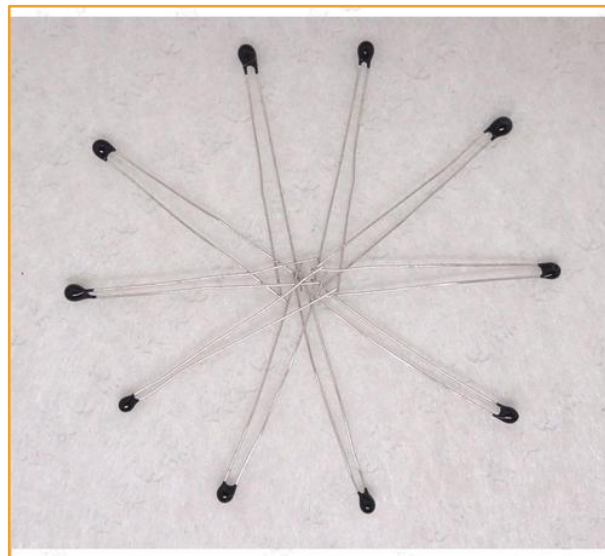


Thermistor experiment

Introduction of thermistors

Thermistors are a class of sensing elements, which can be divided into positive temperature coefficient thermistors (PTC) and negative temperature coefficient thermistors (NTC) according to different temperature coefficients. The typical characteristic of thermistors is that they are sensitive to temperature, showing different resistance values at different temperatures. The positive temperature coefficient thermistor (PTC) has higher resistance value when the temperature is higher, and the negative temperature coefficient thermistor (NTC) has lower resistance value when the temperature is higher, they both belong to semiconductor devices.



Thermistor

Experiment purpose.

- Read the resistance values of thermistors at different temperatures
- Use thermistor to control LED on and off.

The experimental principle

The LED is connected in series with the thermistor, and the end of the thermistor is connected with a 10K pull-up resistance. The voltage change of the thermistor varies with the temperature is read through the analog port, and these parameters are printed out through the serial port monitor. Meanwhile, the change of LED light brightness is observed.

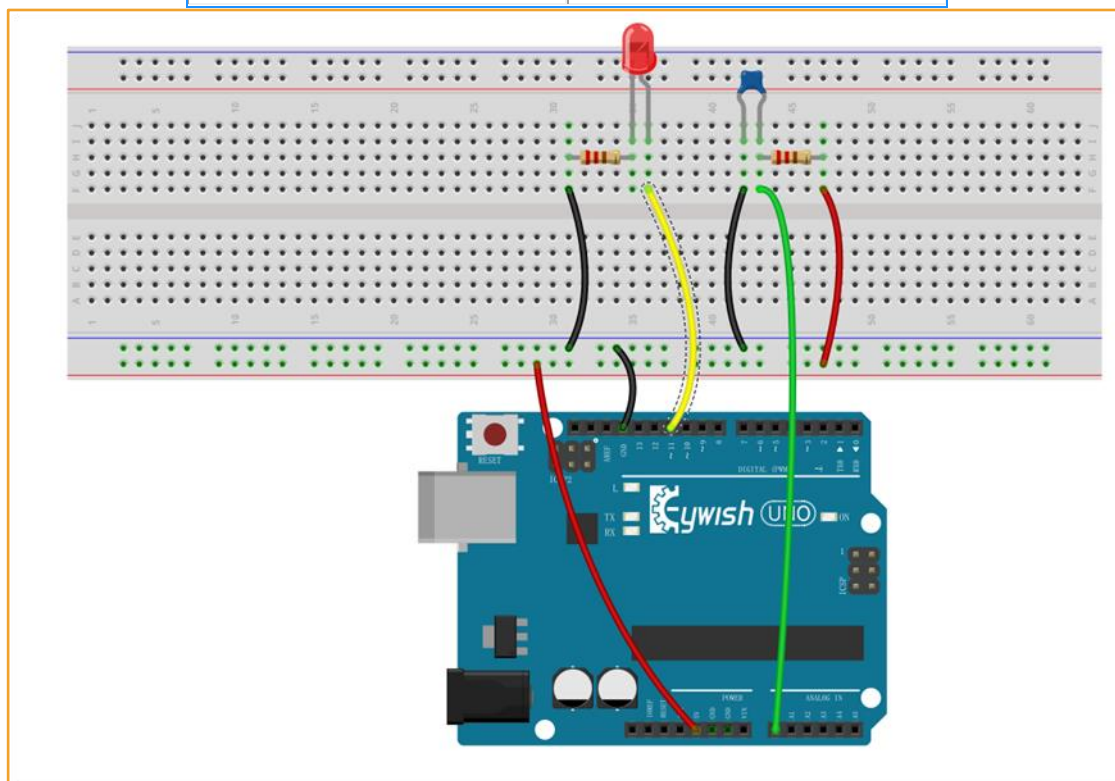
The component list

- ◆ Keywish Arduino UNO R3 motherboard
- ◆ Breadboard

- ◆ USB cable
- ◆ Thermistor *1
- ◆ Red LED*1
- ◆ 10k Ω resistance * 1
- ◆ 220 Ω resistance * 1
- ◆ Jumper wires

Wiring

Arduino UNO	Thermistor
5V	1
GND	3
A0	2
Arduino UNO	LED module
11	+
GND	—

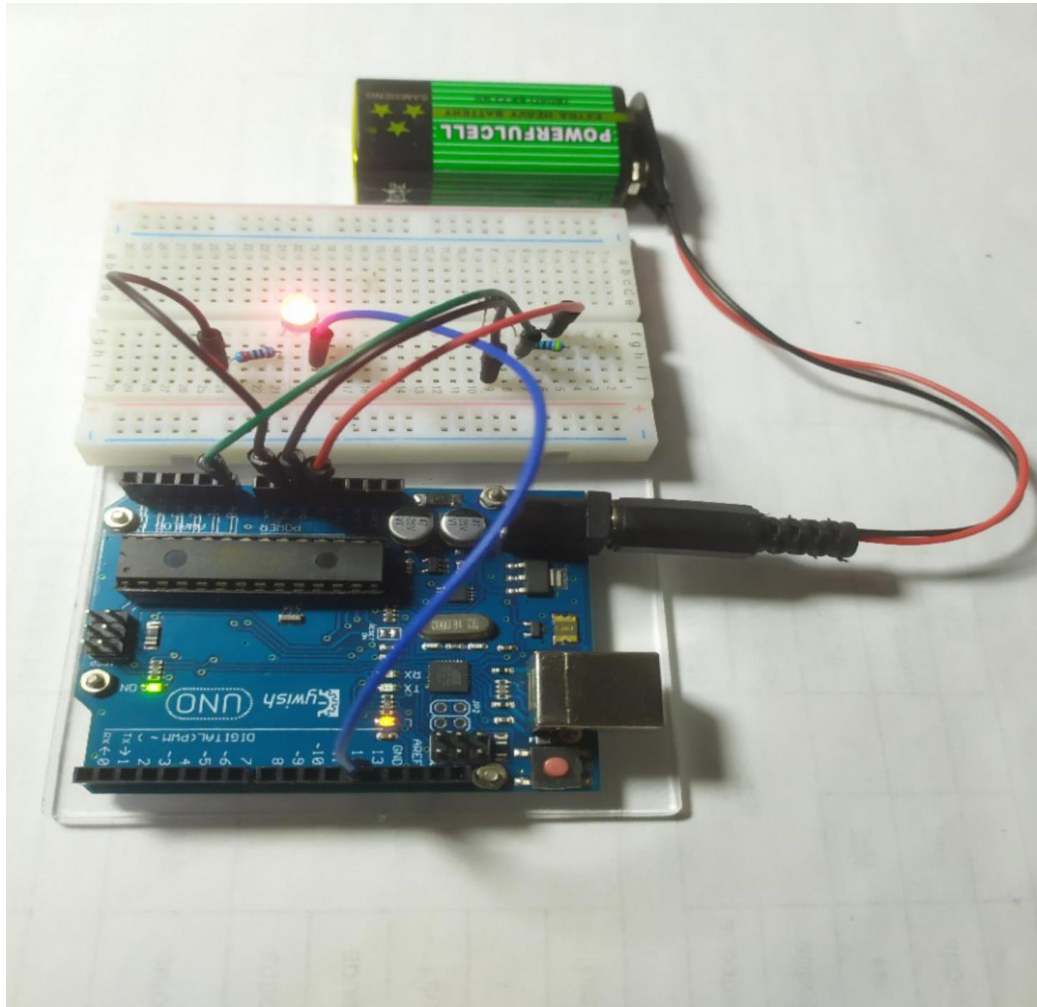


Code

```
int  ADPIN  = A0 ;
int  LEDPIN = 11 ;
int  value  = 0 ;
float voltage = 0.0 ;
void setup()
{
    pinMode(LEDPIN,OUTPUT);
    Serial.begin(9600);    //Serial Baud rate is 9600
}
void loop()
{
    value =  analogRead(ADPIN);
    voltage = ( ( float )value )/1023 ;
    value =  voltage * 256 ;           //convert voltage to value
    analogWrite(LEDPIN,value);
    Serial.println(value);
    Serial.println(voltage );
    delay(1000);
}
```

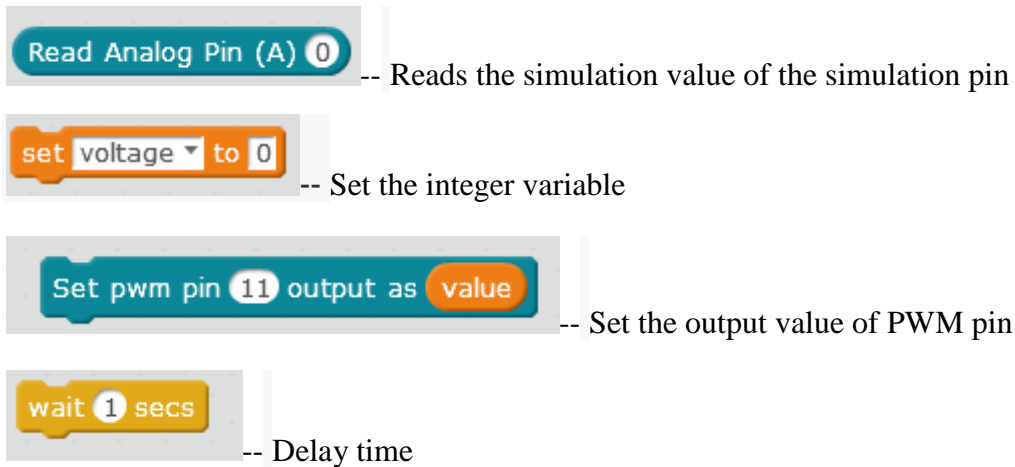
After the program is burned, turn on the serial port monitor and set the baud rate to 9600. First, observe the voltage value printed by the serial port. Then, use the flame or the medium with higher temperature near the thermistor to observe the voltage change printed by the serial port and the brightness of the LED.

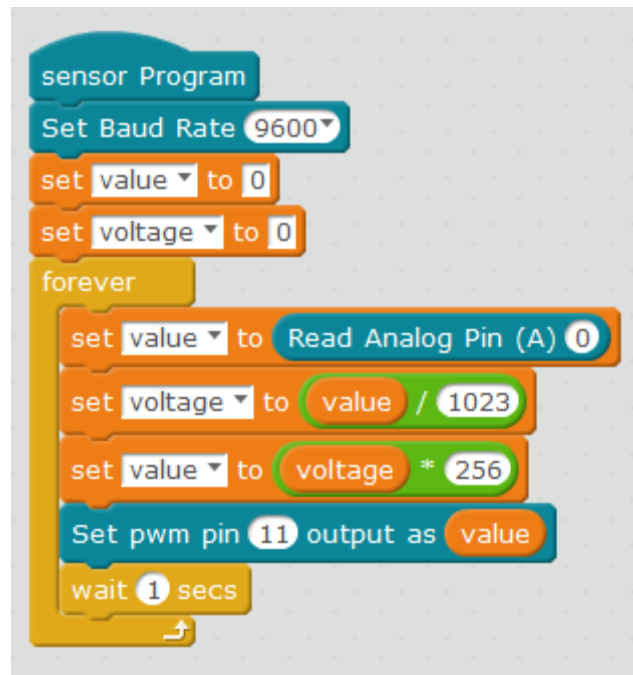
Experiment Result



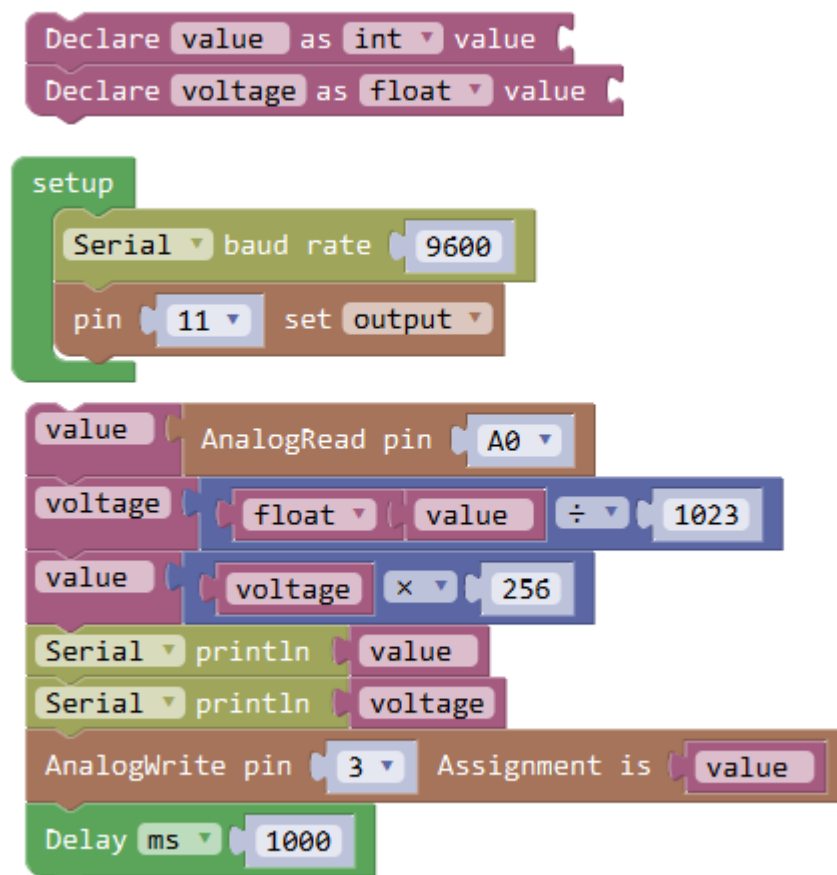
Mblock programming program

Mblock waits the program as shown in the figure below:





Mixly graphical programming program



MagicBlock graphical programming program

