

Chapter 11

IR-controlled Robot

The invention of remote controller allows people to operate devices from a certain distance, which brings a lot of convenience for our daily life. IR remote controller is the most commonly-used one. In this chapter, we will use an IR remote controller with our Maqueen Plus to make an "IR-controlled Robot".

Goal



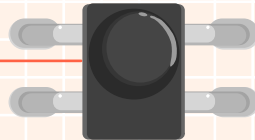
1. Learn how to use function block
2. Learn how to use IR remote controller to control motor

Electronic Component



IR receiver

IR receiver



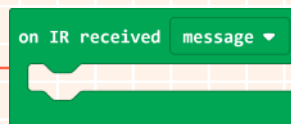
Receive a coded infrared signal and convert it into an electric signal.

Command Learning



Block Brief

IR receiver



Receive and read the infrared value.

Create a function



When a continuous action needs to occur multiple times in the program, in order to make the program more clear, we need to define a sub-function.

Call a function



Drag the sub-function into the program to call it.

Hands-on Practice



We will use an IR remote controller to operate our Maqueen Plus, so we have to get key value first. The decimal number of each key on the remote controller is shown below.



Key	Value
Red key	0
VOL+	1
FUNC/STOP	2
Left arrow	4
Pause	5
Right arrow	6
Down arrow	8
VOL-	9

Key	Value
Up arrow	10
0	12
EQ	13
ST/REST	14
1	16
2	17
3	18
4	20

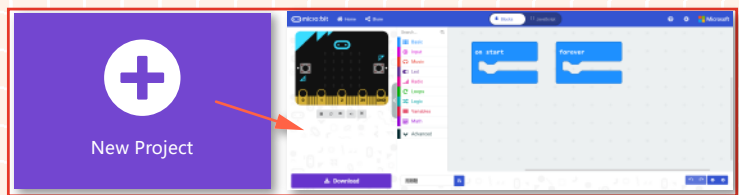
Key	Value
5	21
6	22
7	24
8	25
9	26

Step 1 Create a New Project

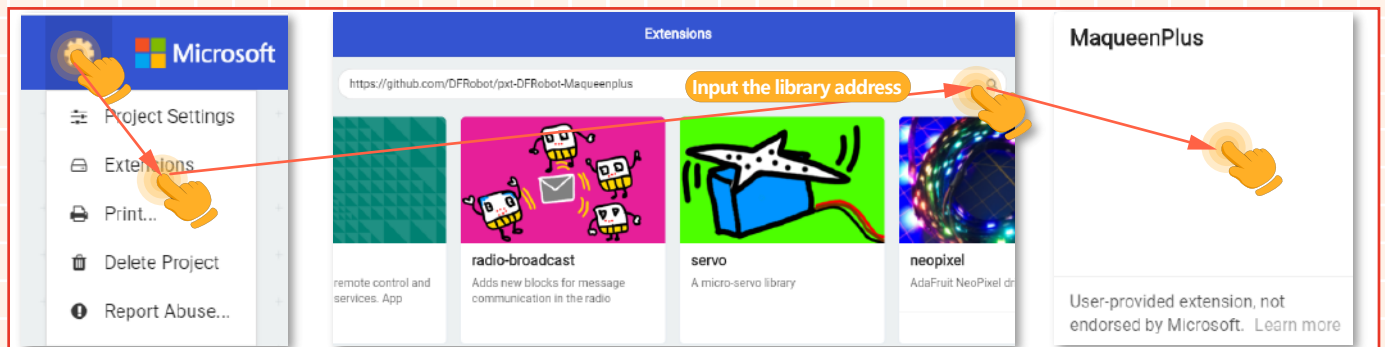
1. Input <https://makecode.microbit.org/> into your browser to enter MakeCode editor.
2. Click "new project" to enter MakeCode programming interface.
3. Add the Maqueen Plus library: <https://github.com/DFRobot/pxt-DFRobot-Maqueenplus>



1. Enter MakeCode editor



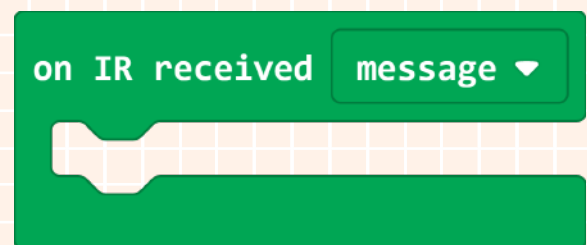
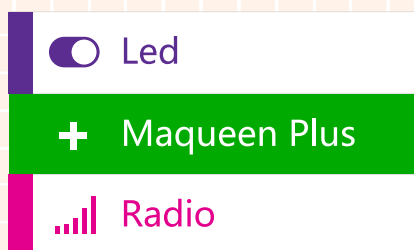
2. Enter programming interface



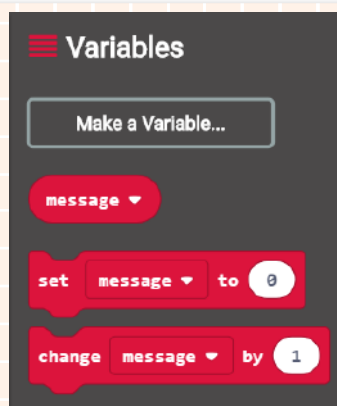
3. Add the extension library

Step 2 Programming

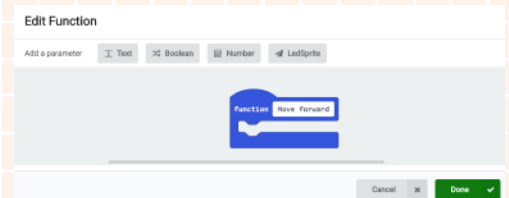
1. Drag the IR receive block to the editing section.



After we dragged the IR receive block to the editing section, there will be a variable named "message" appearing in the variable command section for storing key-value of IR remote controller.



2. Create a function and name it as "Move forward".



- ① Click "Advanced" -> "Function";
- ② Click "Make a function";
- ③ Name the function as "Move forward";
- ④ Click "OK".

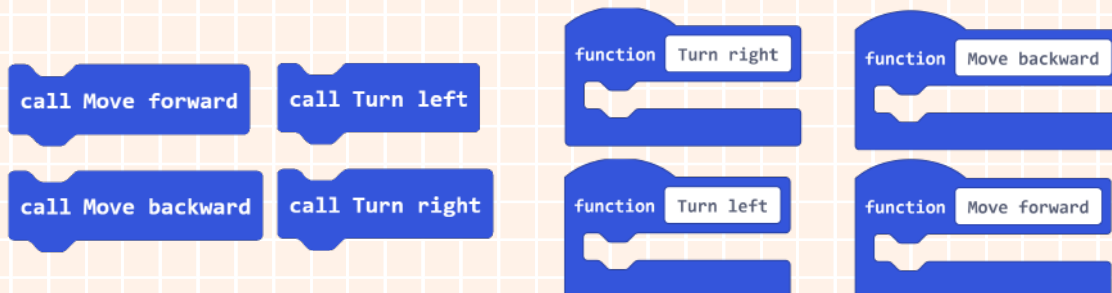
Knowledge Expansion

What is a function?

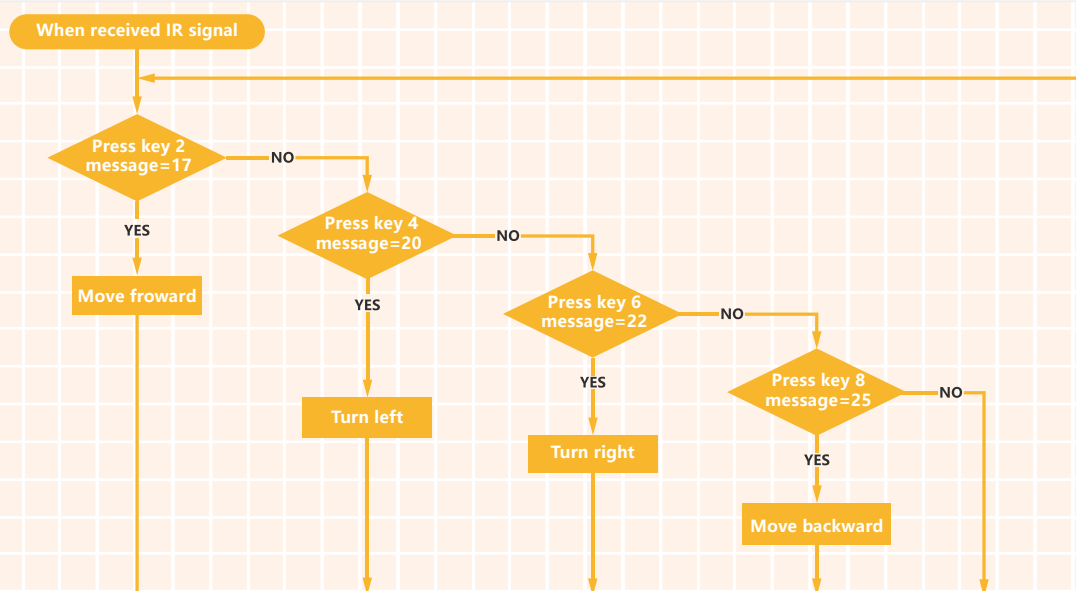
A function, also known as procedure or subroutine, can be defined as the organized block of reusable code which can be called whenever required.

Generally, a large program can be divided into many basic building blocks and each block can realize a specified function. A function can be called multiple times by other main functions and sub-functions, which not only reduces the workload of rewriting the program segment, but also improves the utilization of the program.

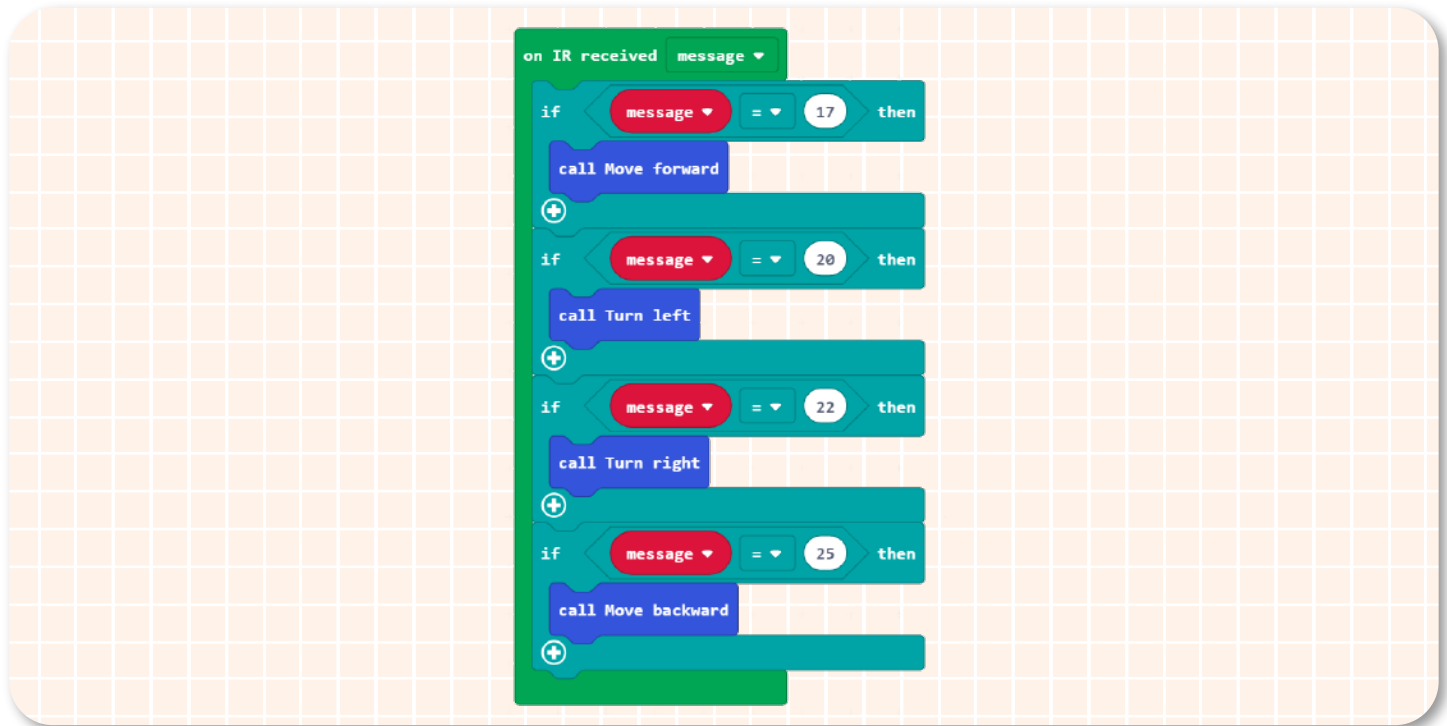
3. Create functions "Move backward", "Turn left" and "Turn right" in the same way above. The customized function will be shown in the editing section and the command block section.



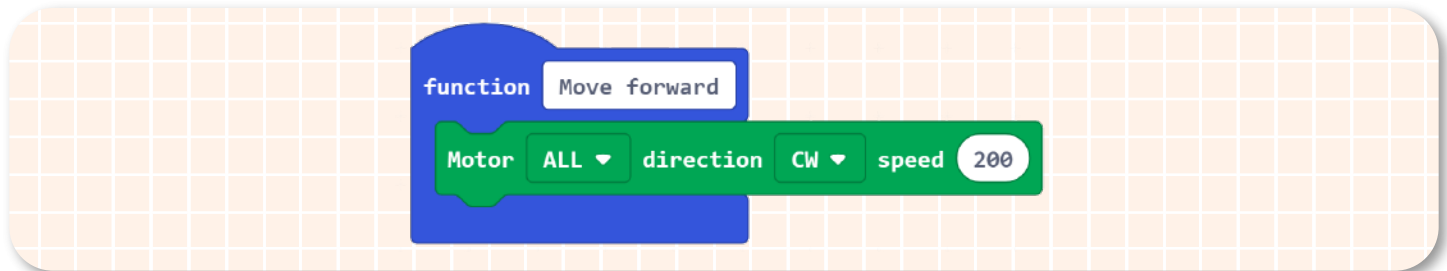
4. How can we use the key 2, 4, 6, and 8 on the IR remote controller to operate our Maqueen Plus car? Let's draw a flowchart to analyze this question:



5.The flowchart above shows that we have to press the related key first, and then judge if the key value meets the condition. When the key value "message=17", call the function "Move forward", and so on.

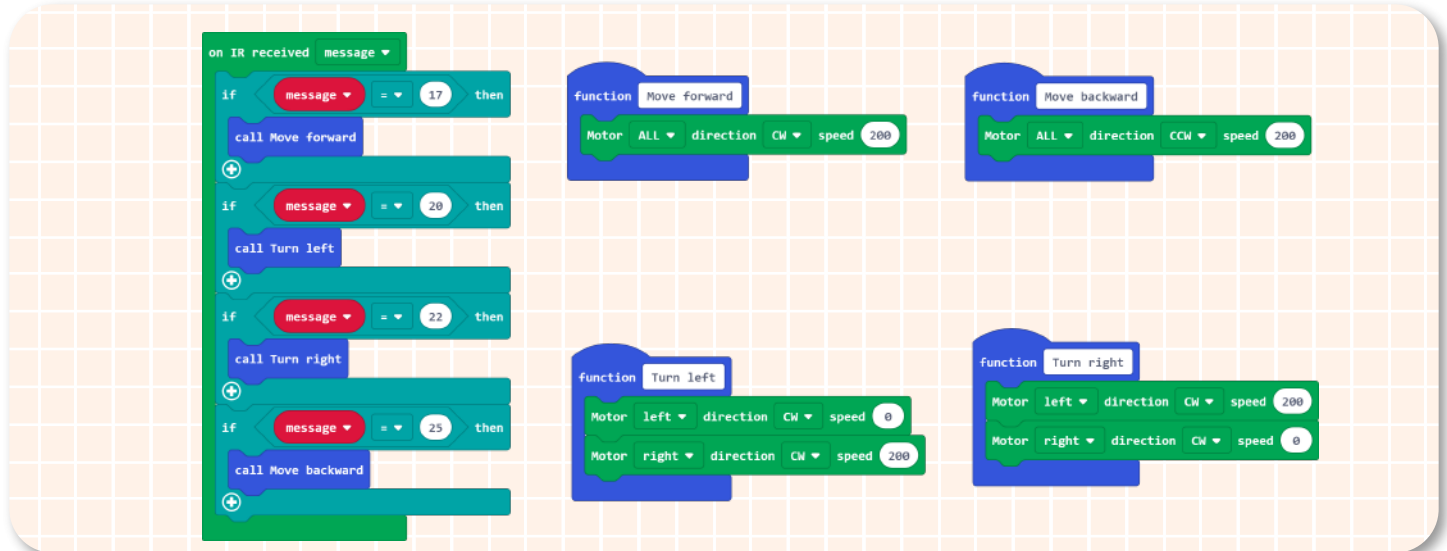


6.The above program is just a framework. The detailed operations need to be implemented in the functions. For example, press key 2, the car move forward. How to achieve that? Well, it's easy, just add a motor control block inside the move forward function.



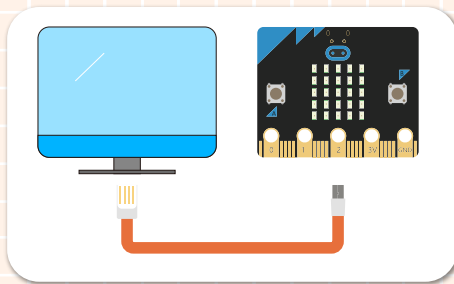
As long as we have a clear logic, the realization of the program will be not so hard. The complete program is shown below:

7.The complete program is shown below.

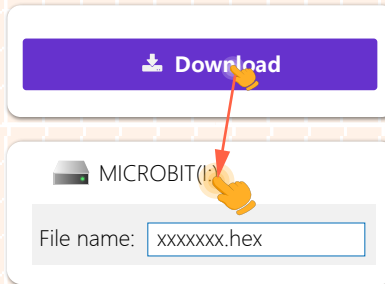


8.Name your project as "IR-controlled robot" and save it.

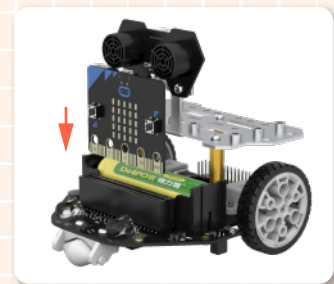
Step 3 Download Program



1.Connect to computer



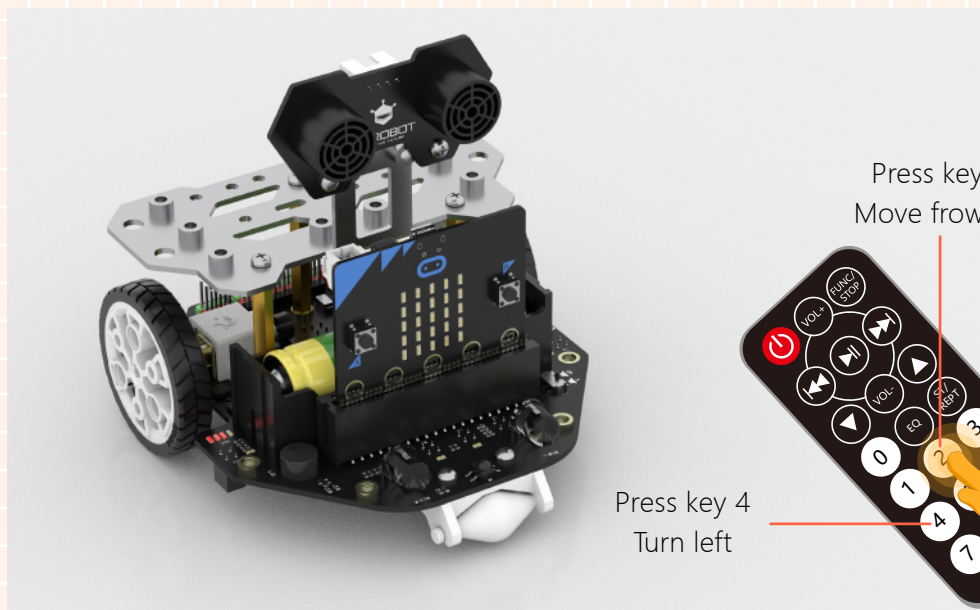
2.Download program



3.Plug in micro:bit

Step 4 Effect Display

After completing all the above steps, use the IR remote controller to operate our Maqueen Plus.



Think & Explore

We may find that once we enabled the Maqueen Plus to move, it won't stop until we turn off its power switch, which could be inconvenient for us to operate. Now here is a task for you: use the red button on the remote controller to make Maqueen Plus stop.

Tip: create a function to stop the motor!