

Chapter 6

Moth Robot

You must have seen that at summer night, plenty of moths fly around the streetlight, flame and any places with bright light. Why are moths attracted to flame? One idea is that moths are able to find their way partly by using light as a compass. You know what, Maqueen Plus can change into a moth robot because it has a pair of light-sensitive eyes.

Goal



1. Learn condition block
2. Program flowchart

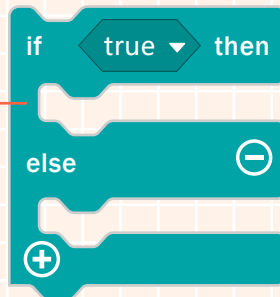
Command Learning



Block Brief

If...then...else

If a value is true, then do the first block of statements. Otherwise, do the second block of statements.



Comparison operator

Return true if the first input is greater than the second input.

Hands-on Practice



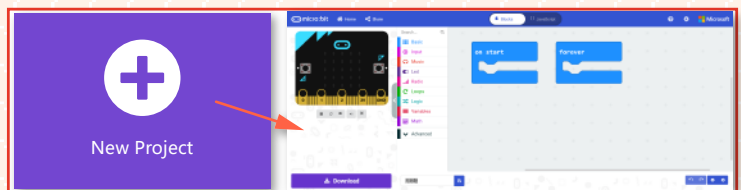
Step 1 Create a New Project

1. Input <https://makecode.microbit.org/> into your browser to enter MakeCode editor.
2. Click "new project" to enter MakeCode programming interface.
3. Add the Maqueen Plus library: <https://github.com/DFRobot/pxt-DFRobot-Maqueenplus>

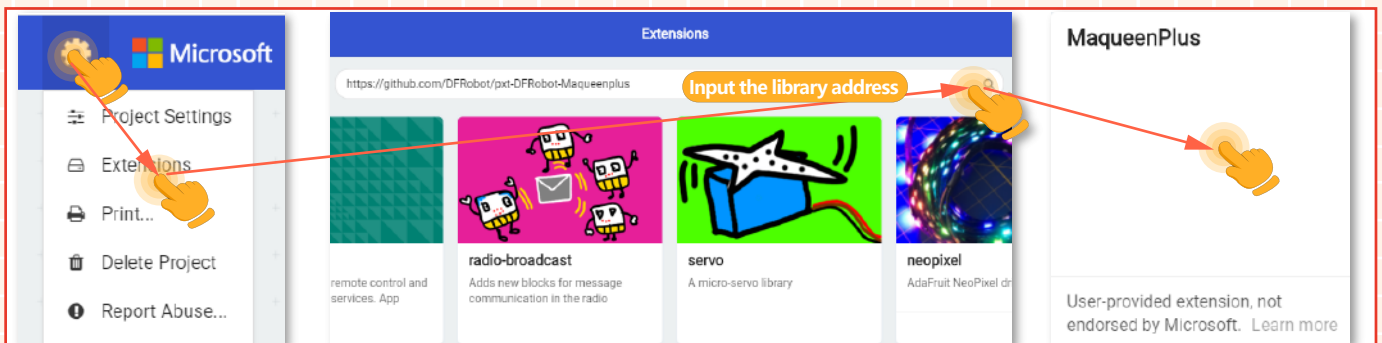
<https://makecode.microbit.org/>



1. Enter MakeCode editor



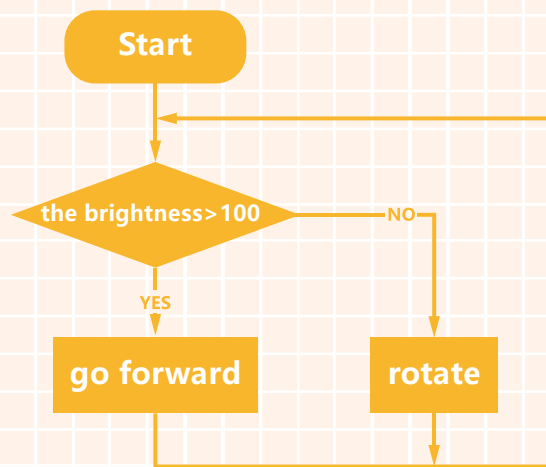
2. Enter programming interface



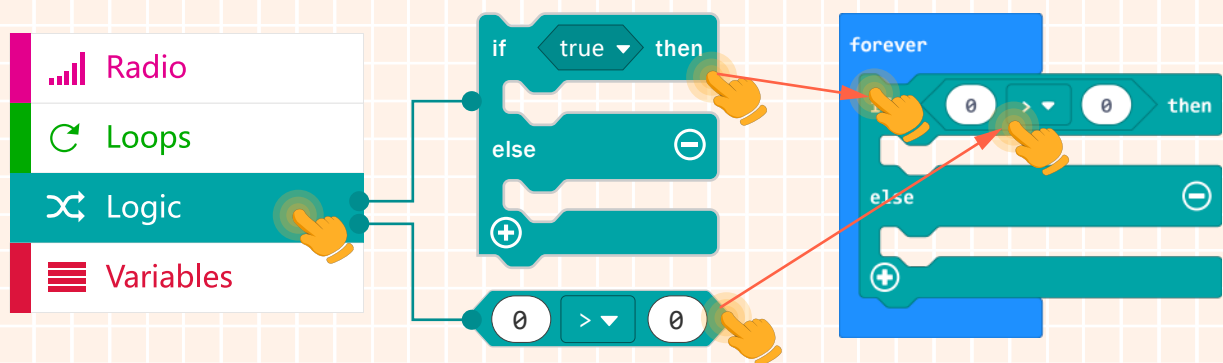
3. Add the extension library

Step 2 Programming

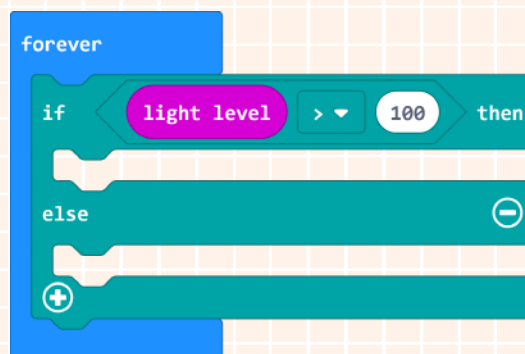
1. When the light level is more than the given value (100 in the example), the moth robot moves towards the light source; when less than that value, the robot revolves around its center. Drawing a corresponding flowchart according to the above functions is gonna help us a lot with programming!



2. Embed the condition blocks into the "forever" block, then the condition judgment can be processed in real-time.

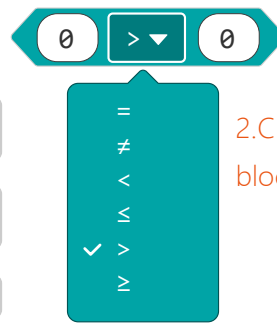
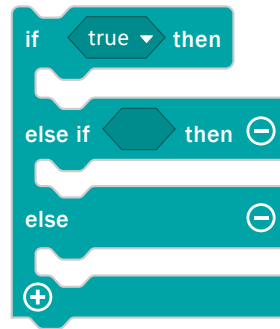


3. The key point of the whole program is the condition statement "light level > 100". Different operations will be executed according to the result of the condition block.



Knowledge Expansion

1. Click the "⊕" in the condition block to add a condition, click "⊖" to delete a condition.



2. Click the ">" in the comparison block to select different operators.

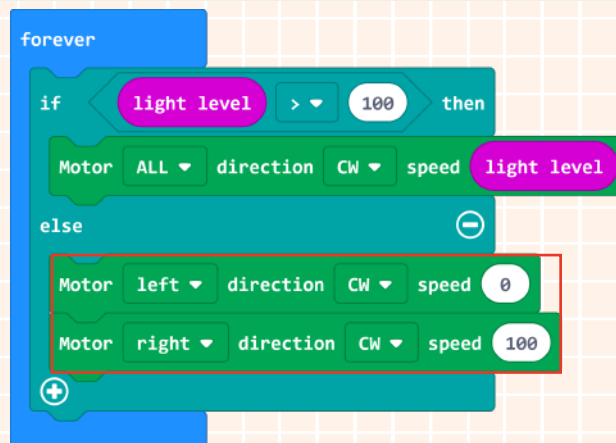
4. When the condition "Light level > 100" is true, the robot car moves forward at the speed of the current light level.



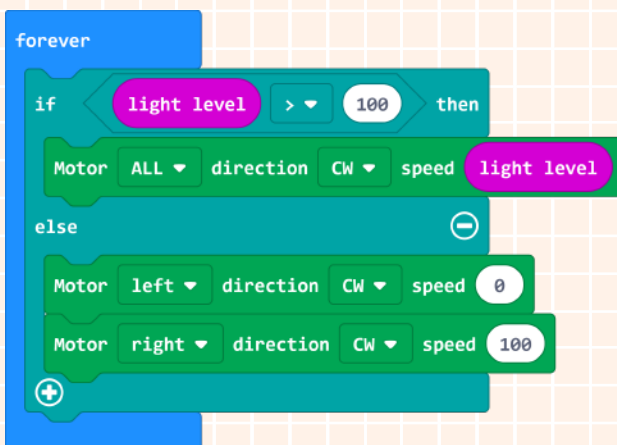
Knowledge Expansion

Set light level as speed, the higher the light level, the faster the speed.

5. When the condition "Light level > 100" is false, the Maqueen Plus rotates around its center.



6. The complete program is shown below.



Knowledge Expansion

Condition to be judged: **light level**

Here we need to find a suitable critical value. Since if the value is too large, the moth robot will not move at all till a relatively strong light is given; if the value is too small, the robot will not likely to stop. So we have to set the critical value reasonably according to different conditions.

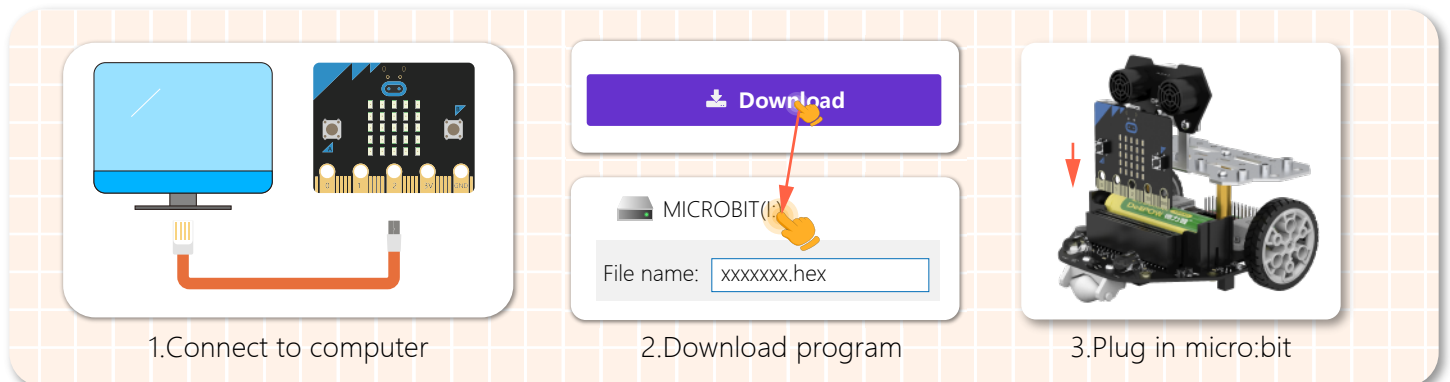
7. Name your project as "Moth robot" and save it.

Step 3 Download Program

1. Connect to a computer: connect the micro:bit to your computer with a USB cable before downloading. There will be a hard-disk named micro:bit appearing in the computer when the connection is successful.

2. Download the program: download your project into the micro:bit hard-disk.

3. Plug in the micro:bit board: after downloading the program, plug the micro:bit board into Maqueen Plus.



Step 4 Effect Display

Turn on the power switch, then Maqueen Plus will turn into a moth robot. When the light level is over 100, our moth robot moves towards the light, the brighter the light is, the faster Maqueen Plus runs. When the light is less than 100, the robot will get lost and rotate around. So funny, right? come to play with this moth robot!

Think & Explore

Let's do a robot running competition! Use a flashlight to lead Maqueen Plus to run forward, the one who uses the least time to finish the game will be the winner. Remember, do not cross the line. Invite your friends to join the game!

Tips: maintaining the speed within a reasonable range holds the key to success.