

## Flame Sensor experiment

### Introduction of Flame Sensor

Many public places, such as hotels and buildings, are equipped with fire alarms, so how does it perceive fire? We know that when a fire breaks out, there is a very strong infrared light, and the equipment can detect the fire through the infrared light. Flame sensors are often used for detecting fire sources and infrared detectors. It is sensitive to infrared rays emitted by flames and also responds to ordinary light. Also commonly used in the intelligent car for infrared obstacle avoidance.

### Flame Sensor



### Working Principle

Flame sensor: composed of various combustion products, intermediates, high temperature gases, hydrocarbons and inorganic substances as the main body of high temperature solid particles. The thermal radiation of flame has discrete gas radiation and continuous solid radiation. The flame radiation intensity and wavelength distribution of different combustors are different. In summary, it is able to detect the short-wave near infrared (sw-nir) emitted by the flame at the wavelength range of 700-1100 nm (nanometer). The resistance value will change when the flame approaches, and the resistance value will decrease when the flame approaches.

### The experiment purpose

Flame alarm experiment, adhere to the fire source for the beeper alarm sound.

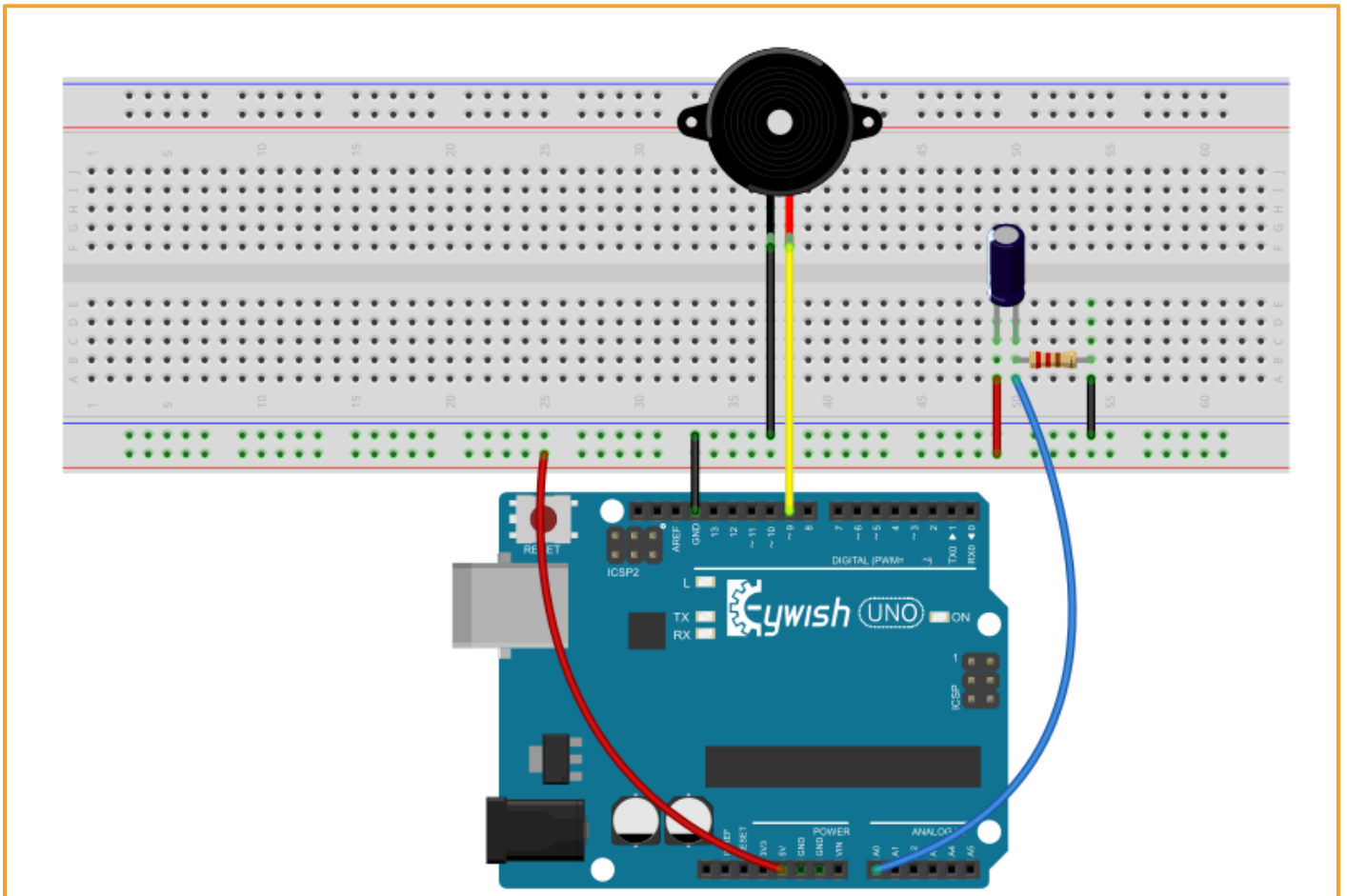
## Component List

- ◆ Keywish Arduino UNO R3 mainboard
- ◆ Breadboard
- ◆ USB cable
- ◆ Flame sensor\*1
- ◆ Buzzer\*1
- ◆ 4.7k Resistor\*1
- ◆ Several jumper wires

## Wiring of Circuit

The short lead of the flame sensor is the cathode and the long lead is the anode. According to the figure below, we connect the 5v interface to the cathode, then connect the 4.7k resistor to the anode, leaving the other end of the resistor to the GND interface. Finally, we insert the jumper into the anode column of the flame sensor, and the other side of the jumper is connected to the analog interface.

Arduino Uno R3	buzzer
GND	GND
9	2
Arduino	火焰传感器
5V	阴极（短）
A0	阳极（长）
GND	电阻

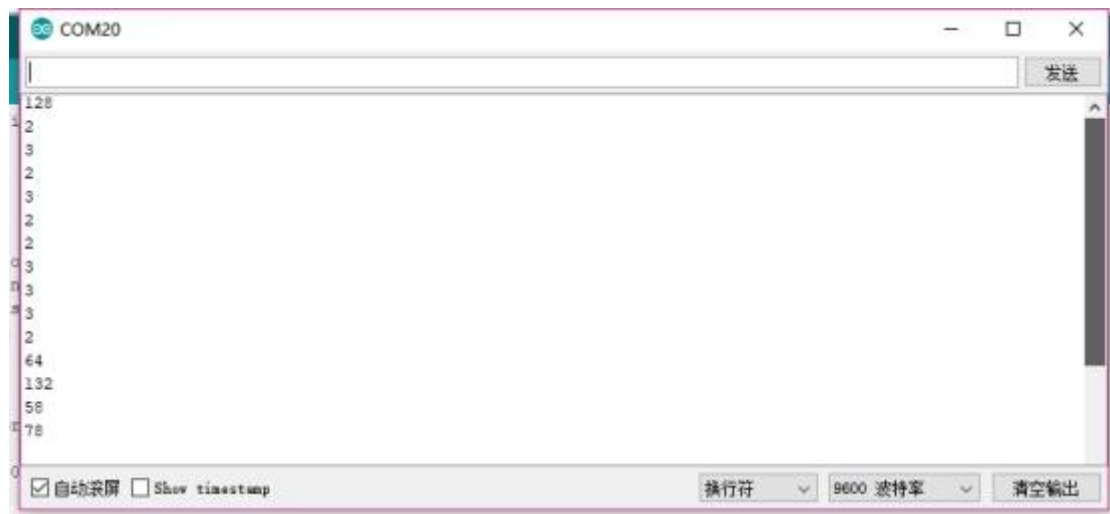
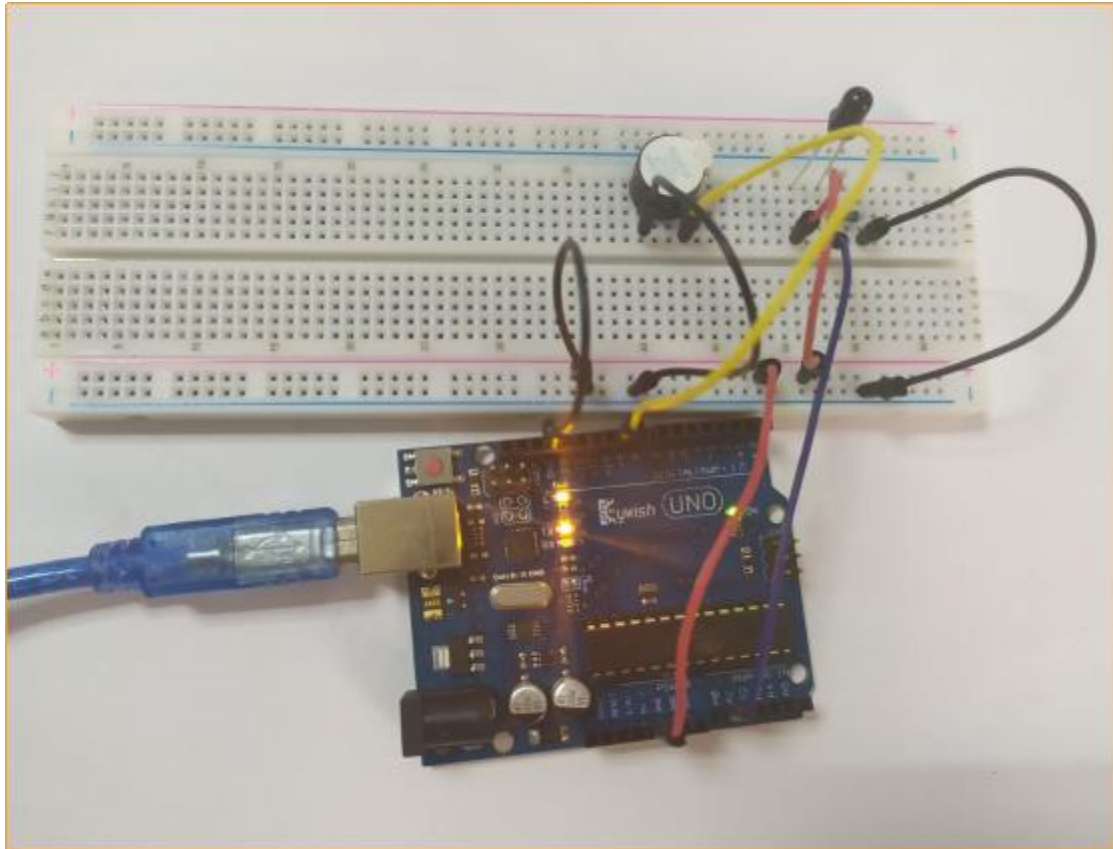


## Code

```
sint fire_pin = A0 ;           // define analog 0 pin for fire-sensor pin
int buzzer = 9 ;               // buzzer dirver pin
int val = 0;
int count = 0 ;
void setup()
{
    pinMode(buzzer,OUTPUT);    // buzzer pin is output
    pinMode(fire_pin,INPUT);   // fire-sensor pin is input
    Serial.begin(115200);      // init baud rate is 115200
    digitalWrite(buzzer,LOW);  // buzzer default value is 0
}
void loop()
{
    val = analogRead(fire_pin); // get fire-sensor analog value
    Serial.println(val);
    if( val > 600 )              // get value > 600 counet add
    {
        count++;
    }else
    {
        count = 0 ;
    }
    if( count >= 5 )             // count > 5 ensure infrared radiation
    found and give an alarm
    {
        digitalWrite(buzzer , HIGH );
    } else
    {
        digitalWrite(buzzer , LOW ); // disable an alarm
    }
    delay(500);
}
```

## Experimental results

The flame sensor is not as resistant to high temperature as the temperature-sensitive resistor. Please keep the safety distance of the lighter above 5cm during the experiment. This program can simulate the ringing of the buzzer, when there is a fire buzzer sound, when there is no fire everything is normal.

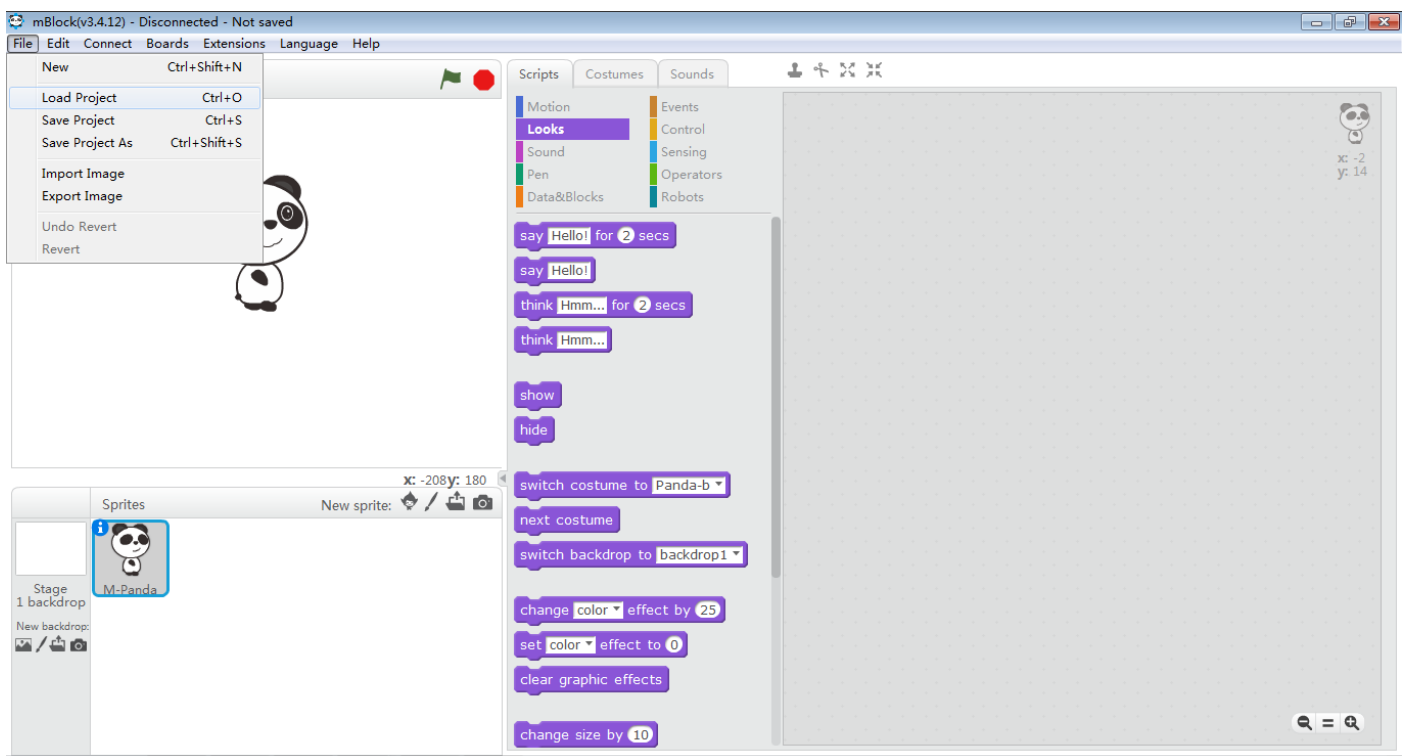


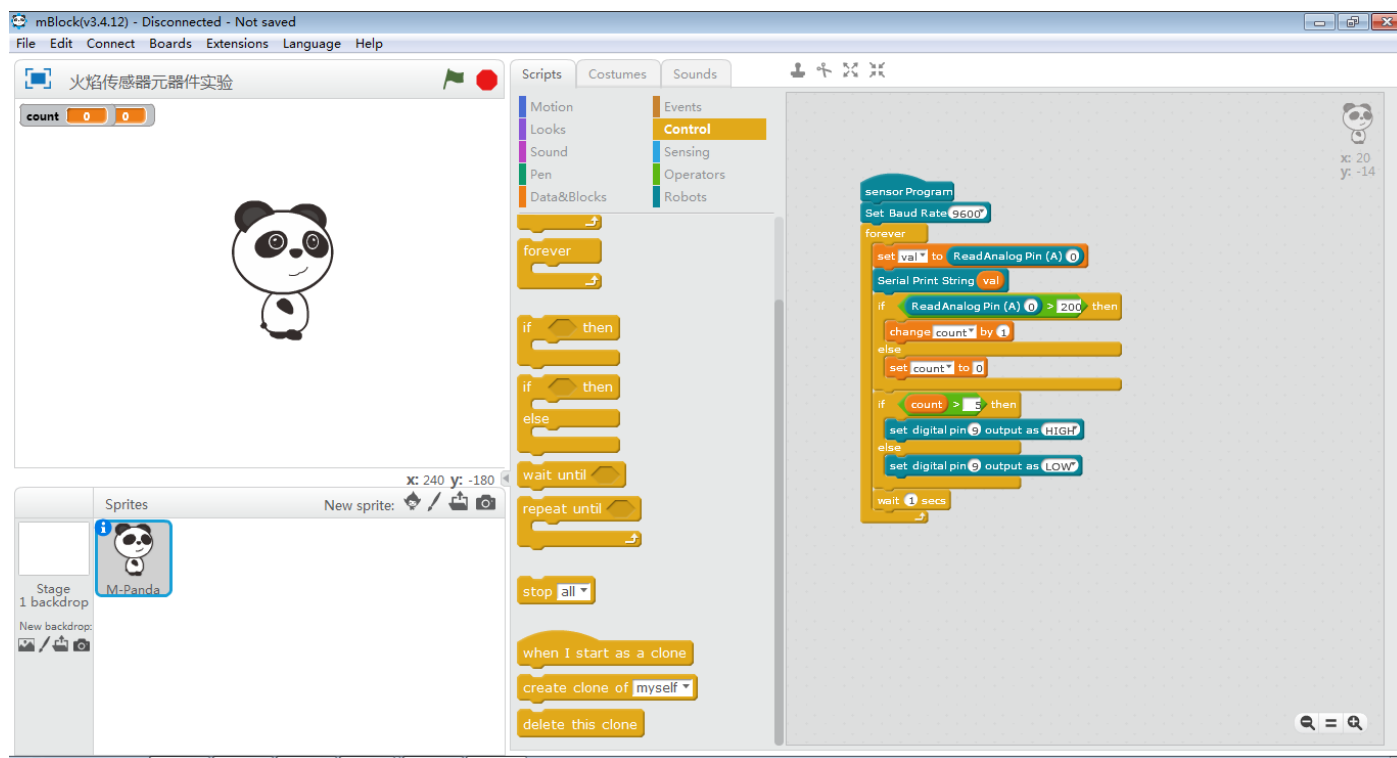
## MBlock graphical programming program

The program prepared by mBlock is shown in the figure below:

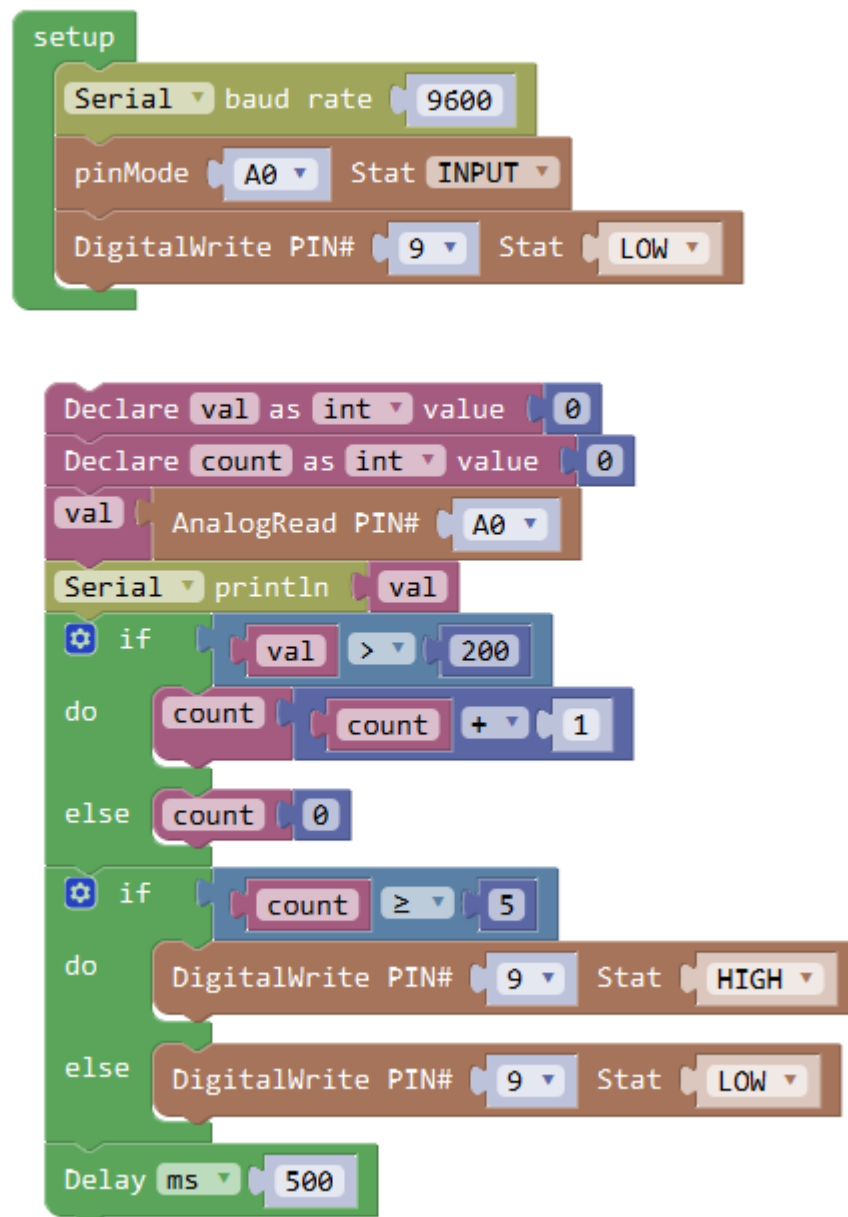


You can also open the program file directly with mblock, which is a .Sb2 file. Here are the steps to open it:





## Mixly graphical programming program





## MagicBlock graphical programming program

