

6.3 Ultrasonic obstacle avoidance

Ultrasonic-obstacle-avoidance.hex

http://www.yahboom.net/xiazai/Tiny_bit/6.Playing%20with%20Tiny%20bit/Ultrasonic-obstacle-avoidance.hex

Ultrasonic-with-light-and-sound.hex

http://www.yahboom.net/xiazai/Tiny_bit/6.Playing%20with%20Tiny%20bit/Ultrasonic-with-light-and-sound.hex

1.Preparation

1-1.The position of the Ultrasonic module on the robot car

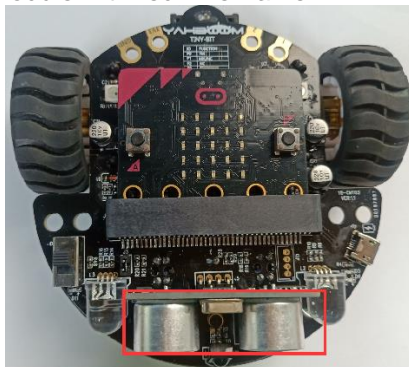
1-2.Learn about the principle of Ultrasonic module

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/Tiny-bit> 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/Tiny-bit>, you can program.

In the picture shown below, the ultrasonic module with red wire frame.



Ultrasonic ranging principle:

The ultrasonic wave has two ultrasonic probes, which are used for transmitting and receiving ultrasonic waves, respectively, and the measurement range is about 3-450 cm. First, input a 15us high level signal to the SCL (TRIG) pin to start the ranging function of module.

After the ranging function is started, the module will automatically send out 8 40 kHz ultrasonic pulses and automatically detect whether there is a signal return. This step is automatically done internally by the module. When the echo signal is detected, the echo terminal SDA (ECHO) pin will output a high level.

The high level duration is the time from the transmission to the return of the ultrasonic wave. We can calculate the current distance by the high level duration.

Formula: Distance = High Time * Sound Speed (340M/S)/2

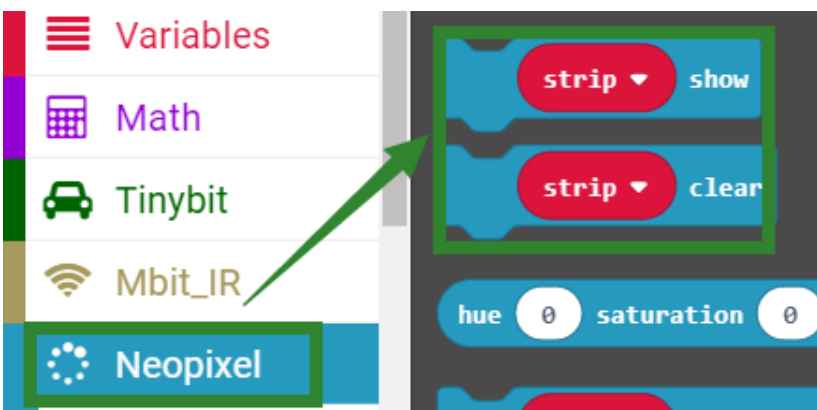
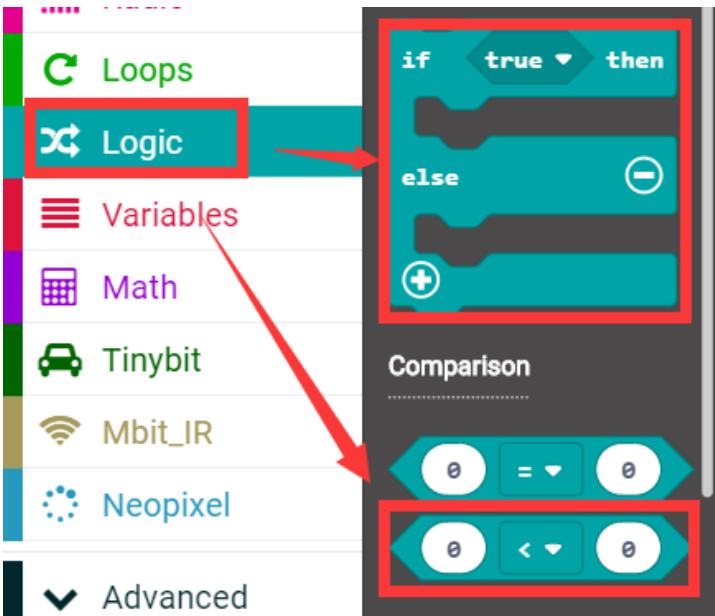
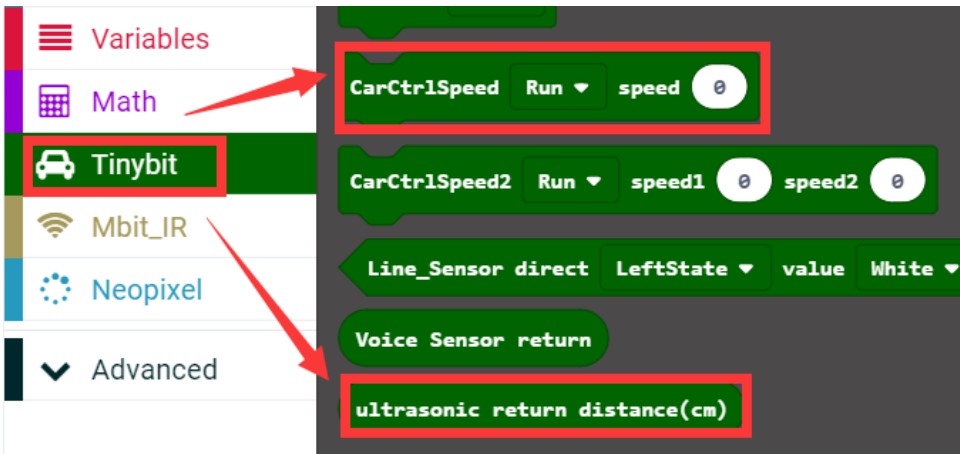
2.Learning goal

2-1. Learn how to use ultrasonic return distance graphically program building blocks

2-2.In this lesson, we will learn how to realize automatic obstacle avoidance

3.Search for block

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



4. Combine block

The summary program is shown below:

```
forever
  set distance to ultrasonic return distance(cm)
  if distance < 15 then
    CarCtrlSpeed Back speed 80
    pause (ms) 200
    CarCtrlSpeed SpinRight speed 100
    pause (ms) 200
  else
    CarCtrlSpeed Run speed 80
```

Note: The speed and time parameters in the program can be adjusted according to the actual situation.

5. Experimental phenomena

After the program is downloaded, the robot will realize automatic obstacle avoidance.

