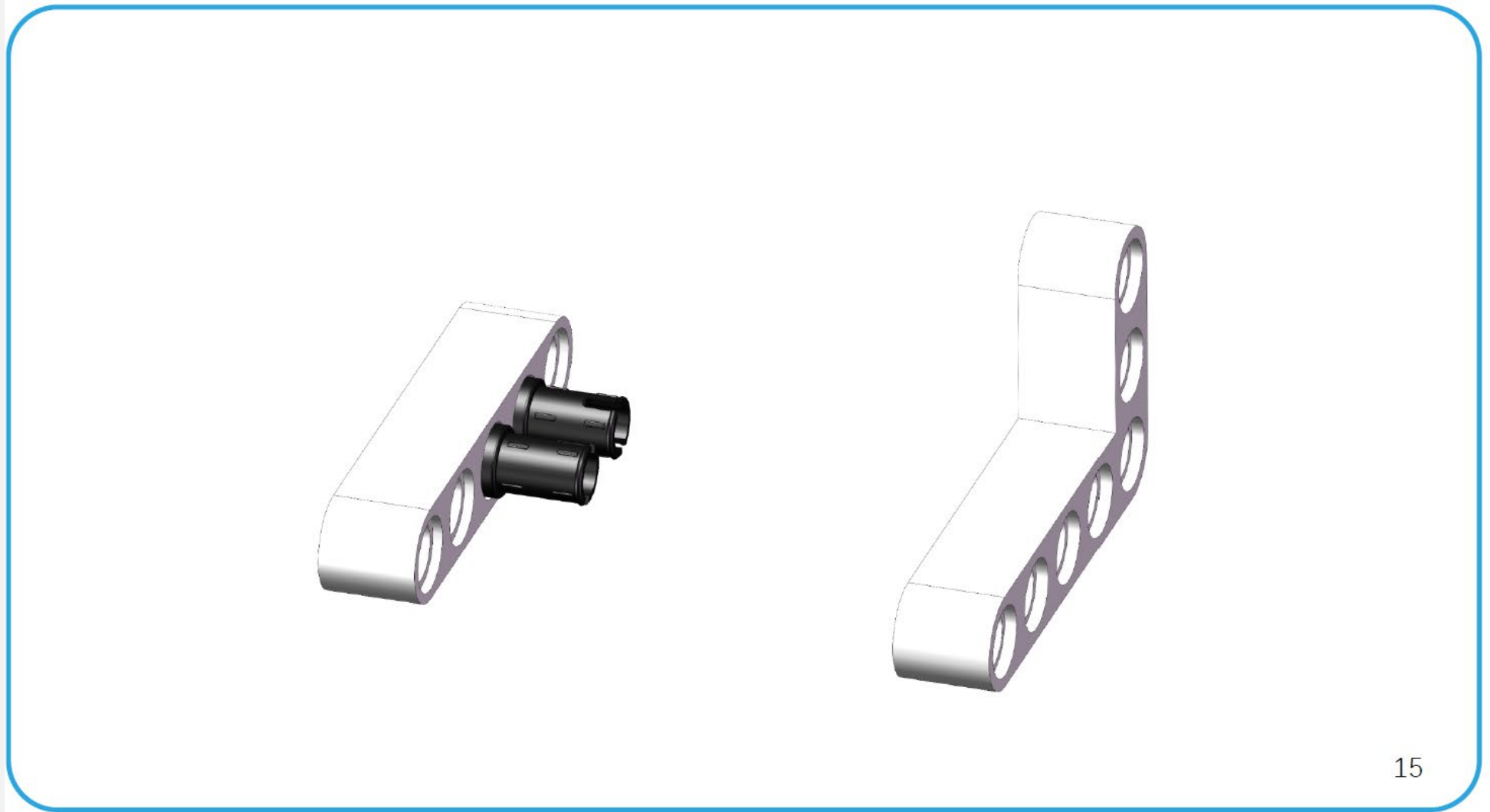
Rocker Control Light

Step 1



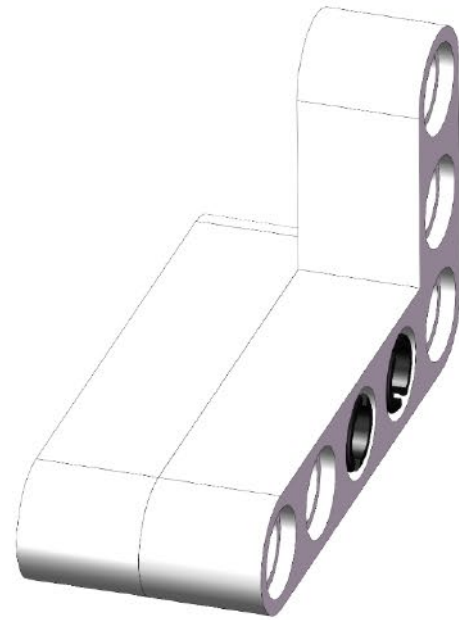
14

Step 2



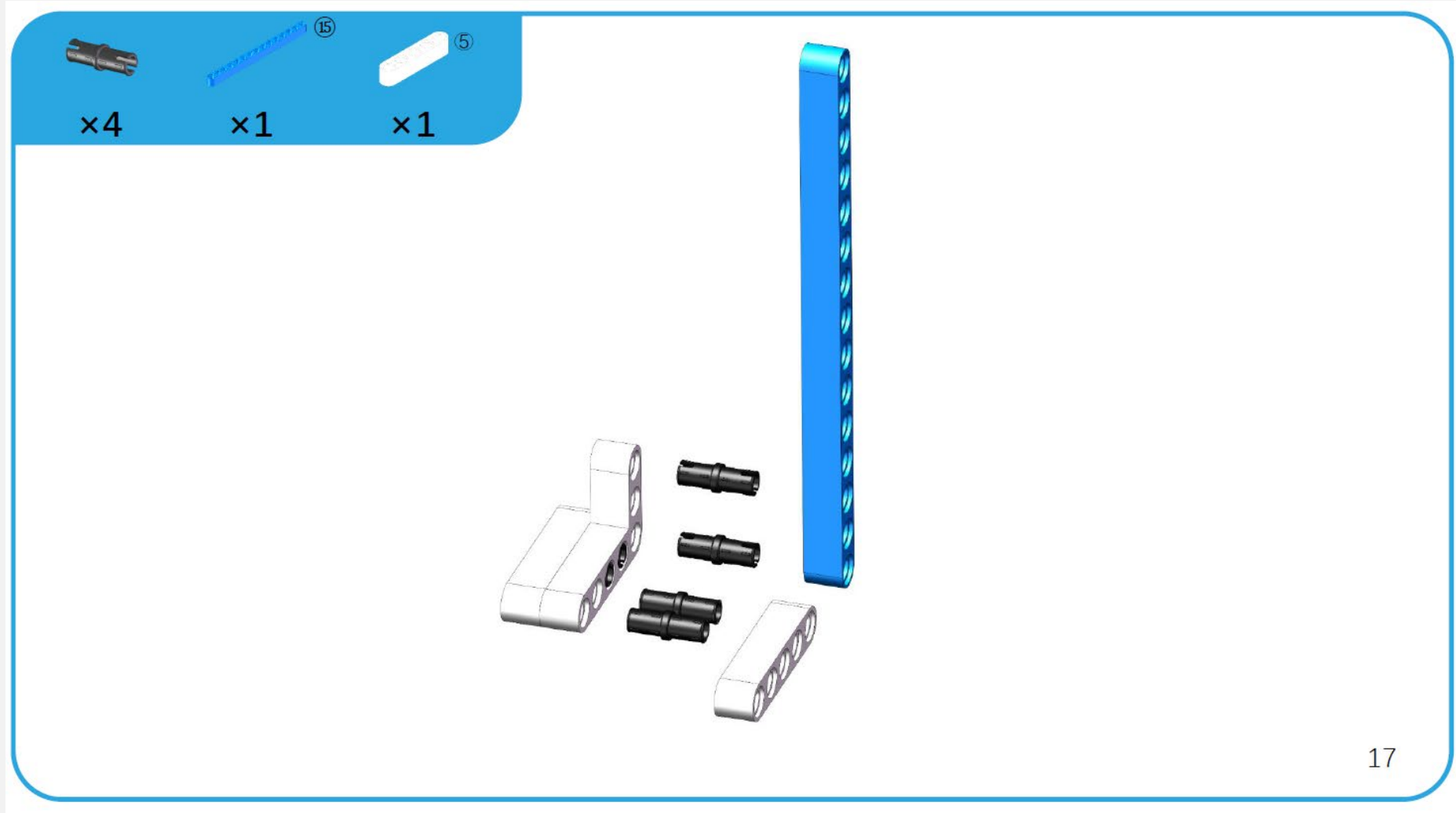
15

Step 3



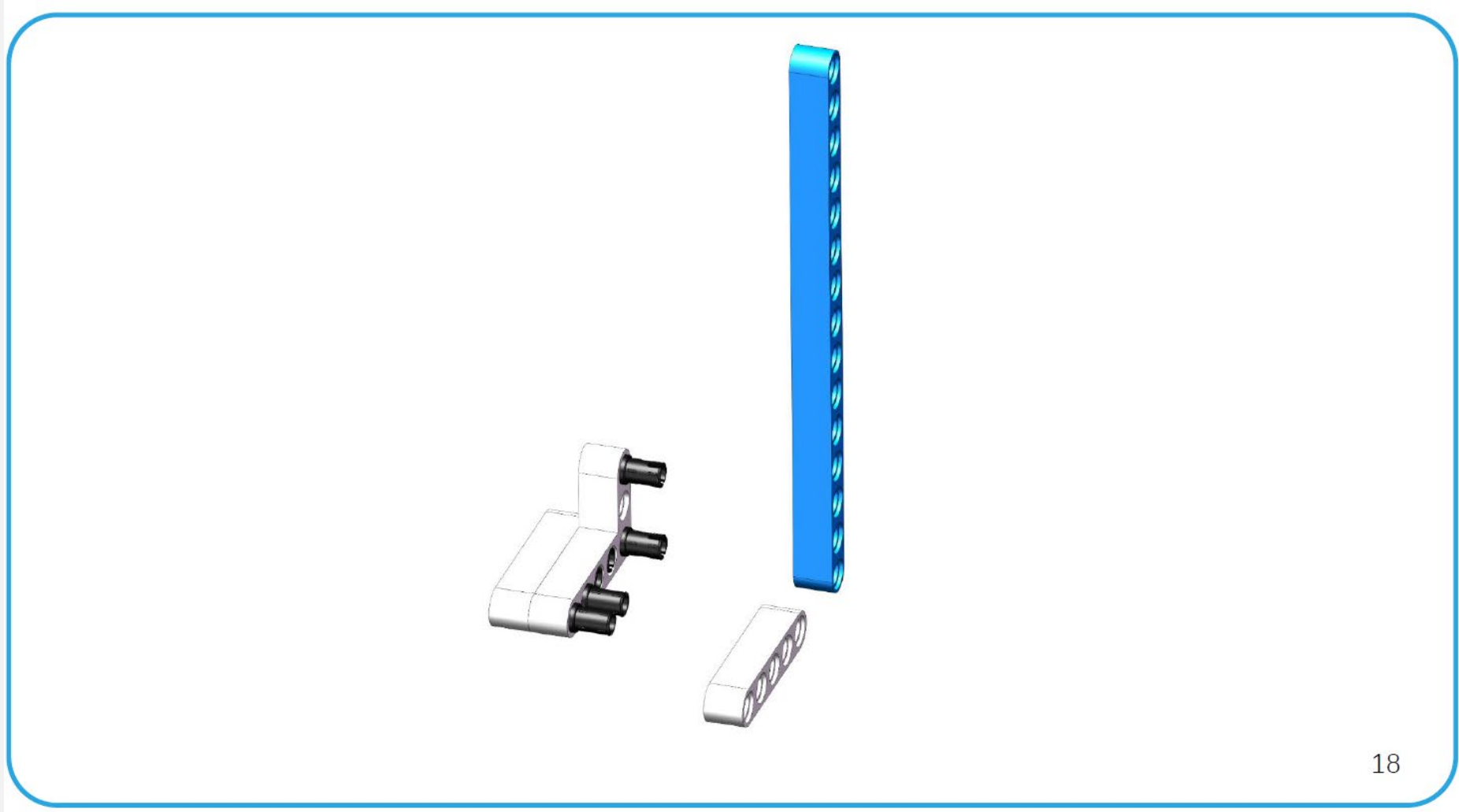
16

Step 4



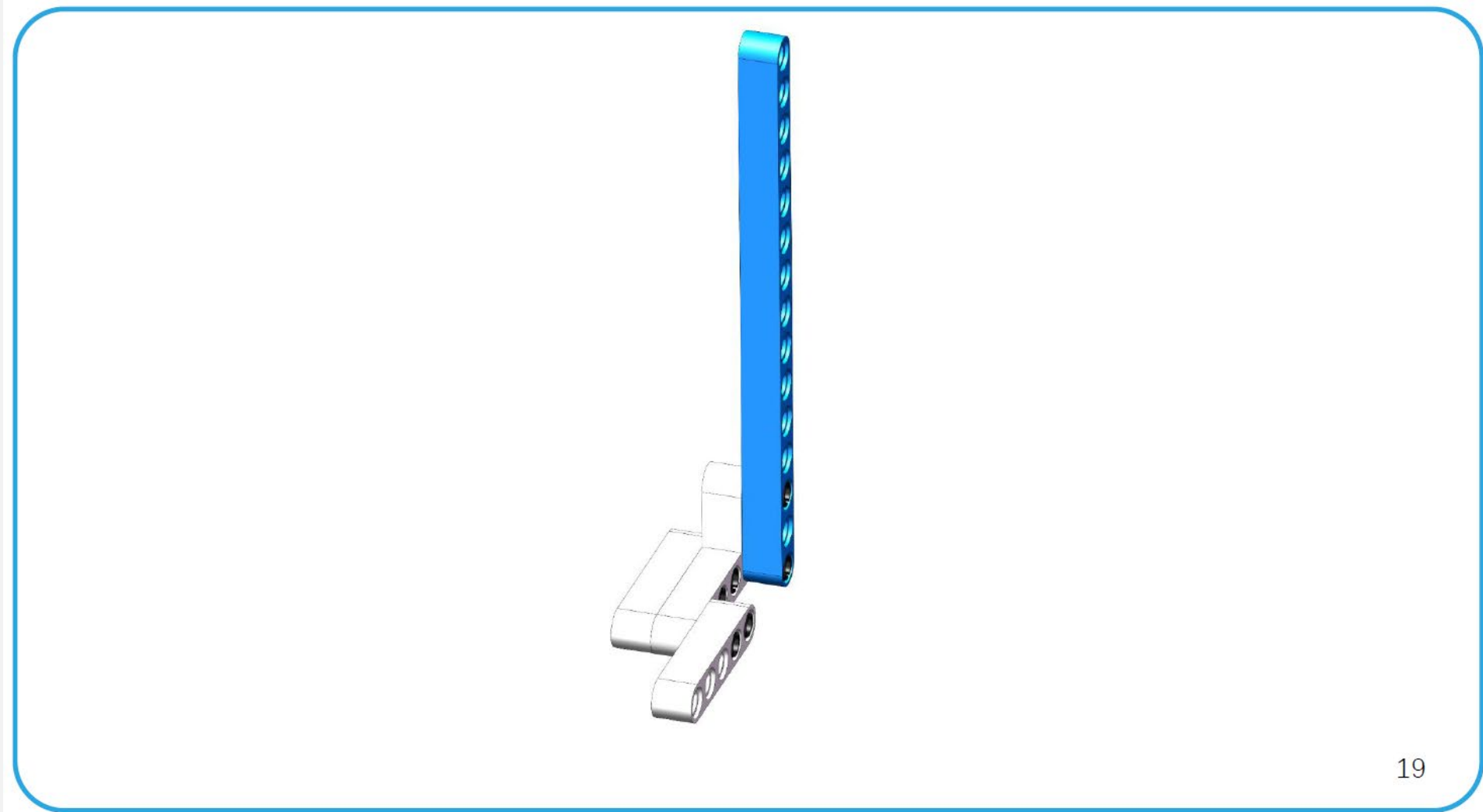
17

Step 5



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Step 6



Step 7



Step 8



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Step 9



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Step 10



Wire Connection

Connect the modules



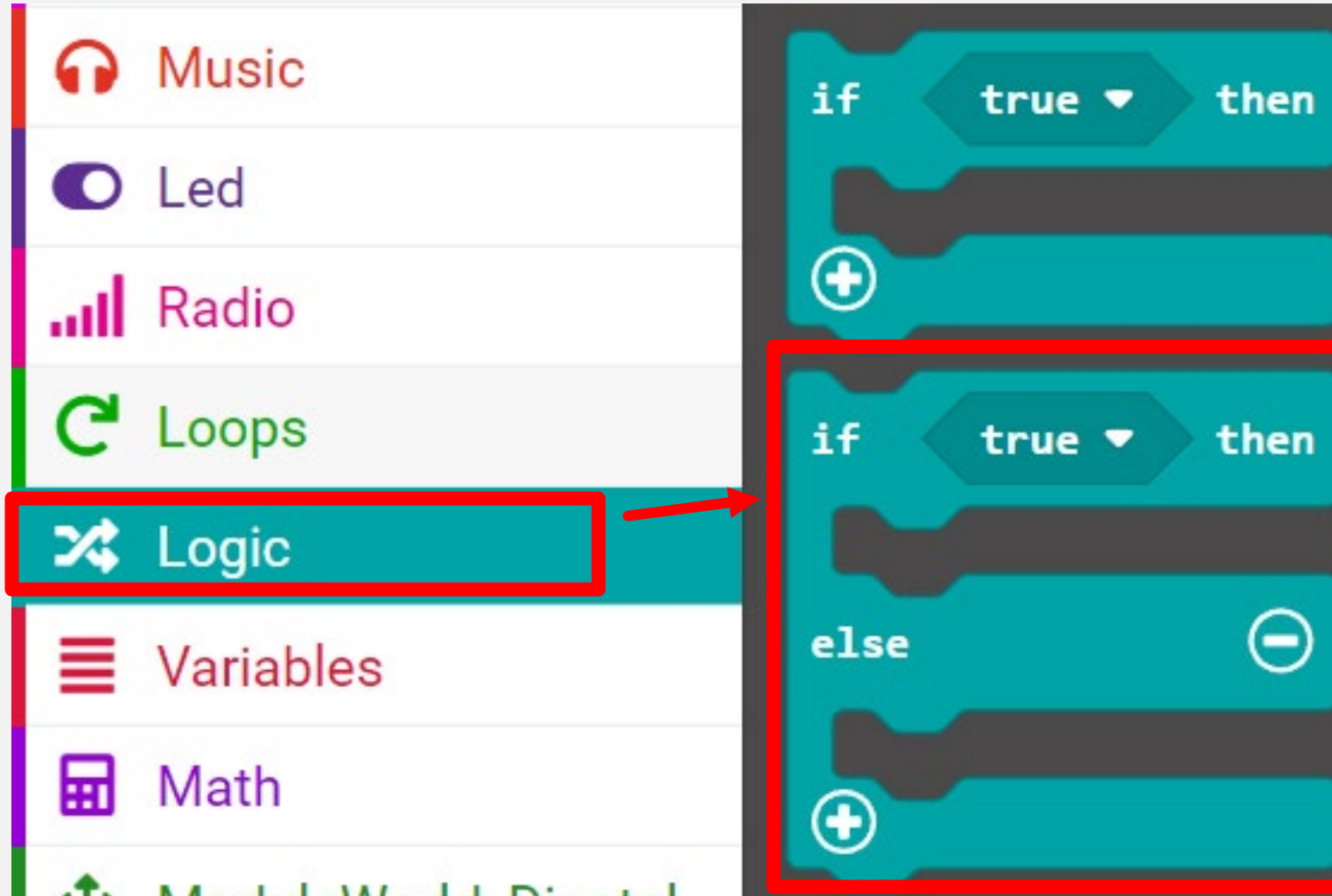
Let's connect the module like this.

MakeCode Programming

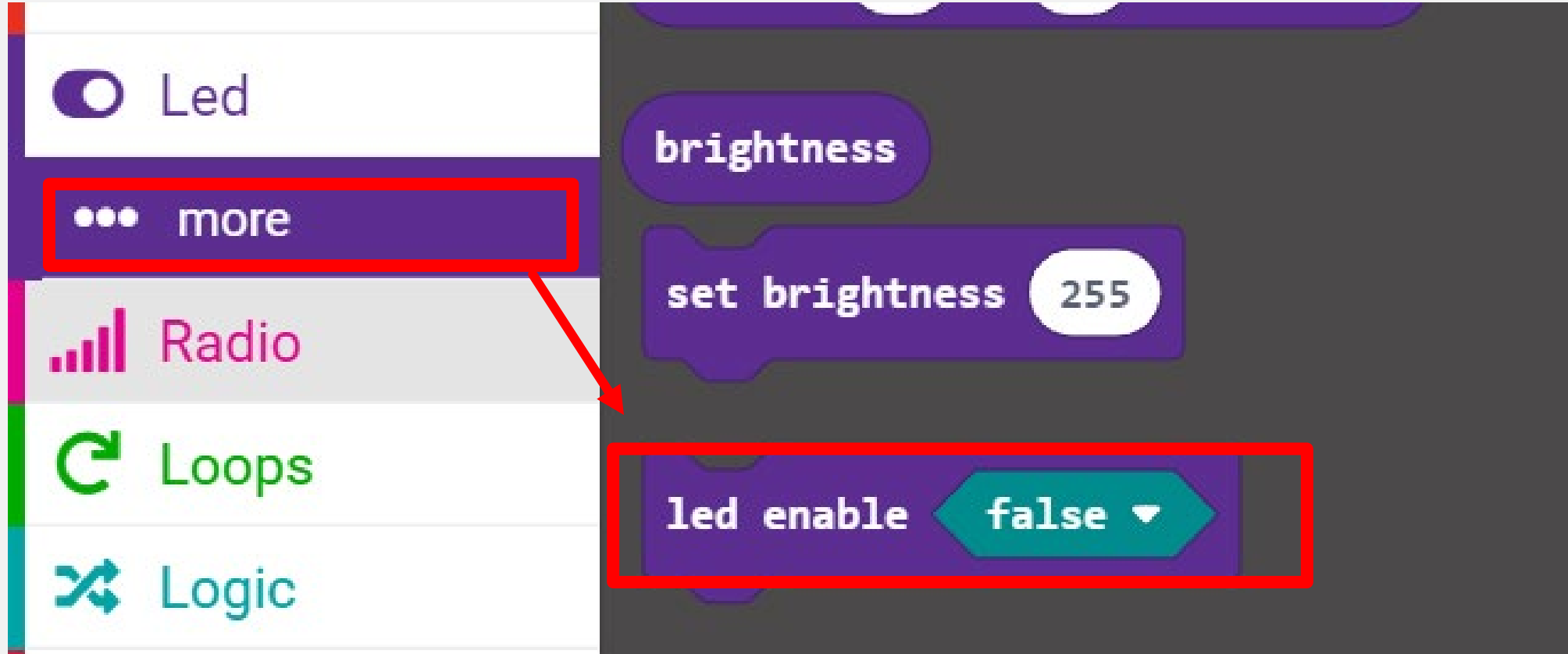
<https://github.com/YahboomTechnology/Module-World>.

Or **search**
YahboomTechnology/Module-World **in**
the extension block

Coding - Logic



Coding - LED, ... more



Coding - ModuleWorld_PWM



The screenshot shows the Microbit coding environment. On the left, a sidebar lists modules: Math, ModuleWorld_Digital, ModuleWorld_Analog, and ModuleWorld_PWM. The ModuleWorld_PWM module is highlighted with a red box. A red arrow points from this box to a block in the workspace. The workspace contains two blocks: an 'RGB (P12P13P14)' block with three value inputs set to 0, and an 'RGB (P12P13P14) value' block with a dropdown menu set to 'OFF'. This second block is also highlighted with a red box.

Coding - ModuleWorld_Analog

The image shows a screenshot of the Scratch coding environment. On the left, a vertical sidebar contains several categories: Loops (green), Logic (teal), Variables (red), Math (purple), ModuleWorld_Digital (green), and ModuleWorld_Analog (purple). The ModuleWorld_Analog category is highlighted with a red rectangular box. A red arrow points from this box to a 'Rocker pin' block in the main workspace. The 'Rocker pin' block is also highlighted with a red rectangular box. The block contains two dropdown menus: 'P0P1' and 'NoState', both with downward-pointing triangles.

Combine Block

```
on start  
  led enable false
```

```
forever  
  if Rocker pin P0P1 value Left then  
    RGB (P12P13P14) value Red  
  else if Rocker pin P0P1 value Right then  
    RGB (P12P13P14) value Green  
  else if Rocker pin P0P1 value Down then  
    RGB (P12P13P14) value Blue  
  else if Rocker pin P0P1 value Up then  
    RGB (P12P13P14) value White
```

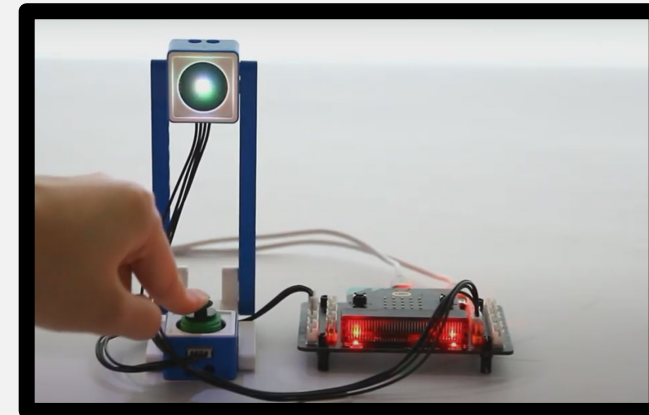
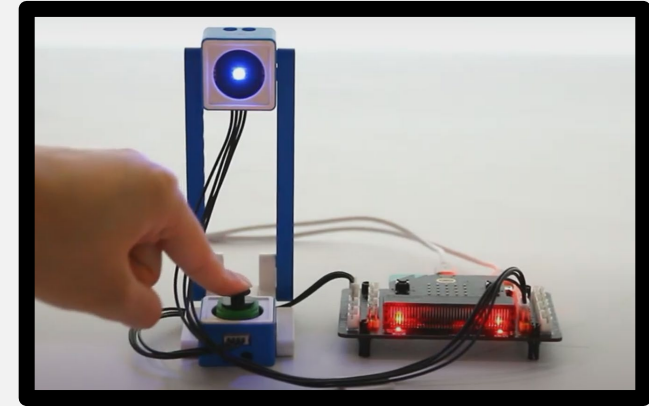
Phenomenon

After the program is downloaded successfully.
We can control the RGB light by shaking the rocker. If the rocker moves to the left-most in the X direction, the RGB light become **red**;

If the rocker moves to the **right-most** in the X direction, the RGB light become **green**;

If the rocker moves to the **up-most** in the Y direction, the RGB light become **blue**;

If the rocker moves to the **down-most** in the Y direction, the RGB light become **white**.

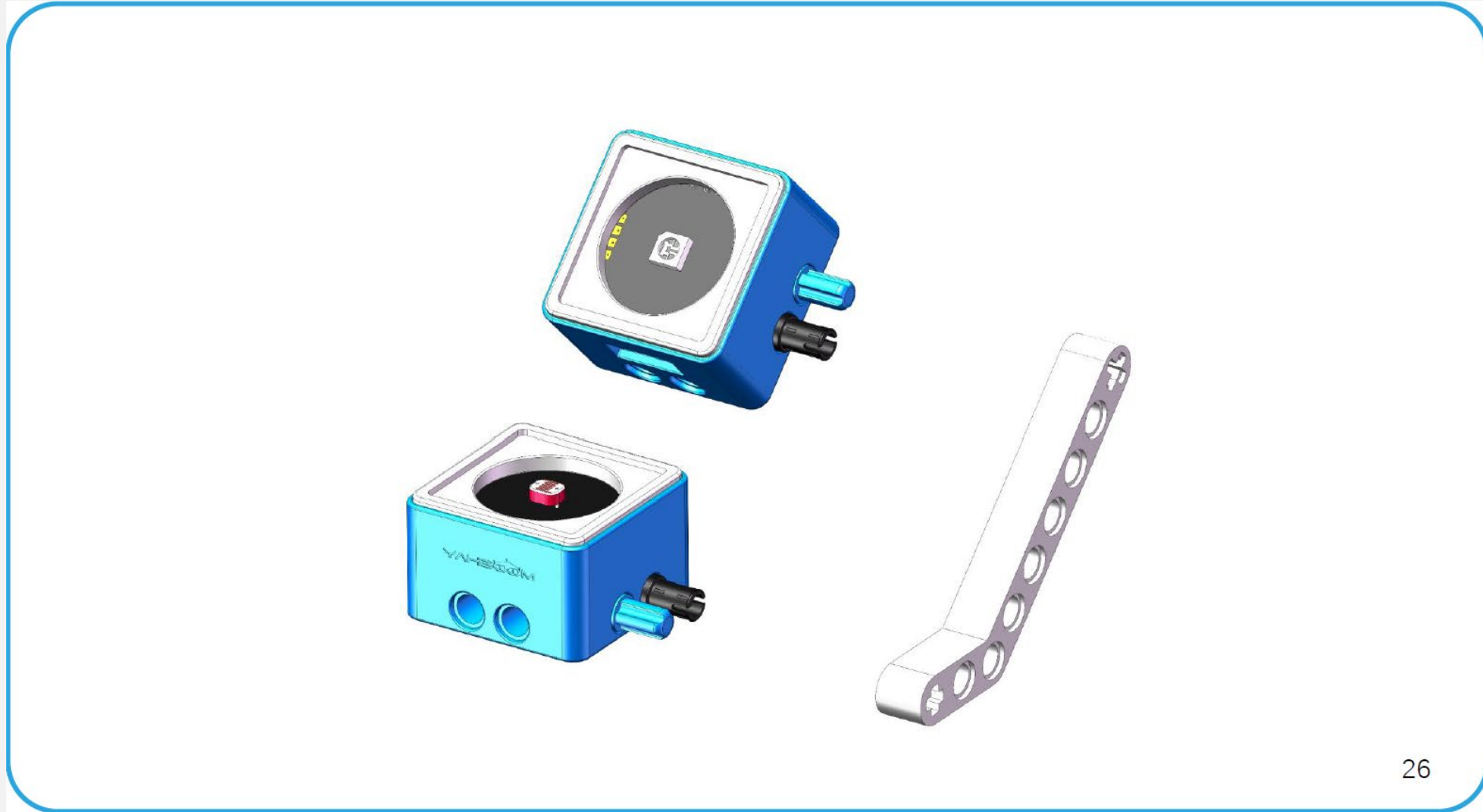


Emergency Light

Step 1



Step 2



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Step 3



Step 4



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Step 5



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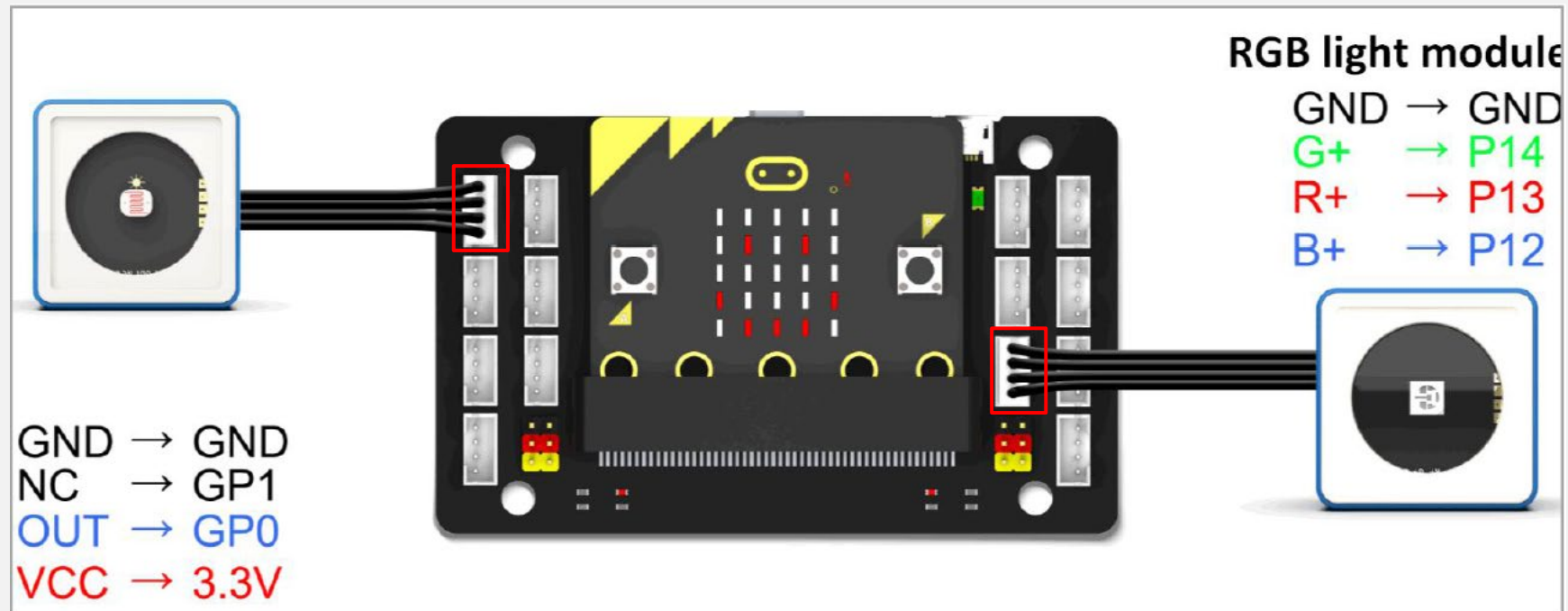
Step 6



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Wire Connection

Connect the modules



Let's connect the module like this.

MakeCode Programming

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

Or search **YahboomTechnology/Module-World** in the extension block

Coding - Logic

The image shows the Advanced Superlogic interface. On the left is a sidebar with various coding categories: Music (headphones icon), Led (lightbulb icon), Radio (signal bars icon), Loops (refresh icon), Logic (crossed arrows icon), Variables (hamburger menu icon), Math (calculator icon), and Model-World Digital (upward arrow icon). The 'Logic' category is highlighted with a red box, and a red arrow points from it to the workspace. The workspace on the right contains two logic blocks. The top block is an 'if true then' block. The bottom block is an 'if true then else' block, which is also highlighted with a red box.

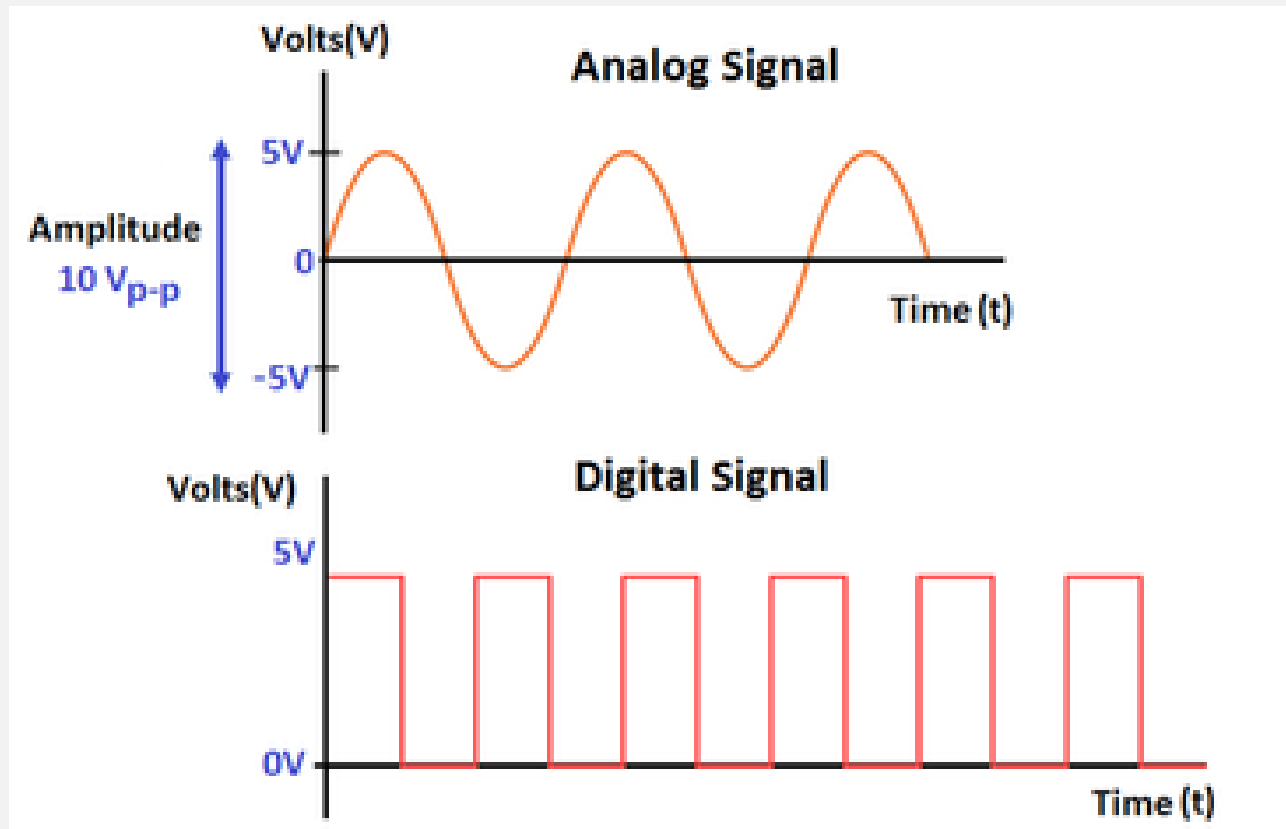
Coding - ModuleWorld_PWM



Coding - ModuleWorld_Analog

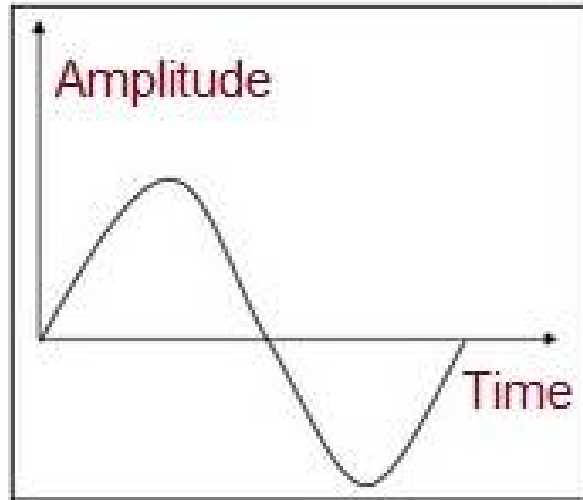
The image shows a screenshot of the Advanced Superlogic coding environment. On the left, a sidebar lists various modules. The 'ModuleWorld_Analog' module is highlighted with a red box. A red arrow points from this box to the 'Light pin' block in the main workspace, which is also highlighted with a red box. Other blocks in the workspace include 'Sound pin', 'Potentiometer pin', and 'Rocker pin', all with 'P0P1' selected in their pin dropdown menus. The 'Rocker pin' block also has a 'value' dropdown menu set to 'NoState'.

Digital vs Analog Signal

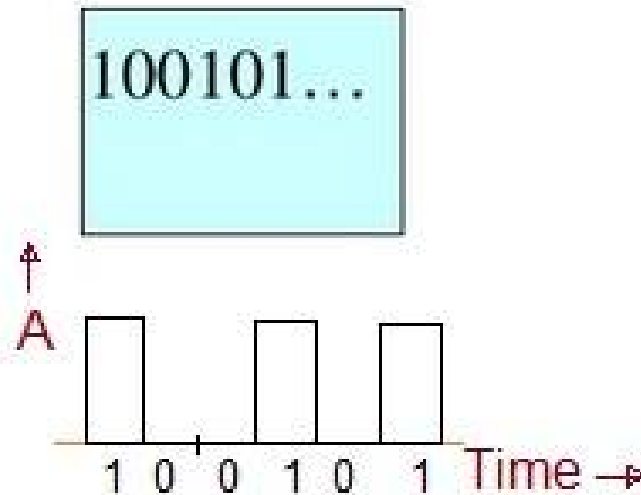


The major difference between both signals is that the **Analog signals have **continuous electrical signals**, while **Digital signals** have **non-continuous electrical signals**.**

Digital vs Analog Signal



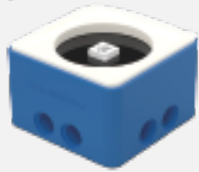
Analog Signal



Digital 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.

Electronic Modules – Which are Digital and Analog?



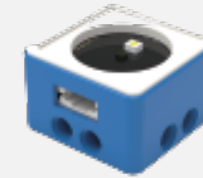
RGB Light Module



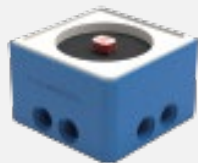
Button Module



Rocker Module



Color Recognition Module



Photosensitive Module



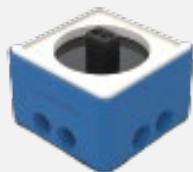
Temperature
Humidity Module



Human body
Infrared Module



Ultrasonic Module

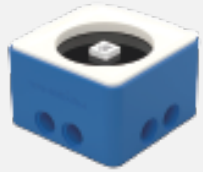


Infrared Module

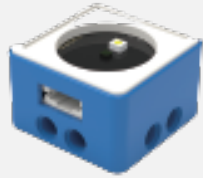


Digital Tube Module

Digital vs Analog Signal - Module



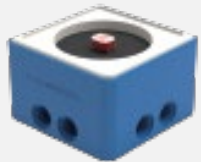
RGB Light Module



Color Recognition Module



Digital Tube Module

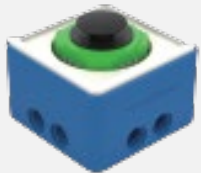


Photosensitive Module



Temperature
Humidity Module

**Analog
Signal**

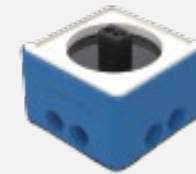


Rocker Module



Ultrasonic Module

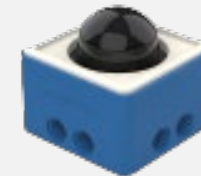
**Digital
Signal**



Infrared Module

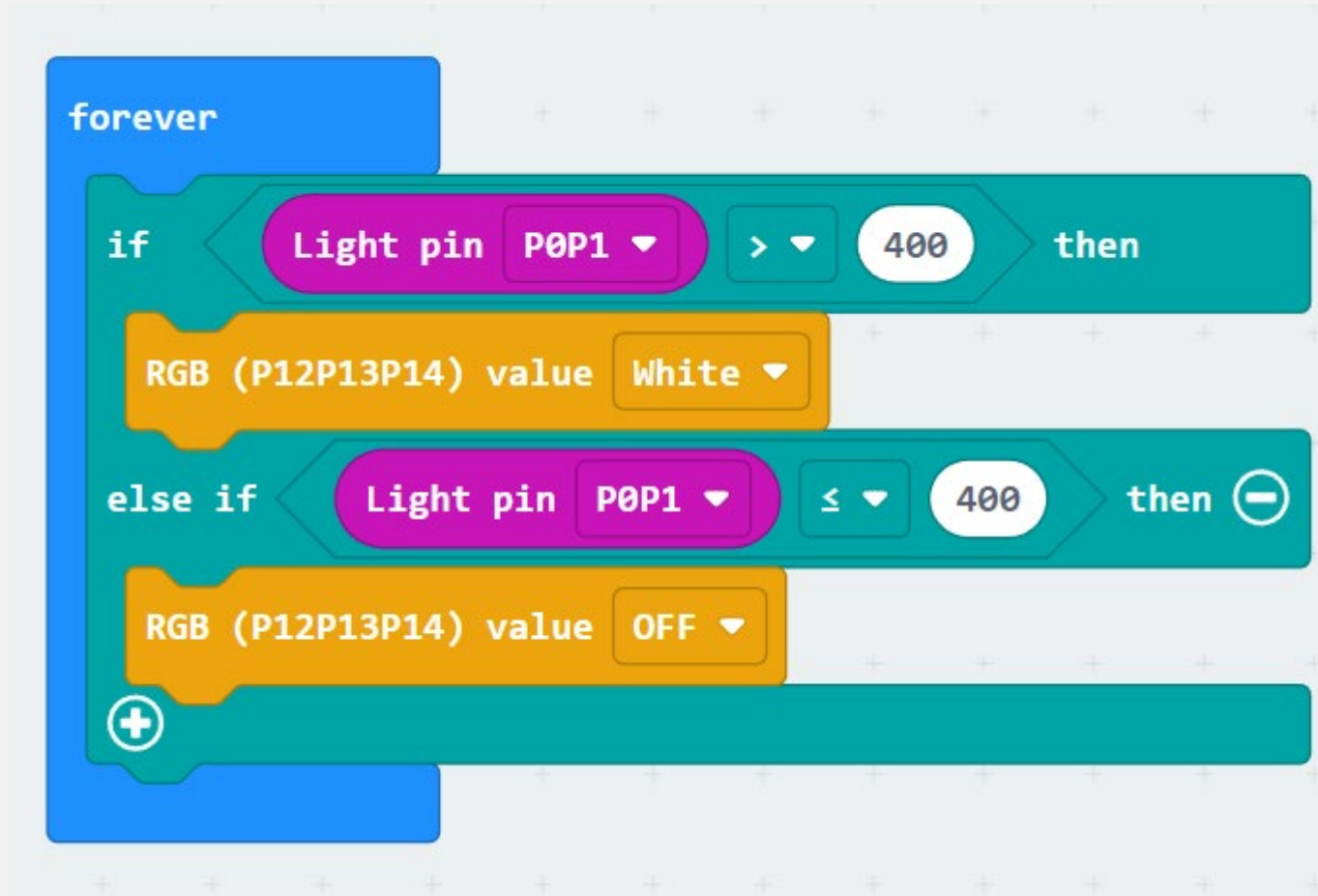


Button Module



Human body
Infrared Module

Combine Blocks



Phenomenon

After the program is downloaded successfully.
When we **block** the photosensitive module with our hands, the RGB light is **on**, otherwise the light is **off**.



CHALLENGE

for : Lesson 5



L5 -

Automatic Light:

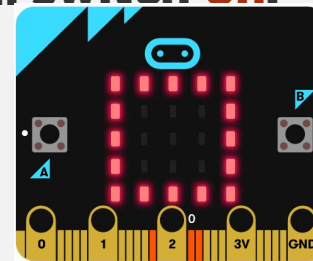
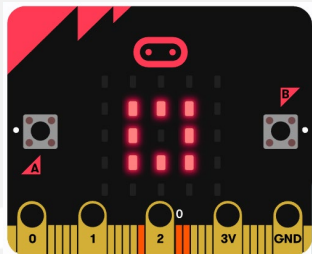
After the program is downloaded successfully.

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**.



Answers

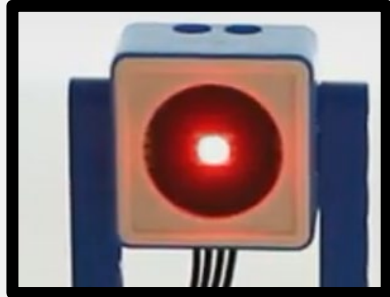
```

forever
  if Light pin P2P3 > 400 then
    show icon [grid icon]
    RGB (P12P13P14) value OFF
  else if Light pin P2P3 ≤ 400 then
    show icon [grid icon]
    RGB (P12P13P14) value White
  
```

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**

L5 - Mission



Using 3 Modules, Rocker, Photosensitive and RGB:

Make an emergency light that can **changes** color when **rocker** is moved,
And **without** changing to the **first** color.

Condition: When there is **no** light, RGB will lights up **automatically**.



Any
Questions?

Thank you :)

Answers - lights up

ly

```
on start
  led enable false
```

```
forever
  if Light pin P2P3 > 400 then
    while Light pin P2P3 > 400 and Rocker pin P3P4 value NoState
      do
        RGB (P12P13P14) value White
      break
```

Answers - **without** changing to the **first** color

```

while Light pin P2P3 > 400
do
  if Rocker pin P3P4 value Up then
    RGB (P12P13P14) value Red
  else if Rocker pin P3P4 value Down then
    RGB (P12P13P14) value White
  else if Rocker pin P3P4 value Left then
    RGB (P12P13P14) value Pinkish
  else if Rocker pin P3P4 value Right then
    RGB (P12P13P14) value Blue
  
```

Answers - **Off** when there is light

```

else if [Light pin P2P3] ≤ [400] then
  RGB (P12P13P14) value OFF
  
```

Answers

```

on start
  led enable false
  
```

```

forever
  if Light pin P2P3 > 400 then
    while Light pin P2P3 > 400 and Rocker pin P3P4 value NoState
      do
        RGB (P12P13P14) value White
        break
    while Light pin P2P3 > 400
      do
        if Rocker pin P3P4 value Up then
          RGB (P12P13P14) value Red
        else if Rocker pin P3P4 value Down then
          RGB (P12P13P14) value White
        else if Rocker pin P3P4 value Left then
          RGB (P12P13P14) value Pinkish
        else if Rocker pin P3P4 value Right then
          RGB (P12P13P14) value Blue
      else if Light pin P2P3 ≤ 400 then
        RGB (P12P13P14) value OFF
  
```