1.learning goals

In this lesson, we mainly study how uses the serial port of micro:bit to receive the information transmitted by the wifi camera, and analyzes the commands received by the serial port.

Then, micro:bit drives the corresponding motor and servo, that is, control the rotation of micro:bit camera platform.

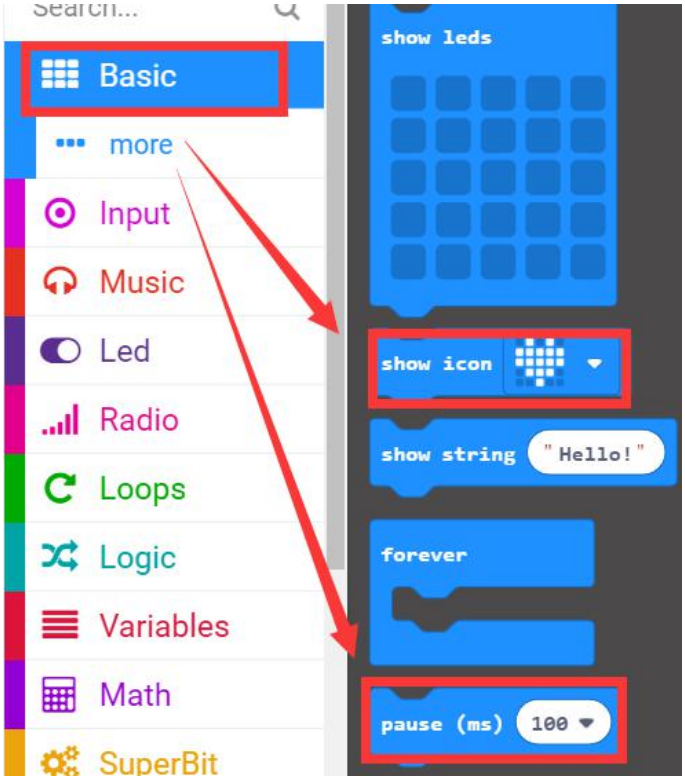
2.Programming method

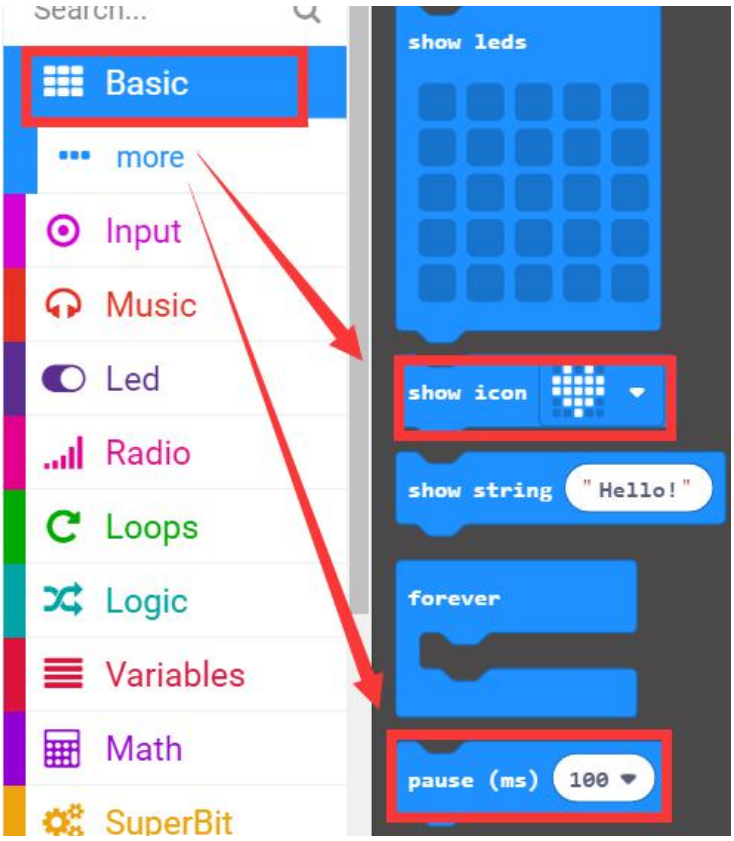
Mode 1 online programming: First, we need to connect the micro:bit to the computer by USB cable. The computer will pop up a USB flash drive and click on the URL in the USB flash drive: **http://microbit.org/** to enter the programming interface. Add the Yahboom package https://github.com/lzty634158/SuperBit to program.

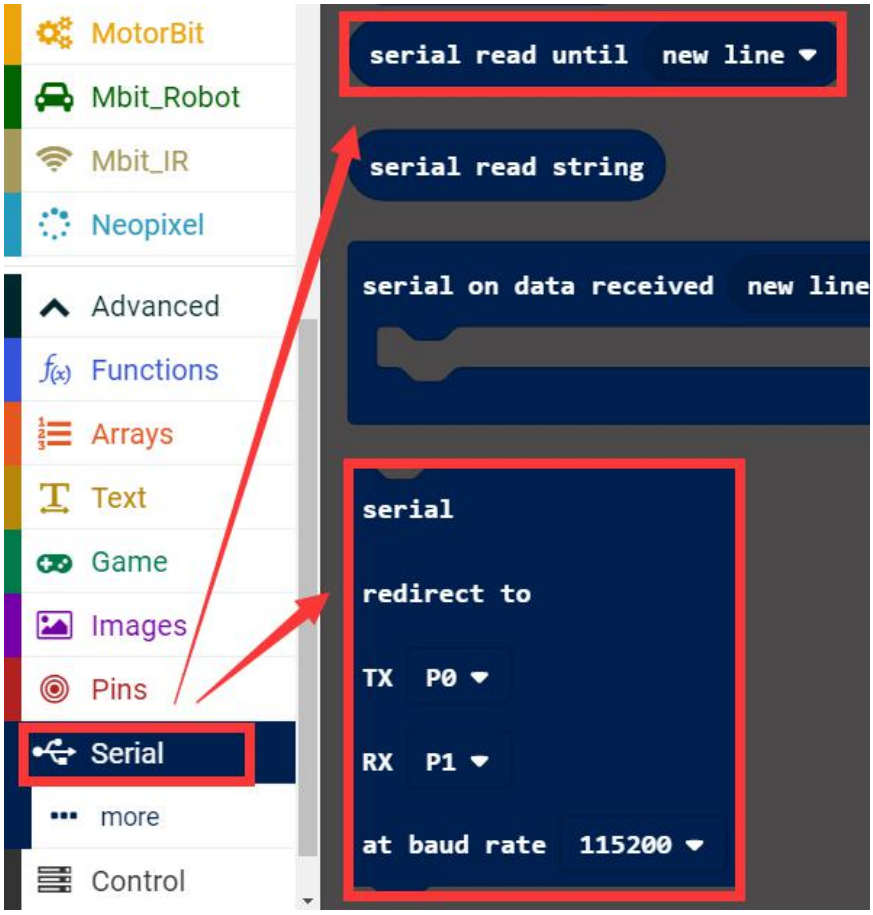
Mode 2 offline programming: We need to open the offline programming software. After the installation is complete, enter the programming interface, click【New Project】, add Yahboom package: https://github.com/lzty634158/SuperBit, you can program.

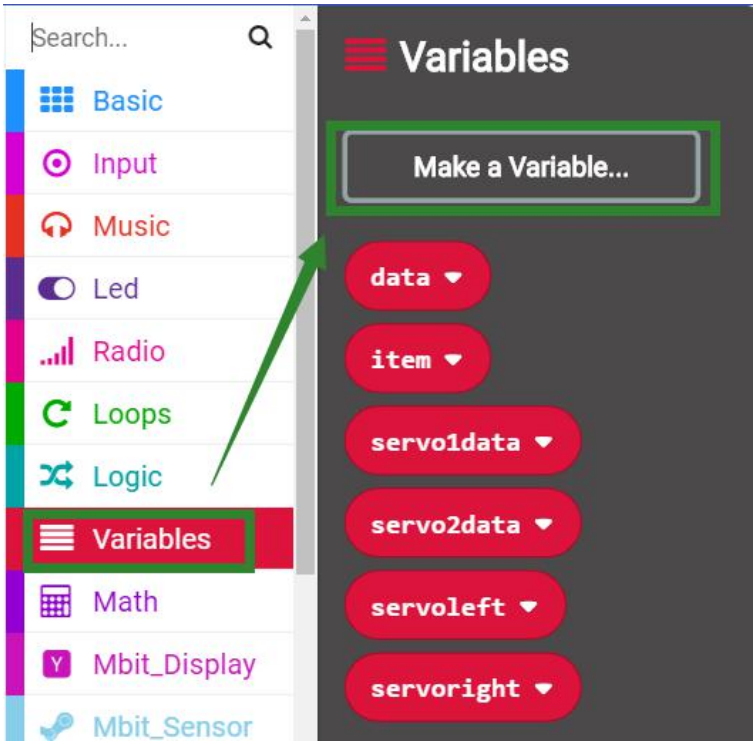
3.Looking for blocks

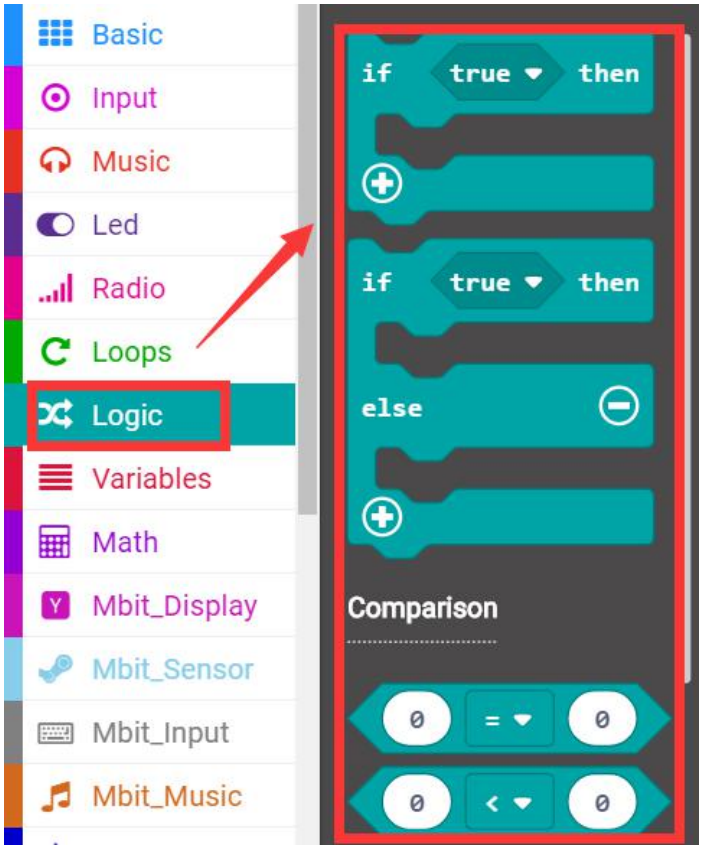
The following is the location of the building blocks required for this programming.

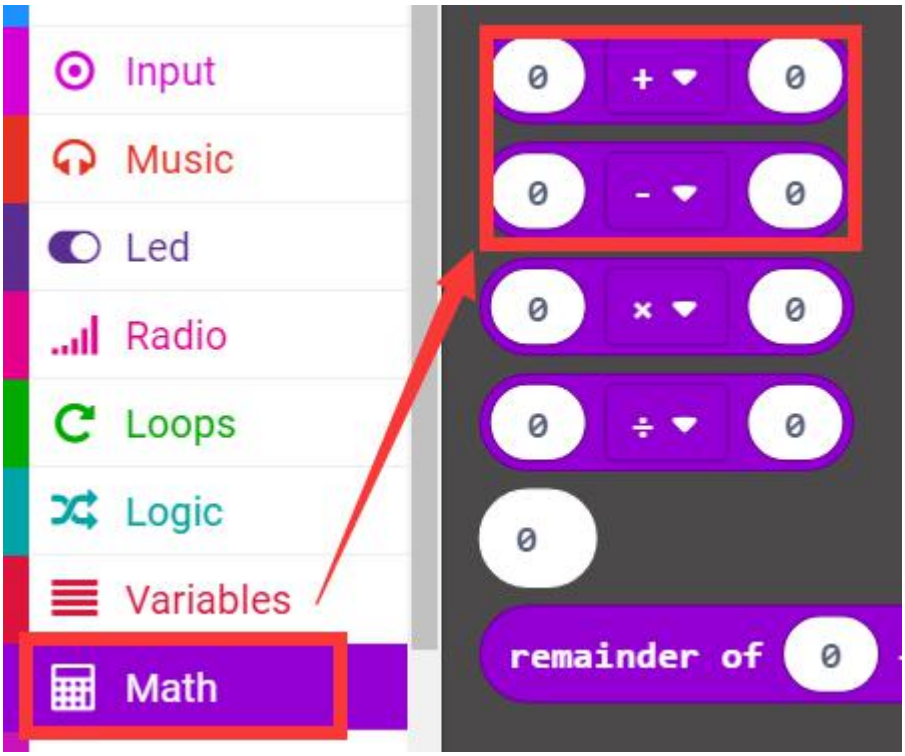


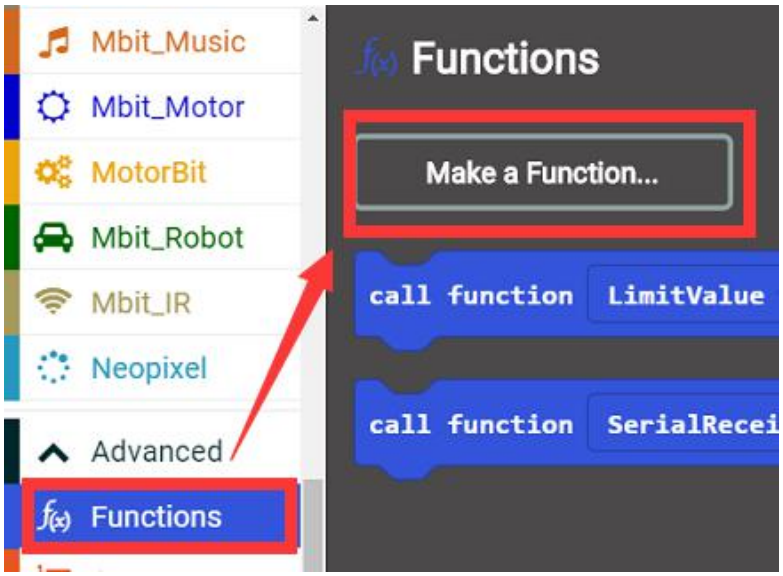

Search...
Basic
more
Input
Music
Led
Radio
Loops
Logic
Variables
Math
SuperBit
show leds
show icon
show string
" Hello! "
forever
pause (ms)
100

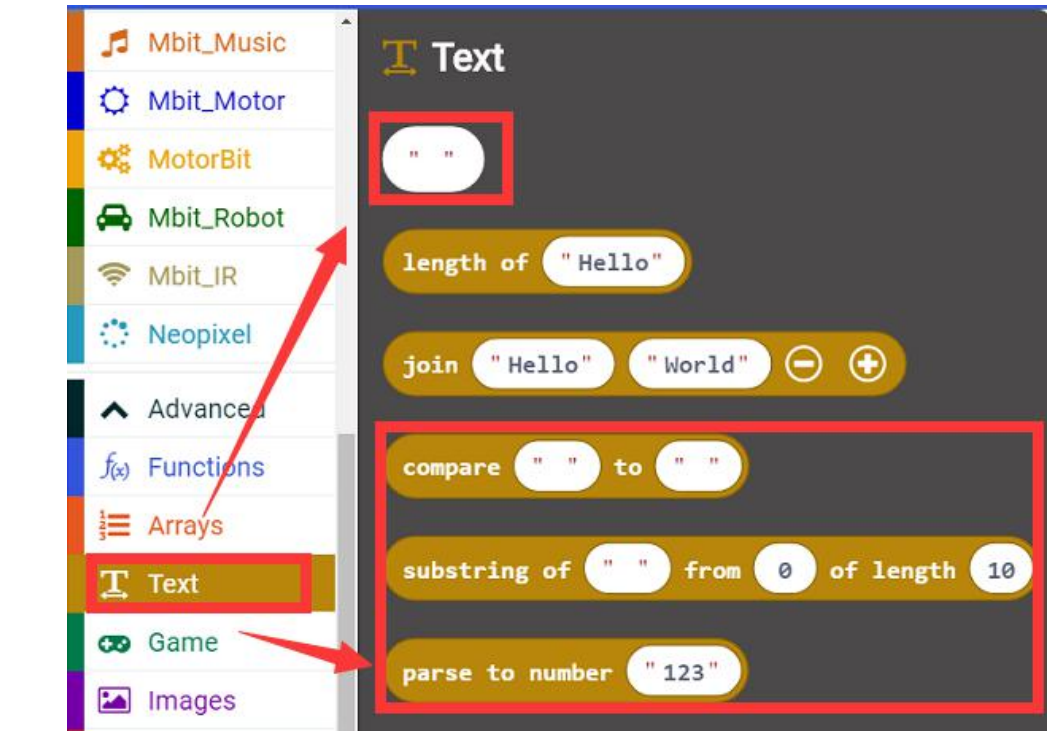

MotorBit
Mbit_Robot
Mbit_IR
Neopixel
Advanced
Functions
Arrays
Text
Game
Images
Pins
Serial
more
Control
serial read until
new line
serial read string
serial on data received
new line
serial
redirect to
TX
P0
RX
P1
at baud rate
115200

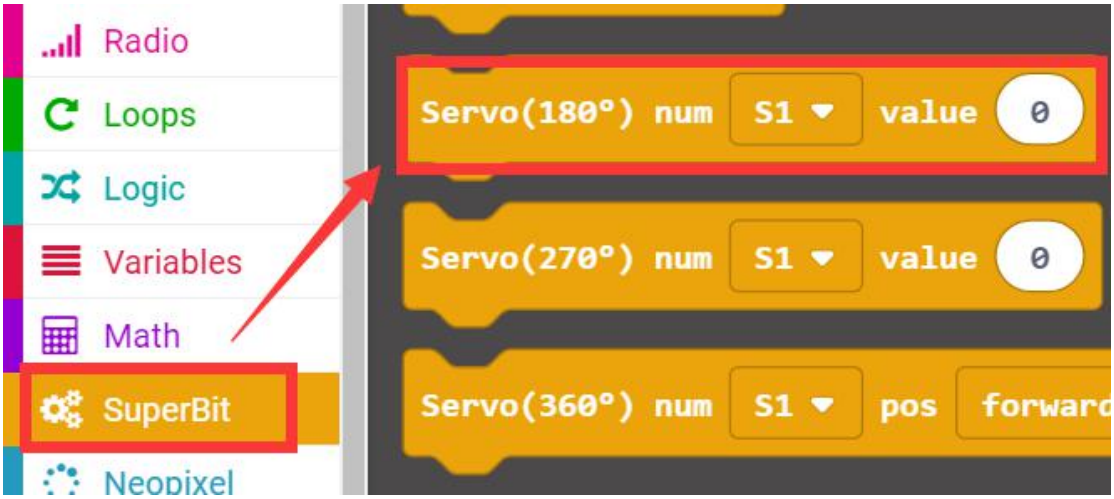

Search...
Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
Mbit_Display
Mbit_Sensor
Variables
Make a Variable...
data
item
servo1data
servo2data
servoleft
servoright


Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
Mbit_Display
Mbit_Sensor
Mbit_Input
Mbit_Music
if true then
if true then
else
Comparison
0 = 0
0 < 0


Input
Music
Led
Radio
Loops
Logic
Variables
Math
0 + 0
0 - 0
0 × 0
0 ÷ 0
0
remainder of 0

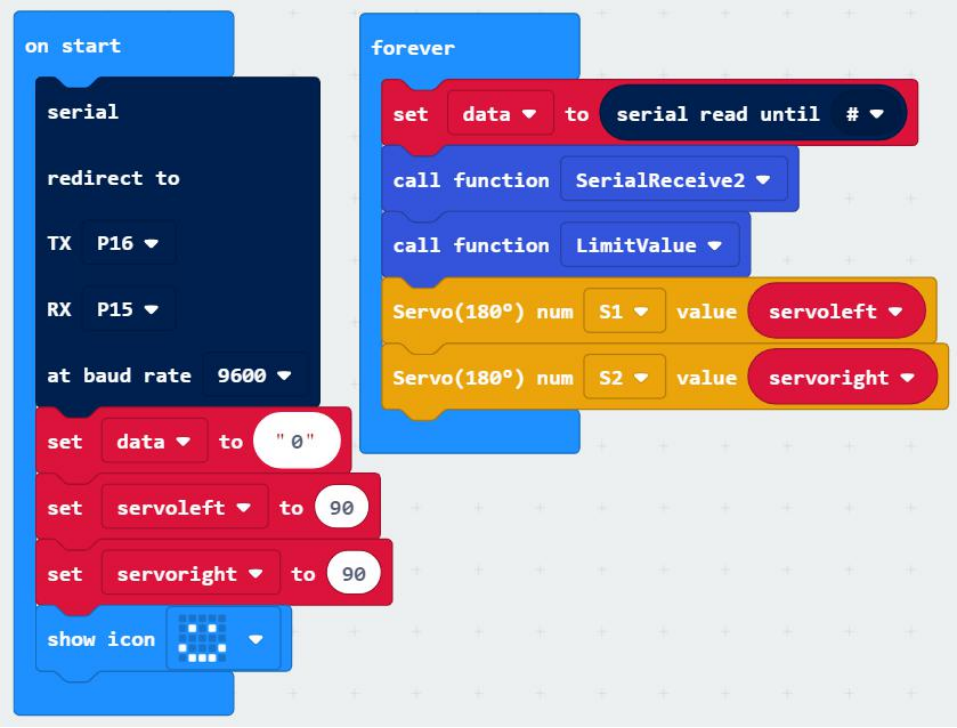

Mbit_Music
Mbit_Motor
MotorBit
Mbit_Robot
Mbit_IR
Neopixel
Advanced
Functions
Functions
Make a Function...
call function LimitValue
call function SerialRecei



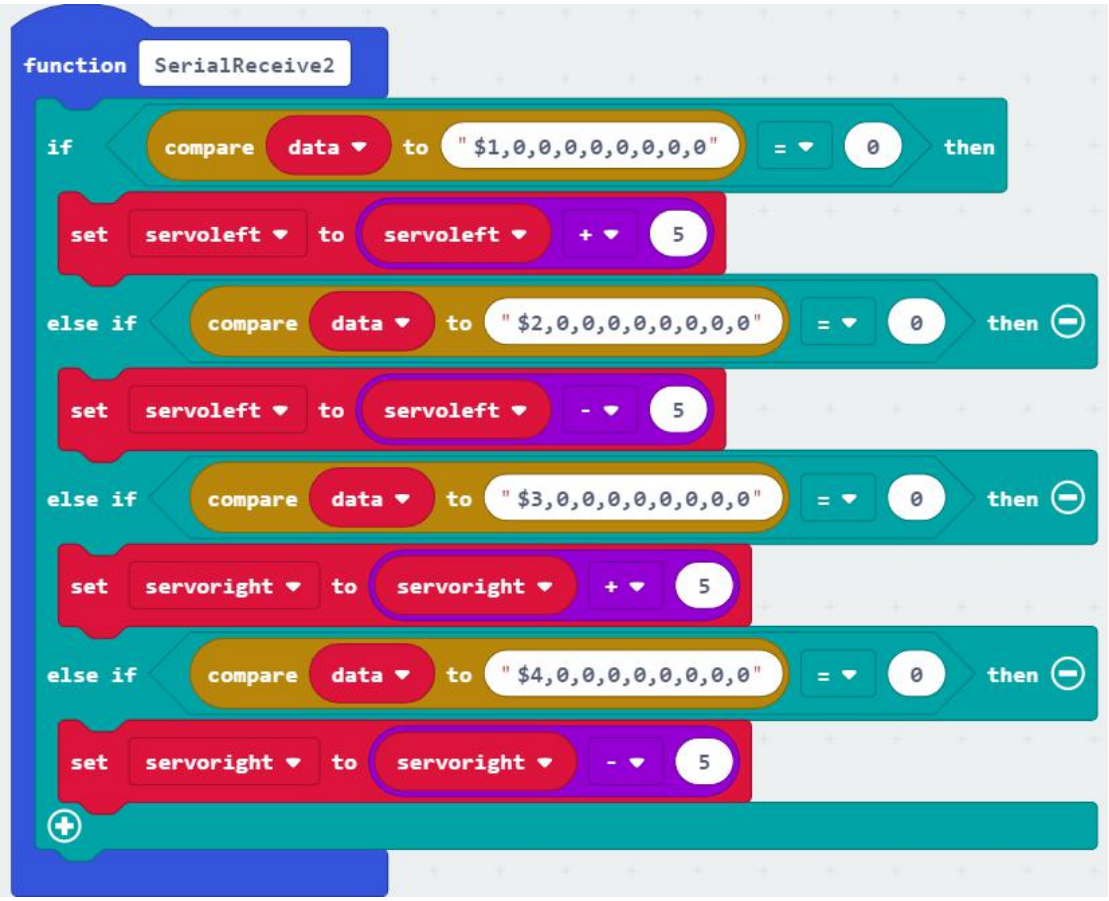


4.Combine building block

The summary program is shown below:


on start
serial
redirect to
TX P16
RX P15
at baud rate 9600
set data to "0"
set servoleft to 90
set servoright to 90
show icon
forever
set data to serial read until #
call function SerialReceive2
call function LimitValue
Servo(180°) num S1 value servoleft
Servo(180°) num S2 value servoright

function LimitValue
if servoleft ≥ 170 then
set servoleft to 170
if servoleft ≤ 10 then
set servoleft to 10
if servoright ≥ 170 then
set servoright to 170
if servoright ≤ 10 then
set servoright to 10



5.Code analysis

1. Serial port initialization definition at boot time, set TX to P12, RX to P13, baud rate is 9600; set initial serial port receive data to "0"; set two servos initial angle to 90°; set micro: bit dot matrix display Smiley face.

The serial port information is obtained cyclically, and the information before the "#" is saved in data.

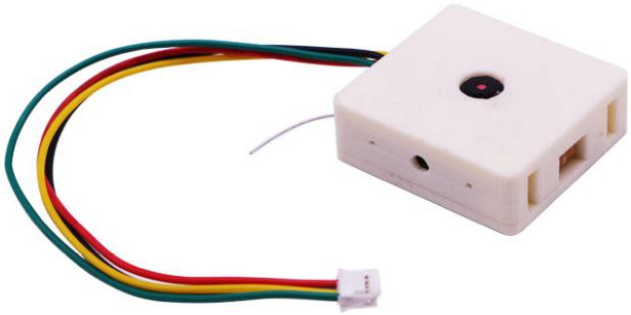
2.Create the SerialReceive2 function, compare the data with the manipulation command, if it meets a certain control command, the drive motor servo, otherwise it will not execute.Make the left and right rotation of the servo every time the rotation is 5 °.

3. Create a LimitValue function to limit the values of servoleft and servooes from 10 to 170.

4.The SerialReceive2 and LimitValue functions are called cyclically, and control the servo to rotate to the specified degree.

6.Hardware wiring

We need to connect the Wifi camera interface to the serial port of the mbit expansion board:



Wifi camera module	mbit expansion board
Red: VCC(5V)	5V
Black: GND	GND
Yellow: TXD	TX
Green(White): RXD	RX

The servo camera that controls the up and down rotation in the wifi camera is inserted into the S1 interface of the expansion board.
The servo camera that controls the up and down rotation in the wifi camera is inserted into the S2 interface of the expansion board.
The orange interface of the servo is connected to the yellow pin, the red interface is connected to the red pin, and the brown interface is connected to the black pin.

7.Building block assembly steps
Please refer to **micro:bit_camera_platform_assembly instructions** file.

8.Download APK
Android users scan the following QR code by browser or search "YahboomRobot" in Play Store to download APP;
Apple users scan the following QR code by camera or search "YahboomRobot" in App Store to download APP.
As shown in figure below.
!!Note:Because the software is relatively large, the download takes a certain amount of time, please be patient.

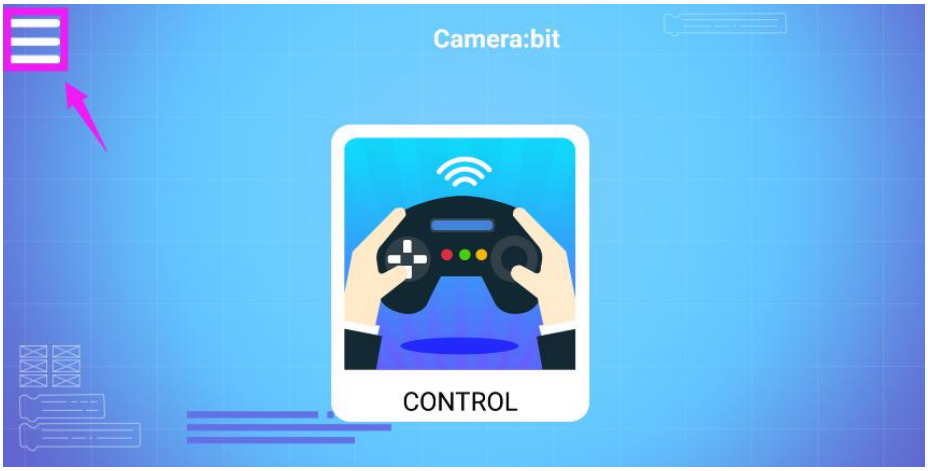
Note: During installation, If you find any prompts on your phone (for example: location permissions of your phone). You must select "Yes".

9.Experimental phenomena

1) After the program is successfully downloaded, the micro:bit dot matrix will display a smile; the wifi camera's indicator light will flashing.

2) We need to use the mobile phone to search for wifi signal**(Yahboom_WIFI, no need password)** and connect.

3) After the wifi connection is successful, open the APP . if you will see the screen shown below. You can click left upper corner to select service -- [**Micro:bit camera platform**].



4) Click to enter the screen shown below, after seeing the video screen, you can start to control the camera platform.

Press the RUN, BACK, LEFT and RIGHT buttons to control the rotation of micro:bit camera platform.