Flame sensor module Experiment

Introduction of Flame sensor module

In public places, such as hotels, buildings and other places are equipped with fire alarms, so how does it perceive fire? It is well known that when a fire breaks out, there is particularly intense infrared light, and the device can detect the fire by infrared light.

The flame sensor is specially used to search for the source of fire, of course, the flame sensor can also be used to detect the brightness of light, but this sensor is particularly sensitive to the flame. The flame sensor makes use of the infrared ray, which is very sensitive to the flame, and USES the special infrared ray receiving tube to detect the flame. Then, the brightness of the flame is converted into the level signal with high and low changes, which is input into the CPU, which makes corresponding program processing according to the changes of the signal.

The working principle of flame sensor module

In the spectrum, we call the wavelength of 0.76 to 400 microns infrared light, which is invisible. All materials above absolute zero (273.15 °c) produce infrared light. It is called thermal radiation in modern physics. We know that before the phototransistor has no light, there is a weak reverse leakage current (dark current), at which point the photosensitive tube does not pass. When hit by light, the saturated reverse leakage current immediately rises, and a photocurrent is formed. It increases as the intensity of incident light varies within a certain range. The only difference between the principle of the infrared receiver and that of the phototransistor is that the infrared receiver is insensitive to visible light, only to infrared light. When there is no infrared light, the reverse leakage current is very weak, the infrared sensor does not conduct; When there is infrared, there is photocurrent, and the on-off resistance decreases as the infrared intensity increases. Due to the flame sensitivity of the flame sensor, the flame can be detected by a special infrared receiver. As the flame grows, the conduction resistance of the infrared receiver decreases.

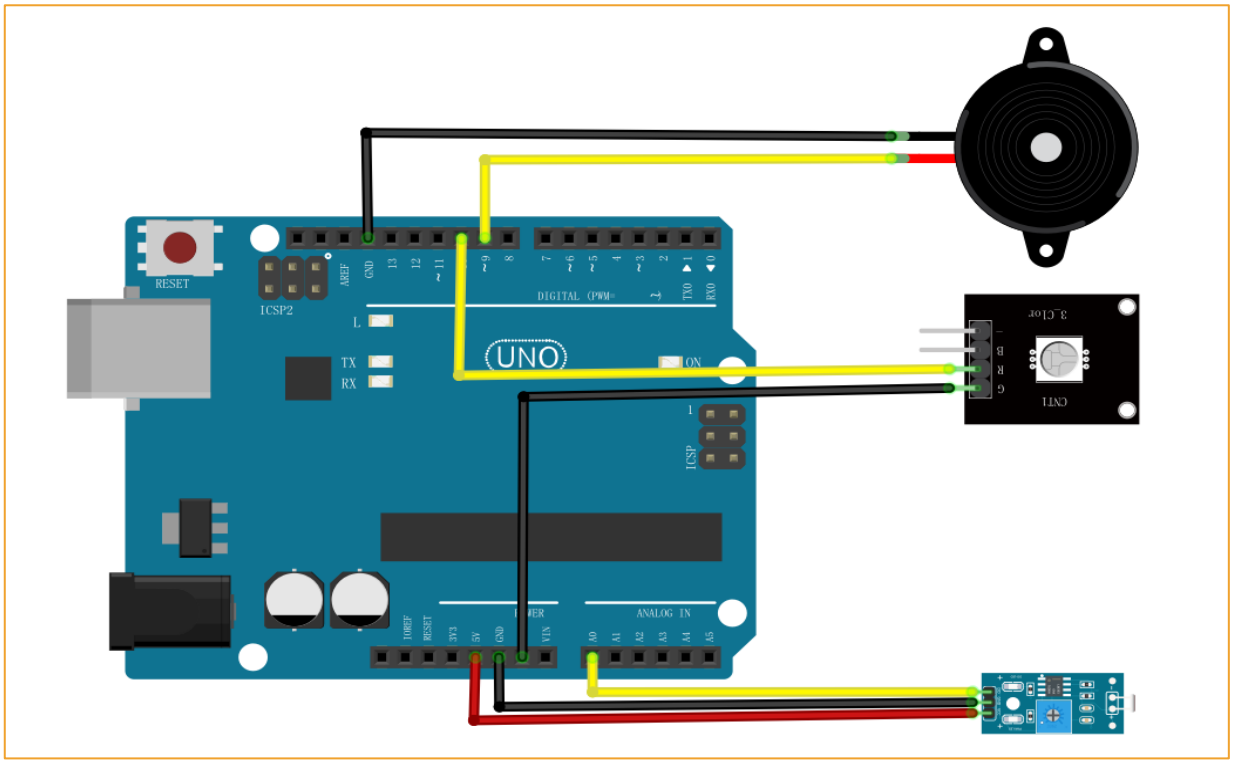
Component List

- Keywish Arduino Uno R3 mainboard
- Breadboard
- USB cable
- Flame sensor module*1
- Jumper wires
- LED module*1
- Active buzzer*1

Wiring of Circuit

Connect the positive electrode of the active buzzer to pin 9, connect the DO of the flame sensor module to the no. A0 interface of the arduino UNO board, connect the positive electrode of the LED lamp to pin 10 of the arduino UNO board, and complete the whole wiring of the experiment.

Arduino Uno	Flame sensor module
A5	Y
GND	G
5V	R
Arduino Uno	LED modul
9	+
GND	-
Arduino Uno	Active Buzzer
10	+
GND	-



Experimental princple

When there are two situations:

1. Whether the voltage value of the digital interface is changing
2. Whether its close to flames.

The signal output of the flame sensor module in this experiment is digital signal. When no flame is detected, high level is output; when flame is detected, low level is output.

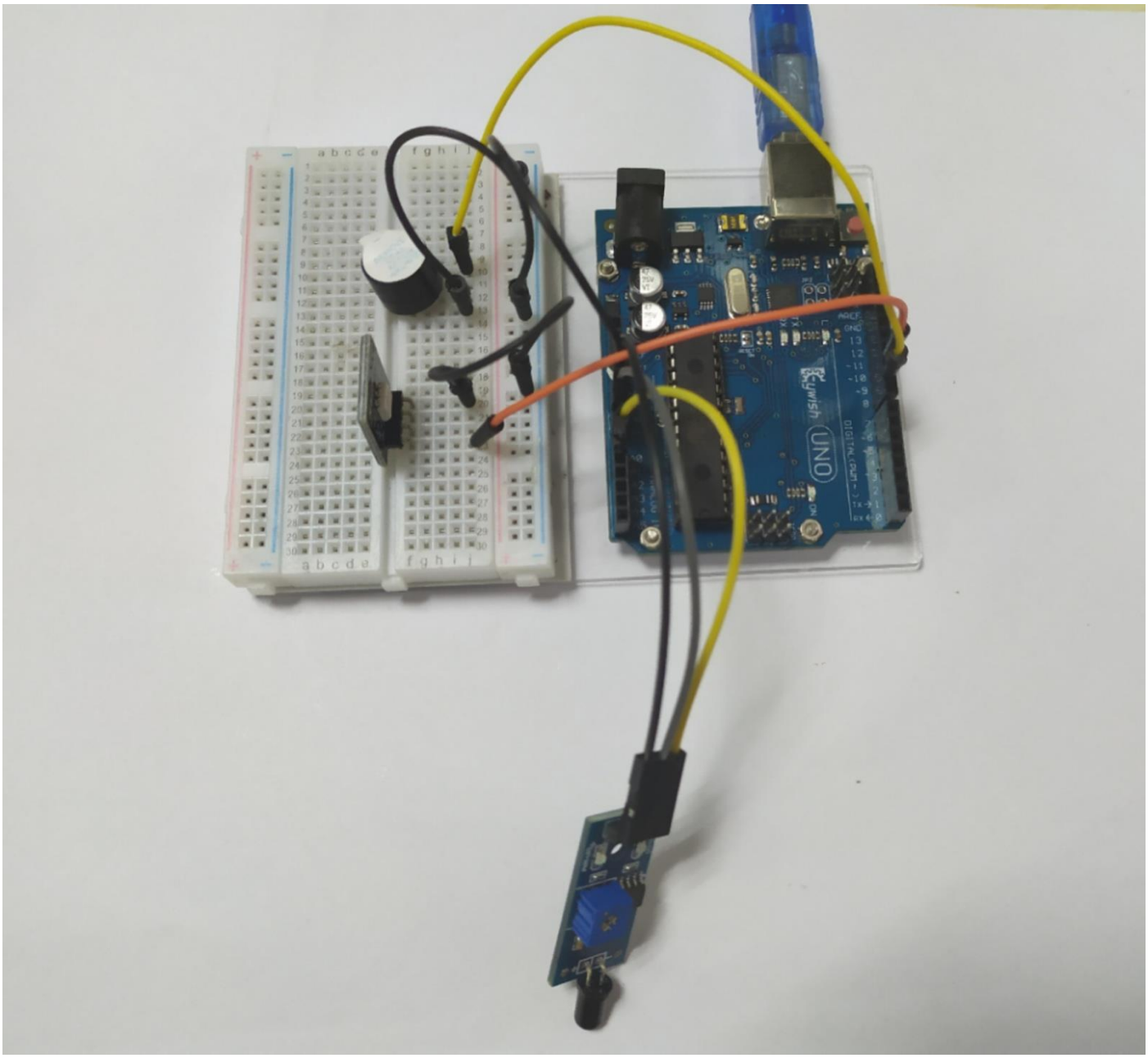
Due to the fear of error, if the value is higher than the threshold for five consecutive times, we confirm that a fire will start the buzzer and the LED light will be on;If less than the threshold, the buzzer remains silent and the LED goes out.

Arduino IDE programming Code

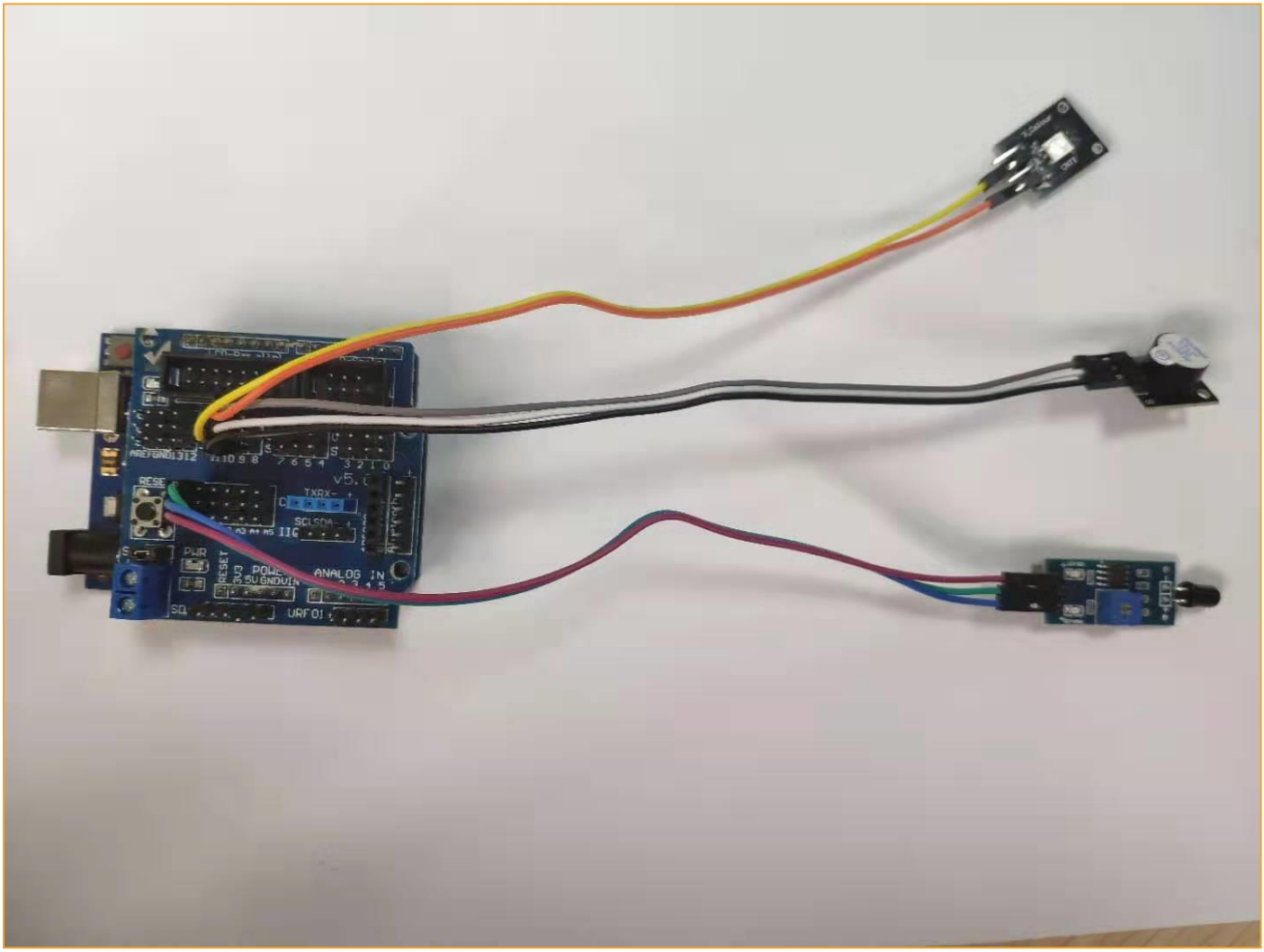
```
int fire_pin = A0 ;
int buzzer = 9 ;
int LED_PIN=10;
int val = 0;
int count = 0 ;
void setup()
{
    pinMode(buzzer,OUTPUT);
    pinMode(LED_PIN,OUTPUT);
    pinMode(fire_pin,INPUT);
    Serial.begin(9600);
    digitalWrite(buzzer,LOW);
    }
void loop()
{
    val = digitalRead(fire_pin);
    if( val==0) {
           count++ ;
    } else {
       count = 0 ;
    }
    if( count >= 5 ) {
        digitalWrite(buzzer , HIGH );
         digitalWrite(LED_PIN , HIGH );

    } else {
        digitalWrite(buzzer , LOW );
         digitalWrite(LED_PIN , LOW );
    }
    delay(500);
}
```

The program can simulate a fire buzzer, red LED lights, no flames when all is normal.

Experiment Result

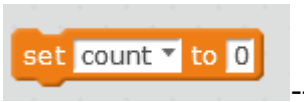


If you have a Sensor V5.0 expansion pad in your kit, you can connect it as shown in the figure below for more convenience.



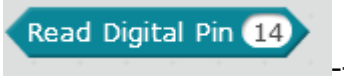
MBlock graphical programming program:

The main building blocks used in mBlcok programming are:

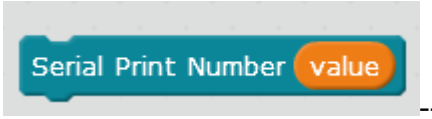


--Create a new variable count to hold the number of times the fire was triggered

--Fire trigger times increase by 1

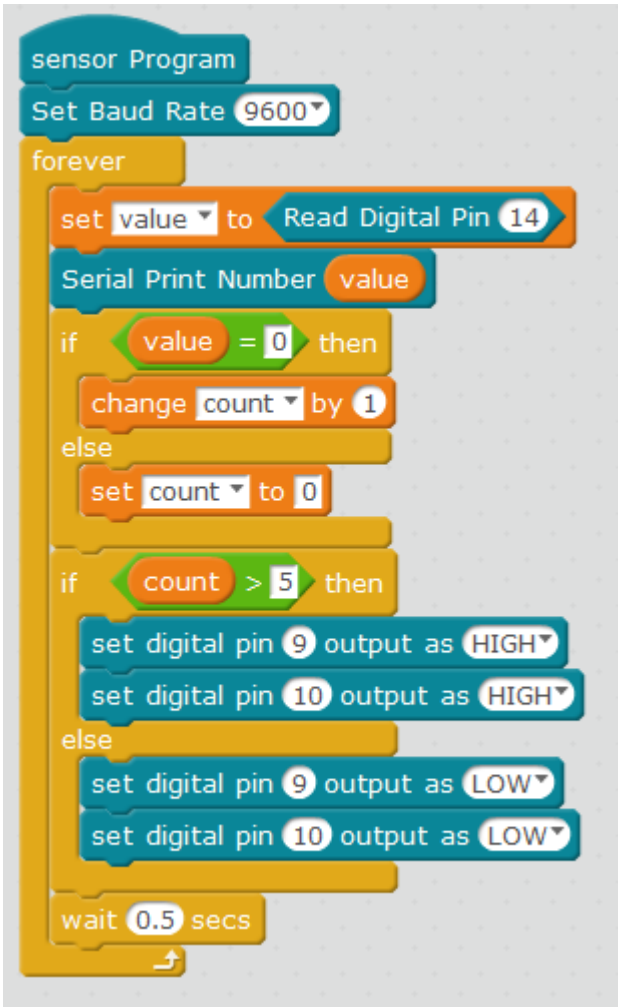


--Reads the value of 14 (A0) pin



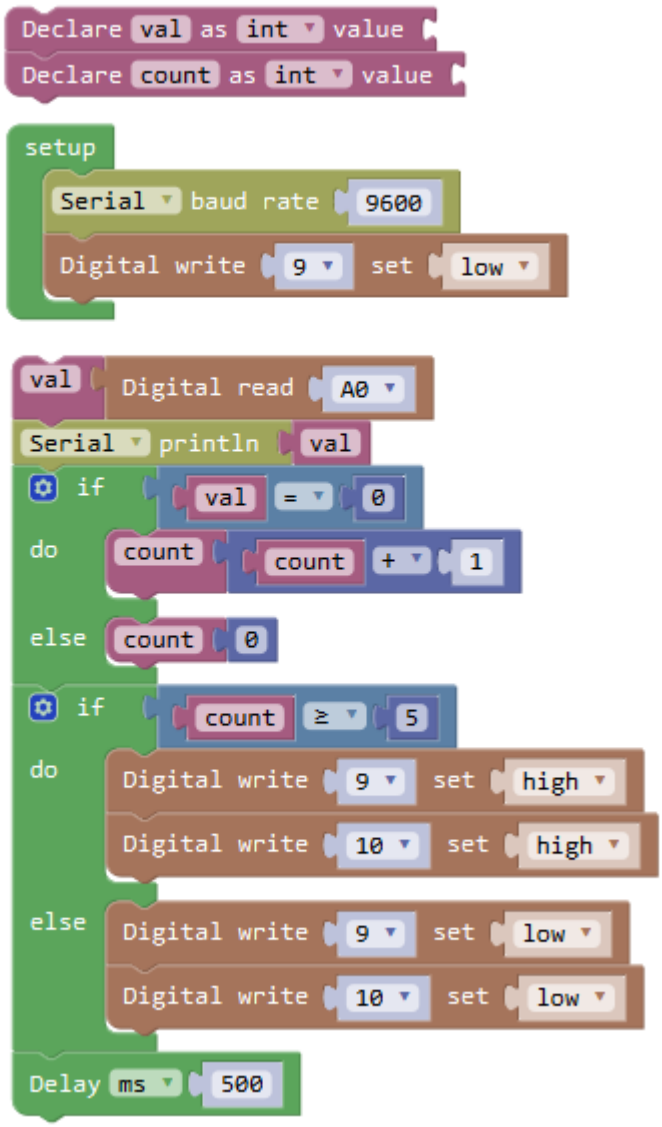
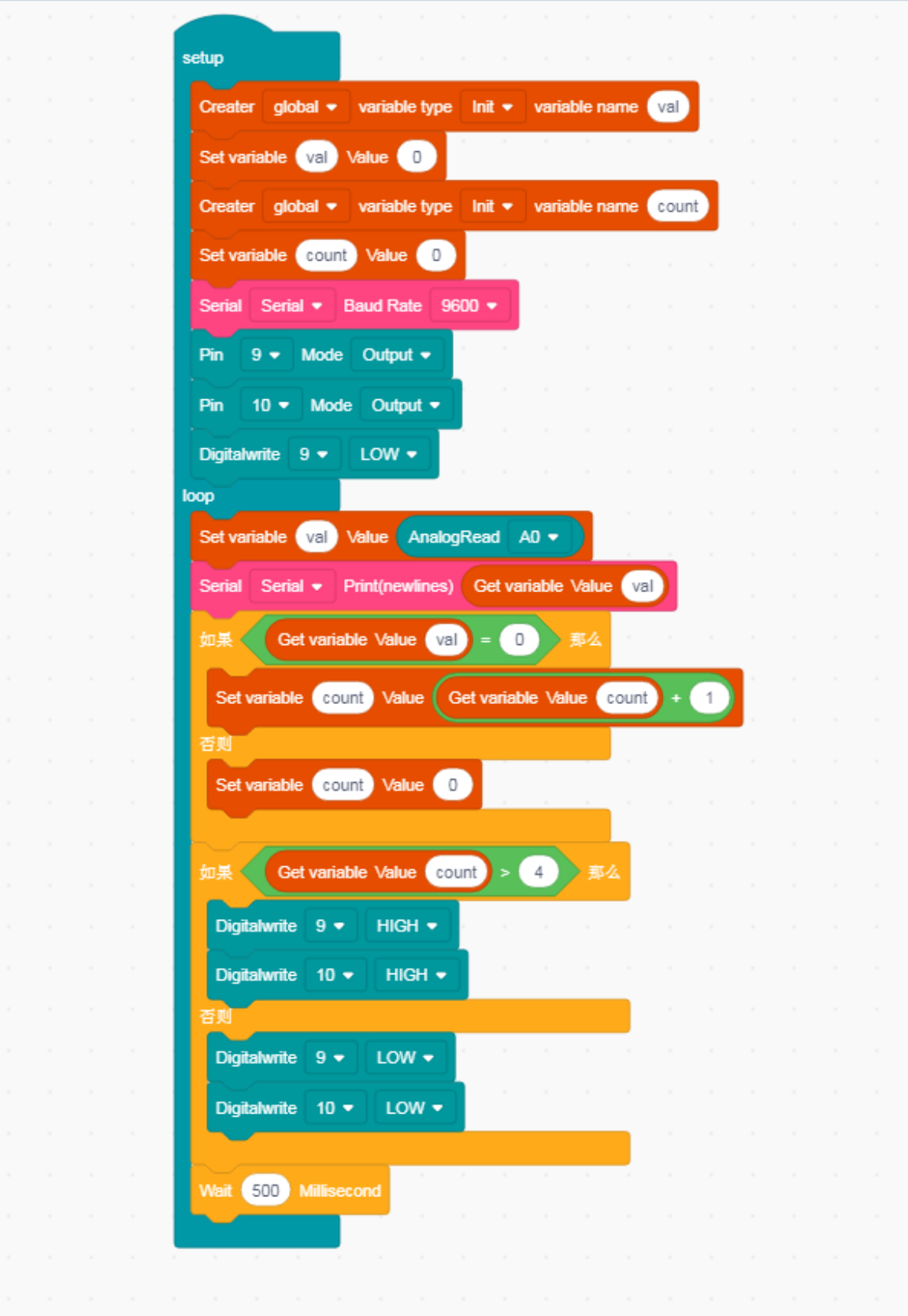
--Serial print Numbers

--Sets the digital pin to output and sets the high and low levels for the pin



Mixly graphical programming program

You can also use Mixly to open a written program file directly. It is a.mix file. Here are the steps to open it:


Declare val as int value
Declare count as int value
setup
Serial baud rate 9600
Digital write 9 set low
val Digital read A0
Serial println val
if val = 0
do count count + 1
else count 0
if count ≥ 5
do Digital write 9 set high
Digital write 10 set high
else Digital write 9 set low
Digital write 10 set low
Delay ms 500

MagicBlock graphical programming program