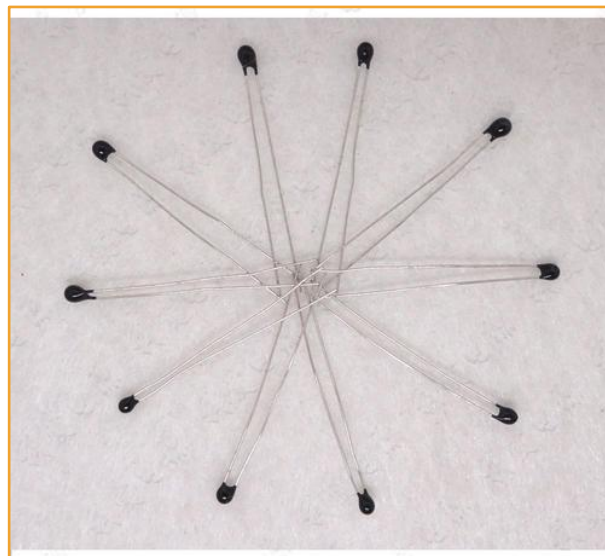


Thermistor experiment

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.

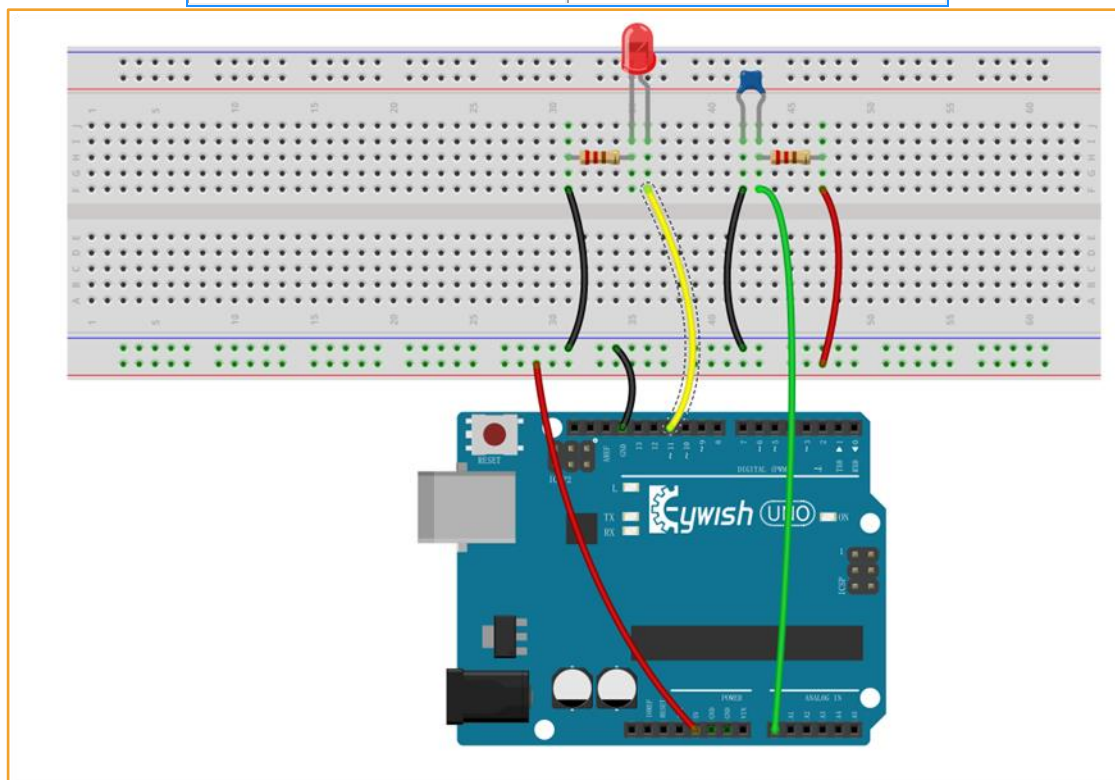
The component list

- ◆ Keywish Arduino UNO R3 motherboard
- ◆ Breadboard

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

Wiring

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



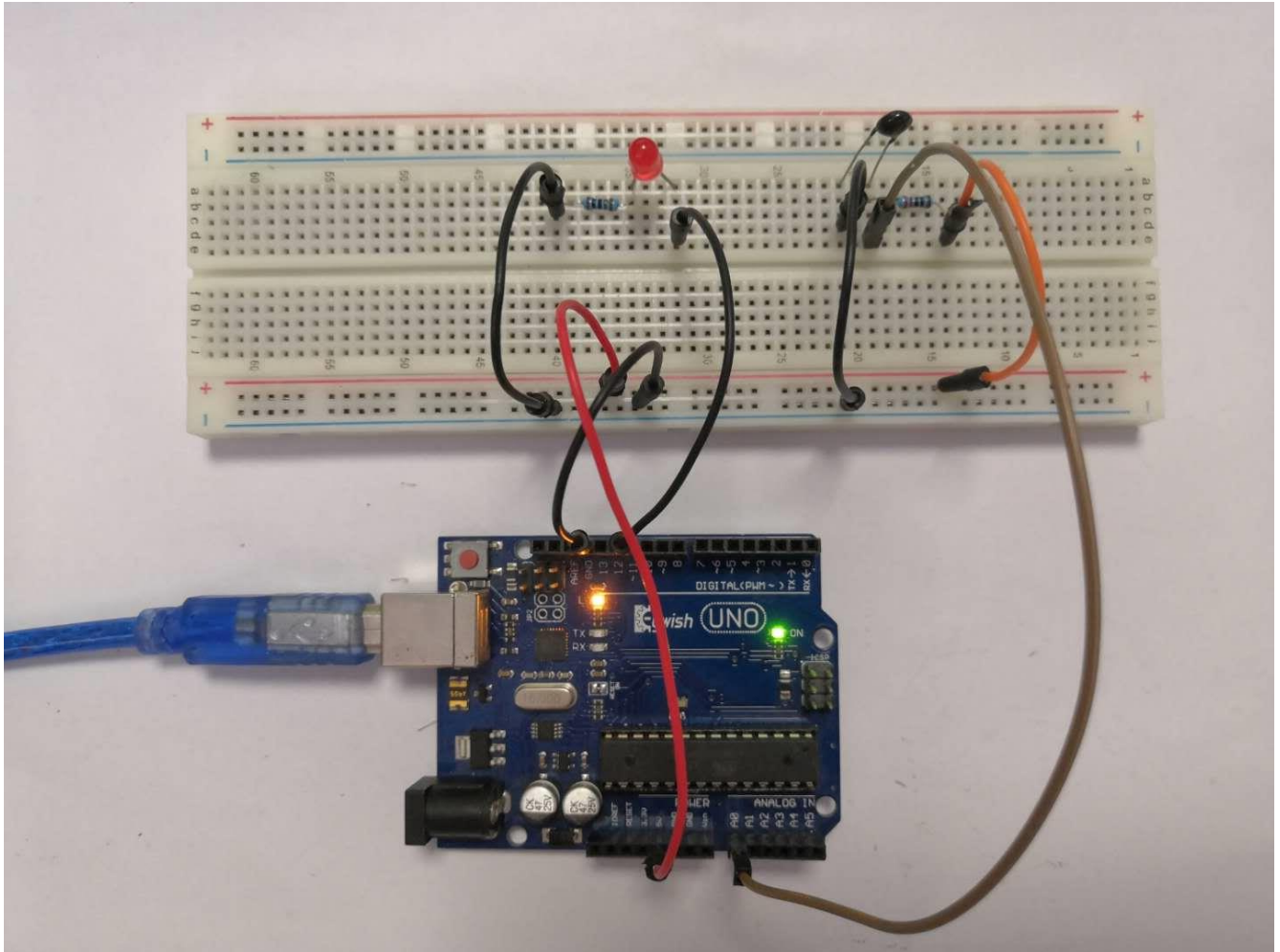
Code

```
int ADPIN = A0 ; // The sensor is connected to A0 port
int LEDPIN = 11 ; // The led light is connected to 11 ports
int value = 0 ;
float voltage = 0.0 ;

void setup()
{
    pinMode(LEDPIN, OUTPUT); // Set the led interface to output mode
    Serial.begin(9600);      // Set the serial port baud rate to 9600
}
void loop()
{
    value = analogRead(ADPIN);
    voltage = ( ( float )value )/1023 ;
    value = voltage * 256 ;           // Use the formula to calculate the Value
    analogWrite(LEDPIN, value);
    Serial.println(value); // Print Value
    Serial.println(voltage ); // print voltage value
    delay(1000); // 1 second delay
}
```

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

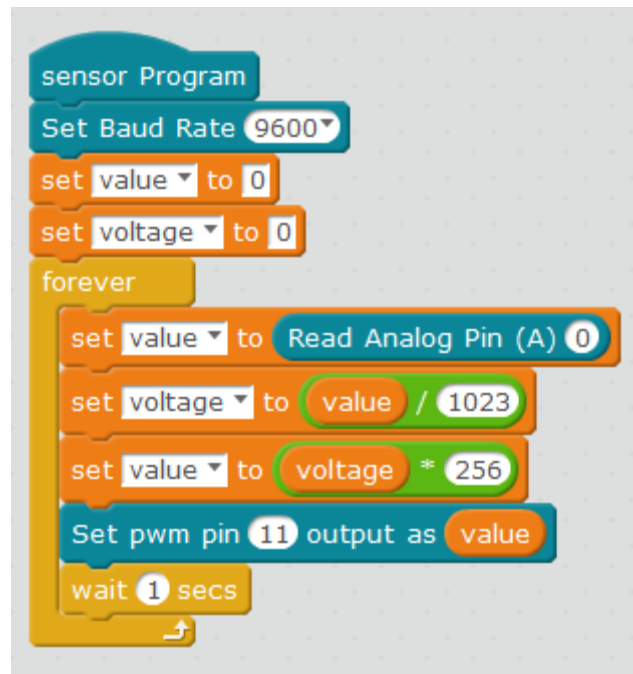
Mblock wairttes tne program as shown in the figure below:

Read Analog Pin (A) 0 -- Reads the simulation value of the simulation pin

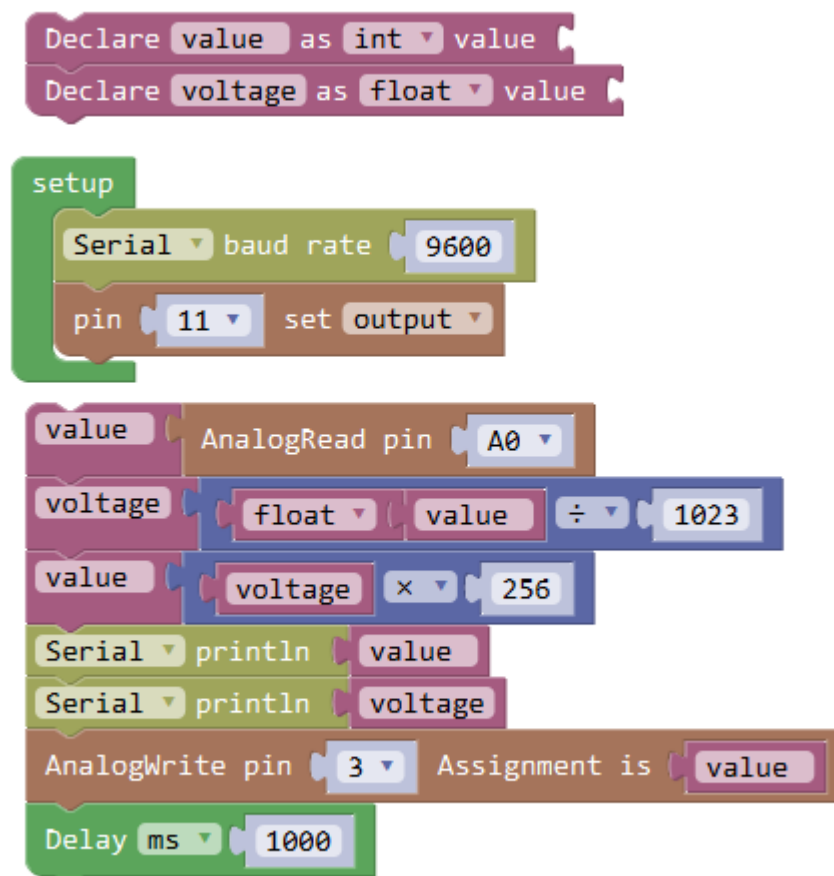
set voltage to 0 -- Set the integer variable

Set pwm pin 11 output as value -- Set the output value of PWM pin

wait 1 secs -- Delay time



Mixly graphical programming program



MagicBlock graphical programming program

