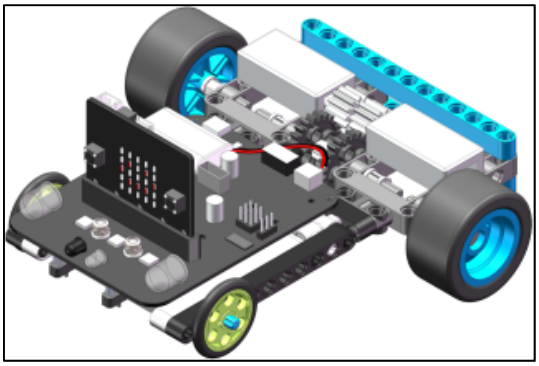
Python course Following car ---"Infrared obstacle avoidance"

! Note: This experiment must be done indoors to reduce the interference of sunlight on the infrared sensor.



1. Learning goals

After downloading the programming, open the power switch of the Following car, Following car will advance. If car encounter an obstacle, it will back for 1 second and then rotate right for 1 second, and finally go straight.

2. Preparation before class

We needs to be ready:
Building Block Following car *1
USB data cable *1

3. Infrared obstacle avoidance principle

The infrared sensor possess a pair of infrared emitting and receiving tubes. The transmitting tube emits infrared light of a certain frequency. Within a certain range, if there are no obstacles, the infrared light emitted will gradually weaken because of the distance of the spread, and finally disappear. If there is an obstacle, the infrared light will encounter the obstacle and it will be reflected to reach the receiving tubes.

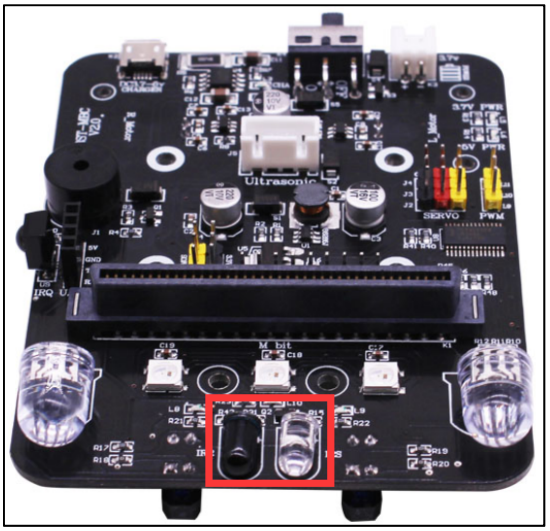
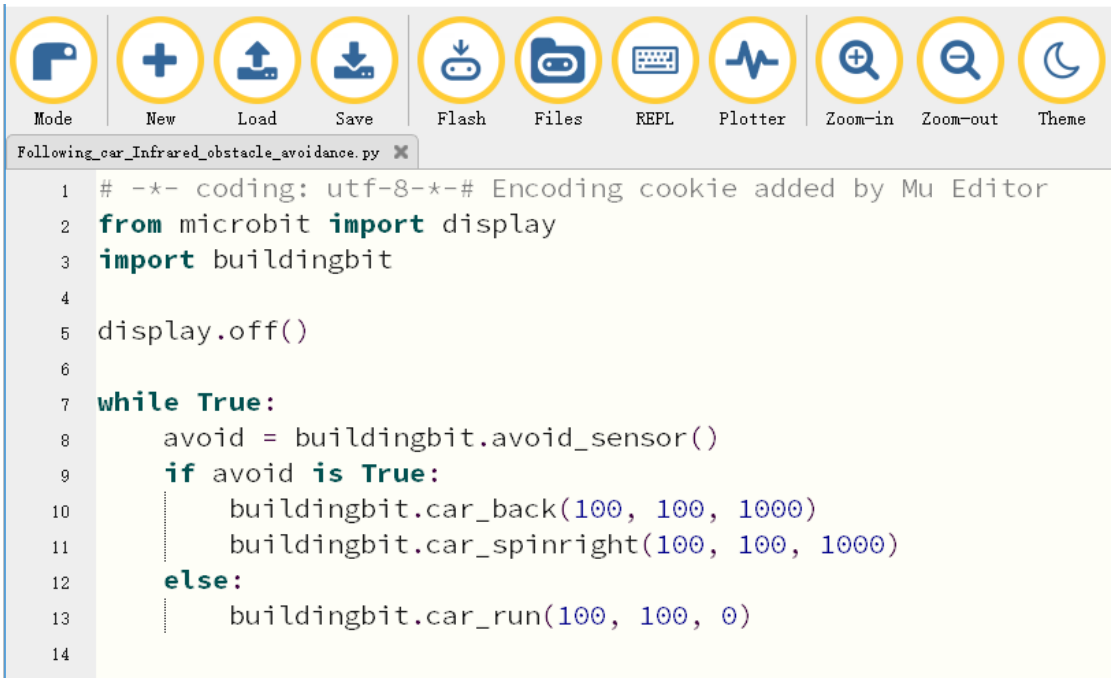


Figure 1 Infrared obstacle avoidance sensor

4. Programming



Program analysis：

1) Import buildingbit library：**import buildingbit**

We also need to use display library: **from microbit import display**

2) **display.off()** Turn off LED dot matrix. When using infrared avoid sensor, we must turn off the dot-matrix display, otherwise pin reuse will cause conflicts.

3) The avoid variable is used to save the value returned by the sensor. If an obstacle is detected, **buildingbit.avoid_sensor ()** returns True; if no obstacle is detected, it returns False;

4) If an obstacle is detected in front, run the **buildingbit.car_back (100, 100, 1000)** function to make the car back. Then, run the **buildingbit.car_spinright(100, 100, 1000)** make the car spin left.
Both time and speed can be adjusted by yourself.
!Note:
Due to the structure of the building blocks, the spin left and spin right rotation of the mini car in the program is opposite to the actual one. This is normal.

5)If no obstacle is detected, car will keep advance. **buildingbit.car_run(100, 100, 0)**

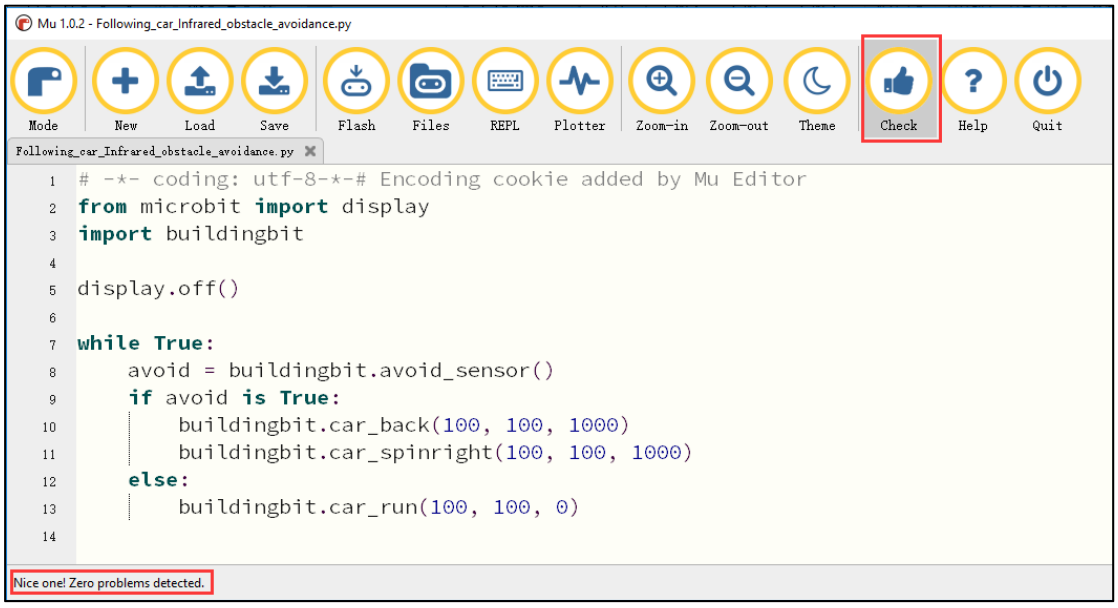
Code as shown below:

```
# -*- coding: utf-8-*-# Encoding cookie added by Mu Editor
from microbit import display
import buildingbit

display.off()

while True:
    avoid = buildingbit.avoid_sensor()
    if avoid is True:
        buildingbit.car_back(100, 100, 1000)
        buildingbit.car_spinright(100, 100, 1000)
    else:
        buildingbit.car_run(100, 100, 0)

```

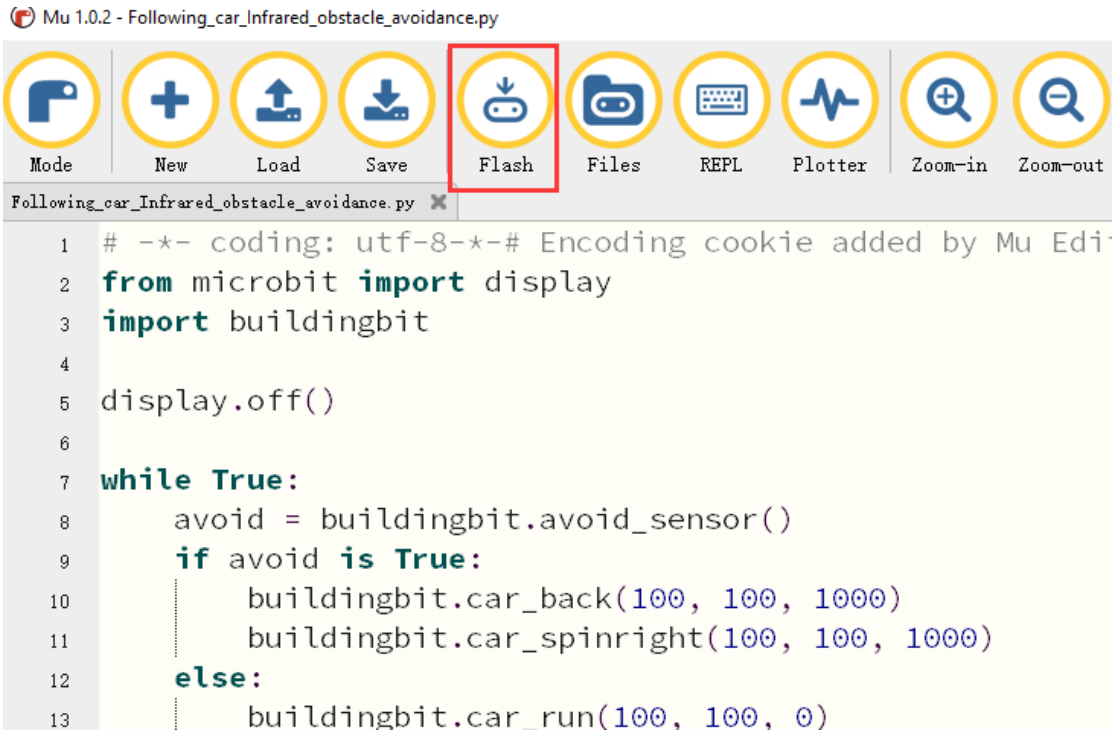
5. Download program

5.1 After programming is complete, please connect the computer and the micro:bit board with a Micro USB data cable.

5.2 You need to click the 【**Check**】 button to check if our code has an error. If a line appears with a cursor or an underscore, the program indicating this line is wrong. If there is no cursor or underline, it means that the code is correct, and the bottom left will prompt that the check is OK.



5.3 Click the 【Flash】 button to download the program to the micro: bit board of the building block following car.



If the program is wrong or the experimental phenomenon is wrong after downloading, please confirm whether you have downloaded the Buildingbit library hex file we provided to the micro: bit board.

For the specific method of adding library files, please refer to 【1.Preparation before class】---【Python programming】