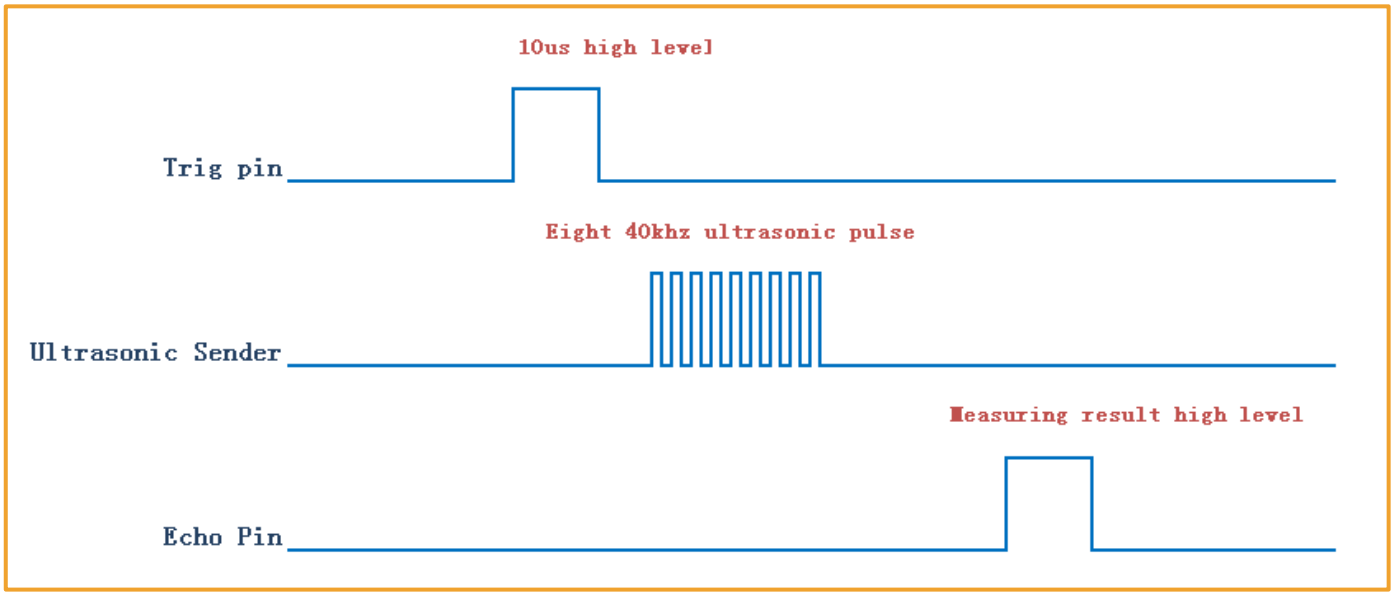
Introduce of Ultrasonic module

Ultrasonic ranging principle : the ultrasonic transmitter fires ultrasonic waves in a certain direction, and we start timing at the same time. When the ultrasound in the air hits an obstacle, it immediately returns, the ultrasonic receiver picks up the reflected wave, and we stop the clock. The velocity of sound waves in the air is 340m/s. According to the recorded time t, the distance s between the starting point and the obstacle can be calculated, that is, s = 340m/s * t / 2. Therefore, we can obtain the distance.

Ultrasonic ranging module has four pins, they are Vcc, Trig, Echo, GND, among the Trig is distance measuring trigger pin, as long as the Trig pin are at least 10μs high level, ultrasonic sending module will automatically send eight 40KHZ ultrasonic pulse, and automatically detect whether there is a returned signal . This step will be done automatically by the inside module. If there is any returned signal, the Echo pin will output high level, the duration of the high level is the time of ultrasonic wave from launch to return. At this point, we can use pulseIn () function to obtain the result of distance measuring, and calculate the actual distance.



Experiment Purpose

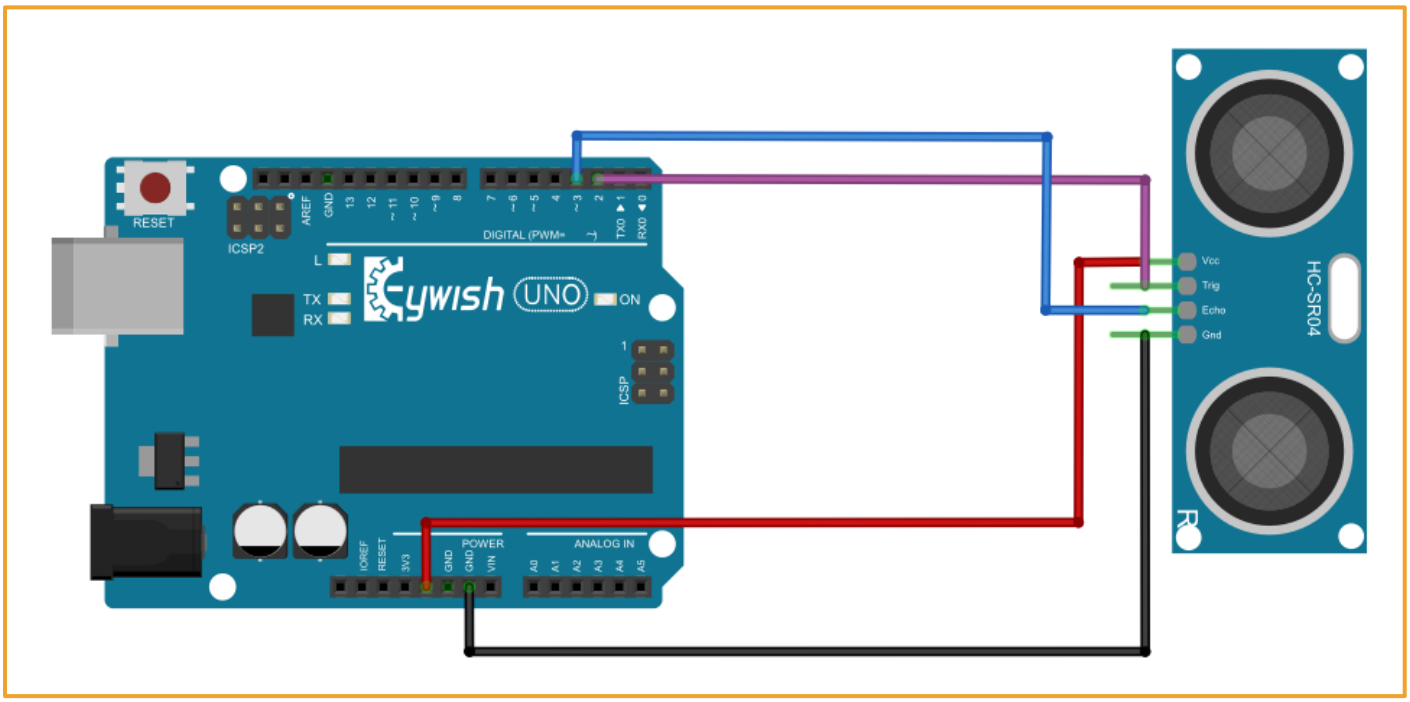
The purpose is to type ultrasonic ranging module distance through a serial port.

Component List

- Keywish Arduino UNO R3 mainboard
- Breadboard
- USB cable
- Ultrasonic module* 1
- Several jumper wires

Wiring of Circuit

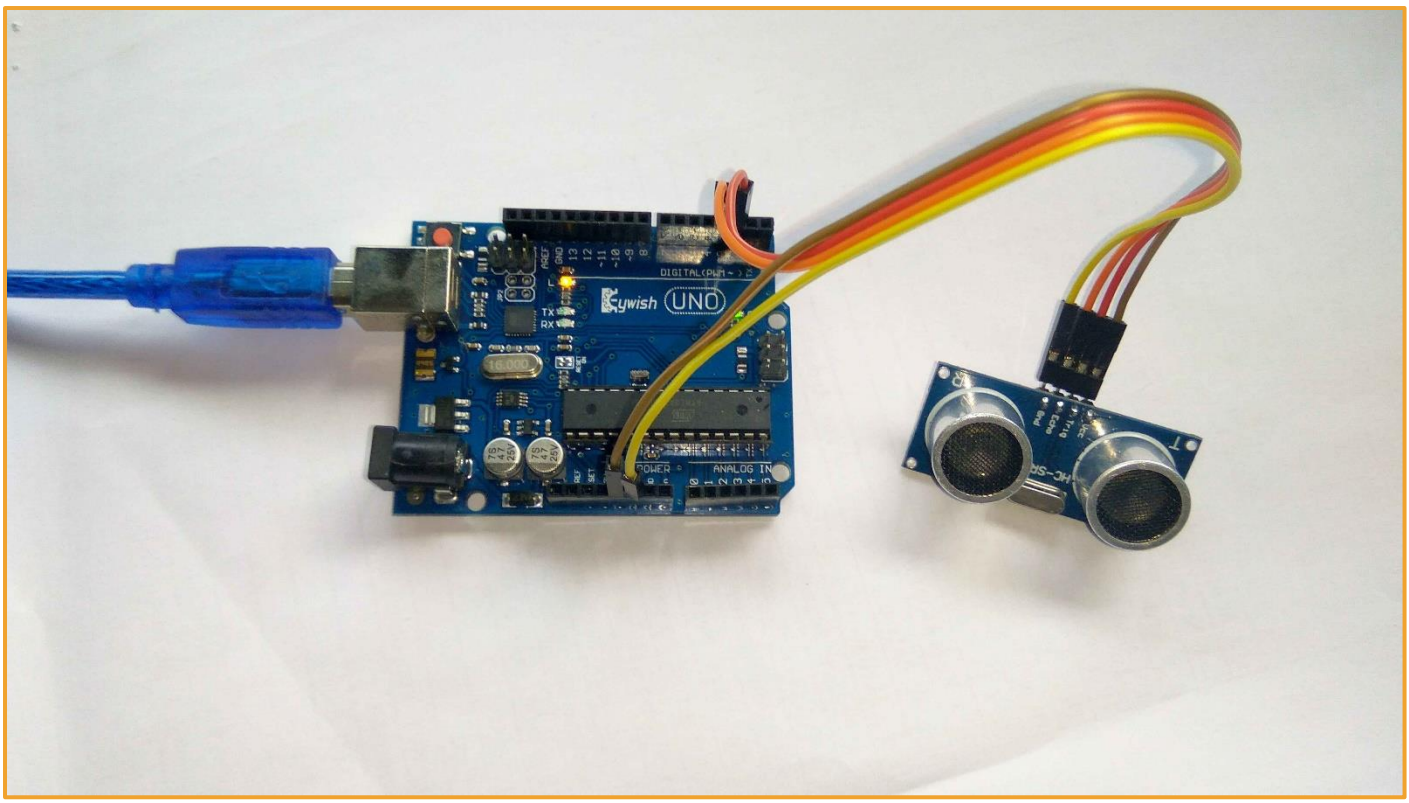
Arduino Uno	Ultrasonic
VCC	1Vcc)
2	2 (Trig)
3	3(Echo)
GND	4 (Gnd)



Code

```
const int TrigPin = 2;
const int EchoPin = 3;
float distance;
void setup() {
    Serial.begin(9600);
    pinMode(TrigPin, OUTPUT);
    pinMode(EchoPin, INPUT);
    Serial.println("Ultrasonic sensor:");
}
void loop() {
    digitalWrite(TrigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(TrigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(TrigPin, LOW);
    distance = pulseIn(EchoPin, HIGH) / 58.00;
    Serial.print("distance is :");
    Serial.print(distance);
    Serial.print("cm");
    Serial.println();
    delay(1000);
}
```

Experiment Result



COM27 (Arduino/Genuino Uno)

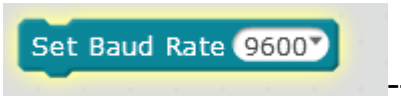
发送

```
Ultrasonic sensor:
distance is :119.64cm
distance is :8.57cm
distance is :4.40cm
distance is :114.98cm
distance is :124.98cm
distance is :120.93cm
distance is :243.98cm
distance is :7.48cm
```

自动滚屏 Show timestamp 换行符 9600 波特率 清空输出

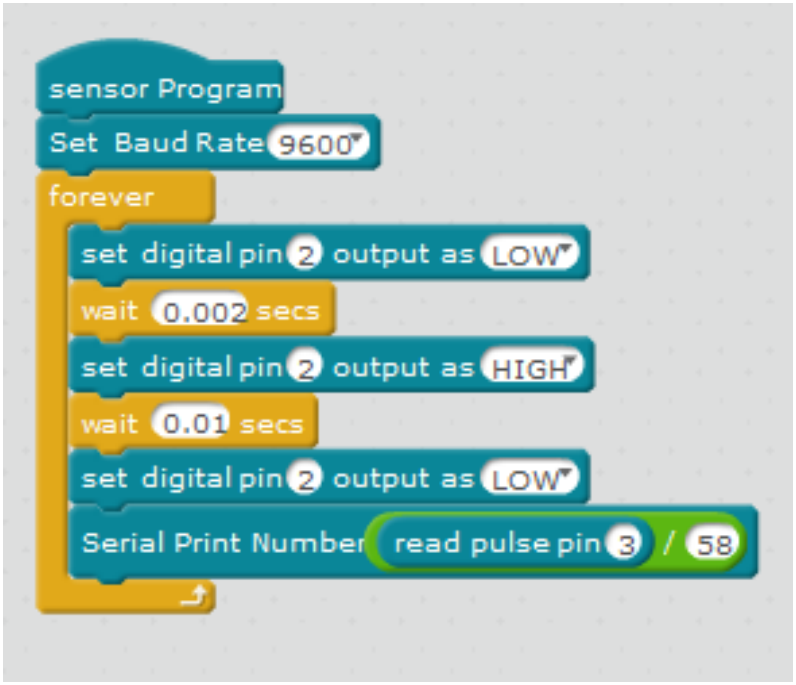
Mblock graphical programming program

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

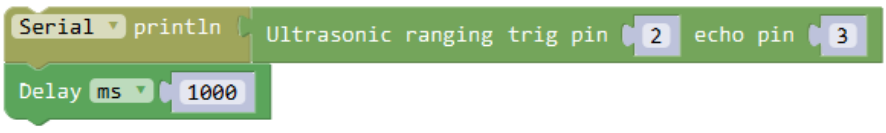
- 

-- Set baud rate
- 

-- Control digital pin output to high or low level

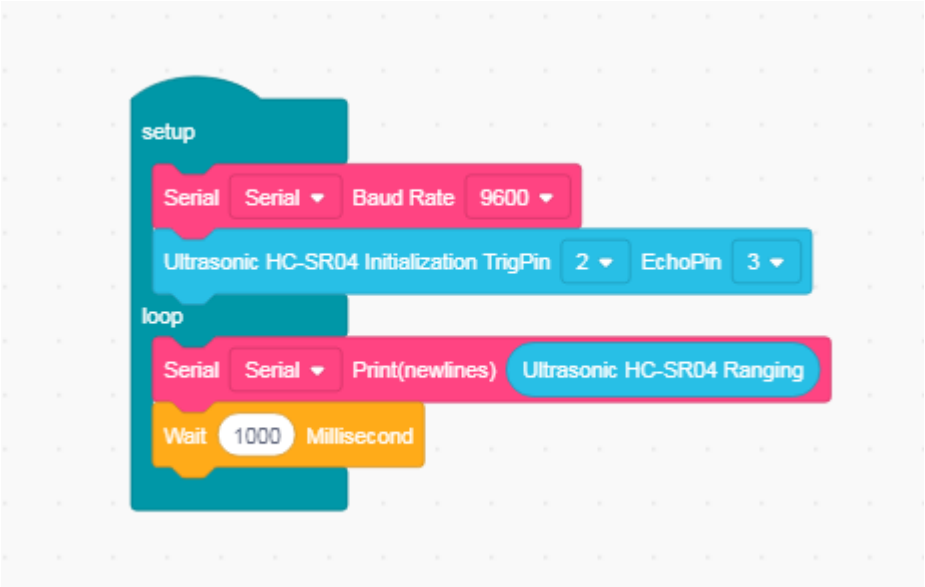


Mixly graphical programming



MagicBlock graphical programming program

MagicBlock prepared the ultrasonic ranging program as shown in the figure below:


setup
Serial Serial Baud Rate 9600
Ultrasonic HC-SR04 Initialization TrigPin 2 EchoPin 3
loop
Serial Serial Print(newlines) Ultrasonic HC-SR04 Ranging
Wait 1000 Millisecond