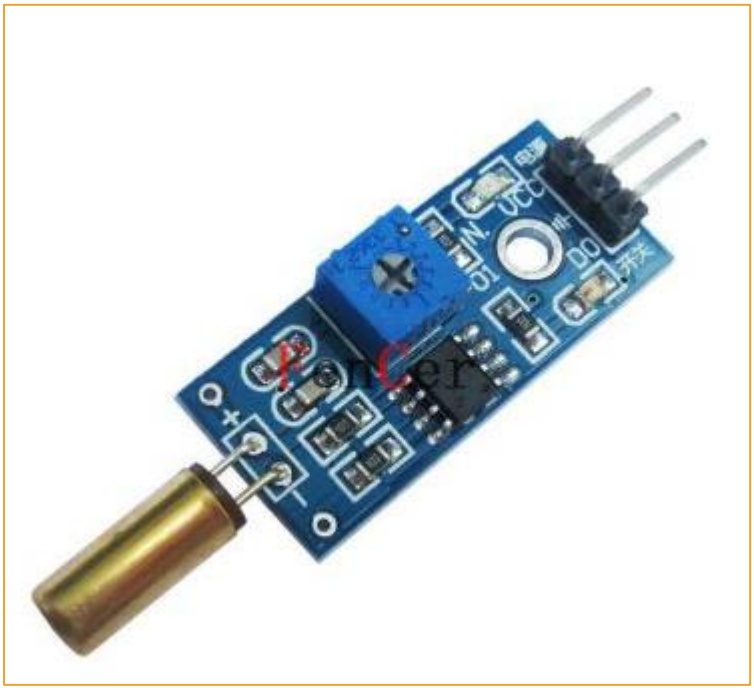
Introduction of Tilt switch module

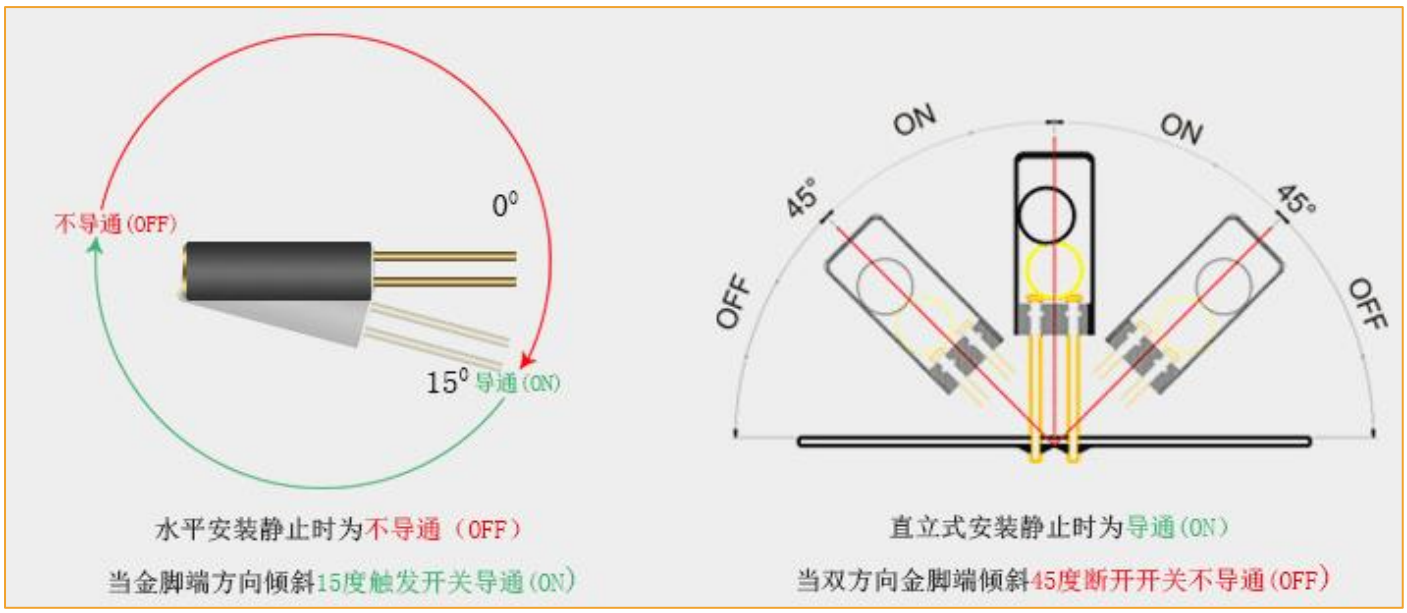
Tilting switch module is also known as the beaded switch, the steel ball switch, is actually a vibration switch. It has a different name, but it works the same way. The ball ball controls the connection or disconnection of the circuit by contacting or not contacting the metal plate. Simply put, like turning a light on or off, the light will go on if the switch touches the inner metal plate, and off when the switch leaves. Contact with a metal terminal or changing the path of light with beads in a switch will produce a conductive effect.

Tilting switches are widely used, such as: tire pressure monitoring system (TPMS), pedal lamp, digital photo frame rotation, flip camera, anti-theft system, etc. The common spherical switches on the market are sw-200d, sw-300da, sw-520d and so on. Is OFF in the static state. When it is subjected to an external touch force to achieve the appropriate vibration, or moving at the appropriate speed to generate the appropriate centrifugal force, the needle will instantly be in the ON state, changing the electrical characteristics. When the external force disappears, the electrical characteristics return to the closed state.

The tilt sensor module adopts the original tilt switch sw-460d of MEC, which has high sensitivity and is generally used to detect the change of object Angle. When the module has no tilt or the tilt Angle cannot reach the set threshold, the DO port outputs the high level. When the sensor's tilt Angle exceeds the set threshold, the module D0 outputs the low level. Digital output D0 can be directly connected with the single-chip microcomputer, through the single-chip microcomputer to detect high and low level, thus to detect the change in the object Angle; Can be applied to tire pressure monitoring system (TPMS), bicycle lamp, digital photo frame rotation, screen rotation, video lens flip, anti-theft system



tilt switch module figure



Internal principle of tilt switch

The experiment purpose

1 Understand the working principle of tilt switch module

2 The tilting switch module controlled by Arduino is used to realize the function of anti-theft alarm.

The component list

1 Keywish Arduino UNO R3 motherboard

2 Breadboard

3 USB cable

4 Tilt switch module * 1

5 LED module* 1

6 Active buzzer *1

7 jumper wires

The experimental principle

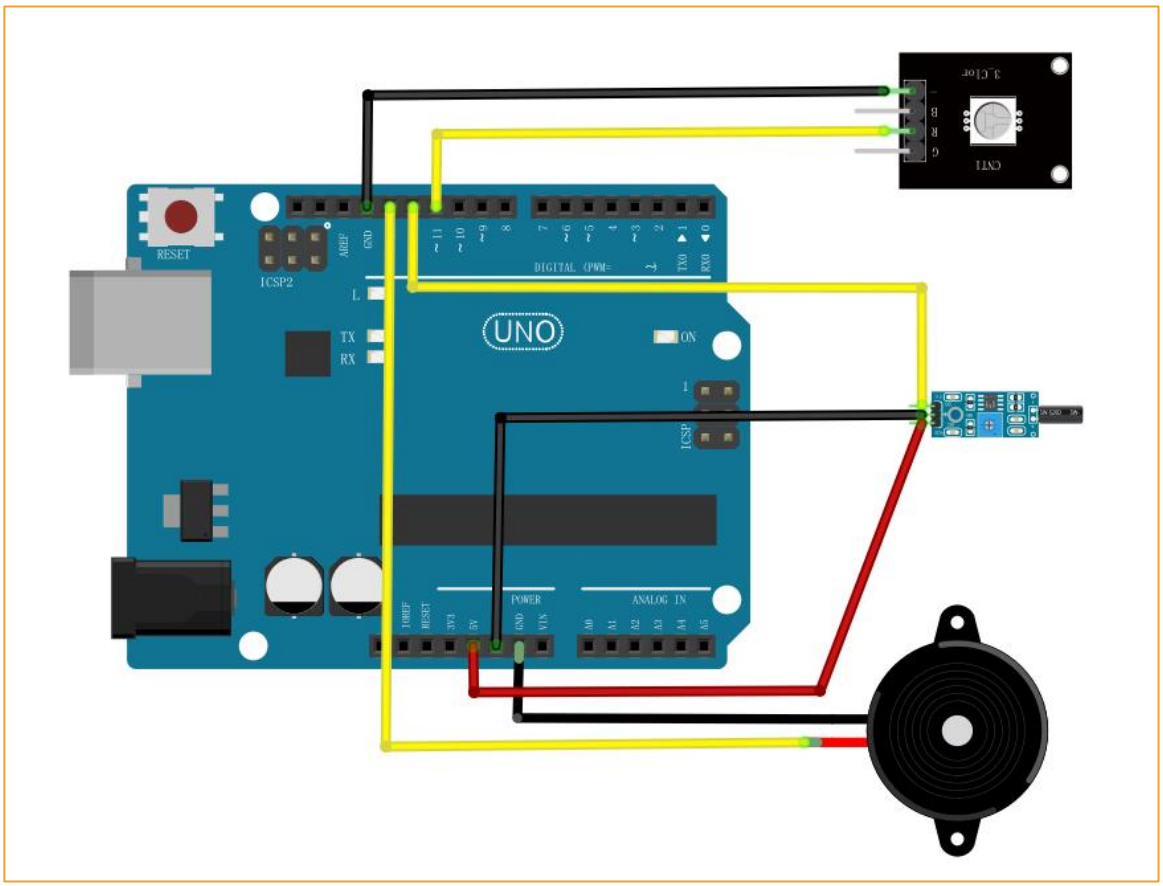
Using the working characteristics of the tilt switch module, when the circuit board is in the static state, the tilt switch module is in the state of disconnection. When an external force touches the circuit board, which causes the ball and wire in the tilt switch to close, the alarm will be triggered, the LED will be on, and the buzzer will sound. When back to rest, the LED goes off and the buzzer stops ringing..

Wiring the circuit

Arduino UNO	Active buzzer
13	+
GND	-

Arduino UNO	LED
12	+
GND	—

Arduino UNO	Vibration switch module
nkai12	DO
5V	VCC(+)
GND	GND(-)



Arduino ID Code

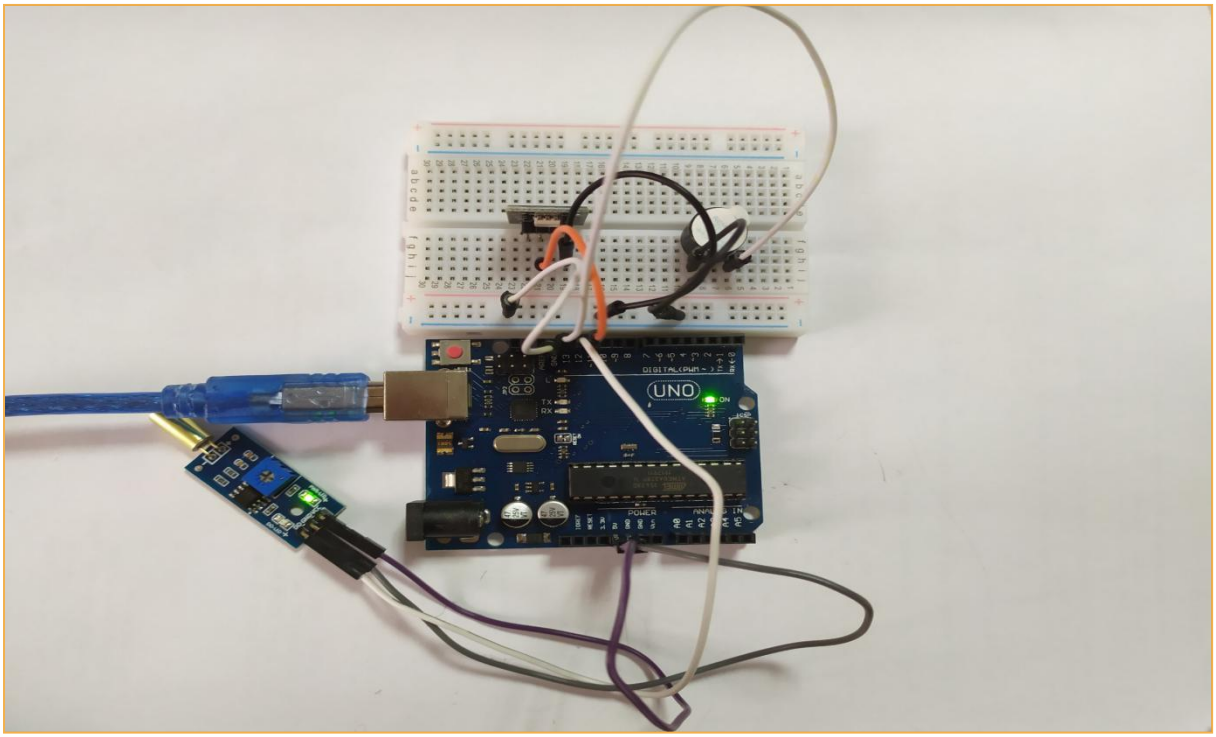
```
int Led=11;
int Buzzer_pin=13;
int buttonpin=12;
int val=0;
void setup()
{
  pinMode(Led,OUTPUT);
  pinMode(Buzzer_pin,OUTPUT);
  pinMode(buttonpin,INPUT);
}
void loop()
{
  val=digitalRead(buttonpin);
  if(val==0)
     {
       digitalWrite(Led,HIGH);
      digitalWrite(Buzzer_pin,HIGH);
      delay(3000);
```

```
int
int
int
void
{
  pin
  pin
  Ser
}
void
{
   va
  Ser
  if
  els
```

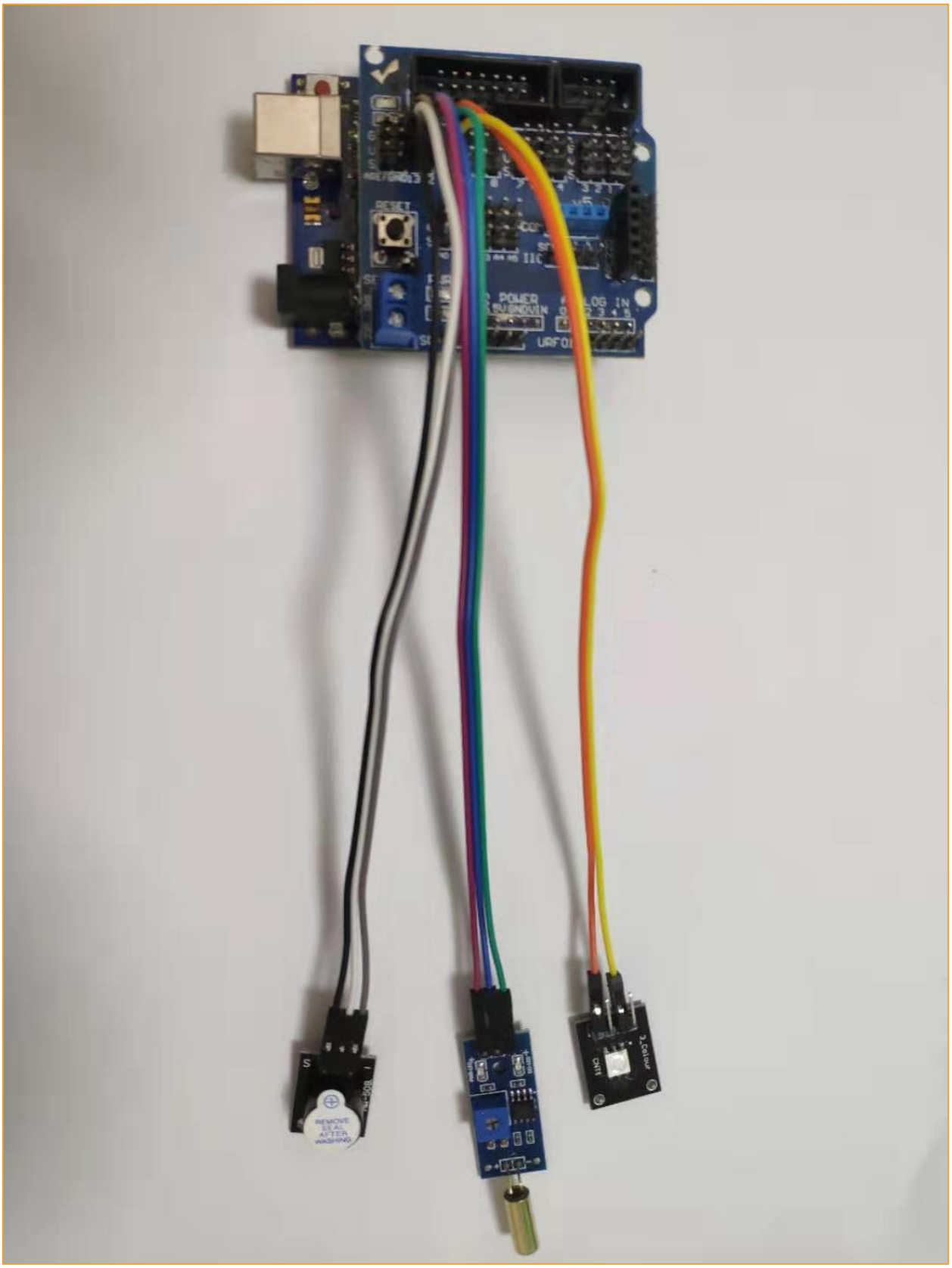
```
    }
  else
    {
      digitalWrite(Led,LOW);
      digitalWrite(Buzzer_pin,LOW);
    }
}
```

After burning the program, touch the tilting switch module slightly, and the alarm will be triggered. The LED light will be on, and the buzzer will sound.

Experiment Result



If you have a Sensor V5.0 expansion board in your kit, you can use the following wiring for more convenience.

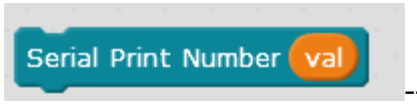


Mlock graphical programming program

The main blocks used in mBlock programming are:

--Set variable read values

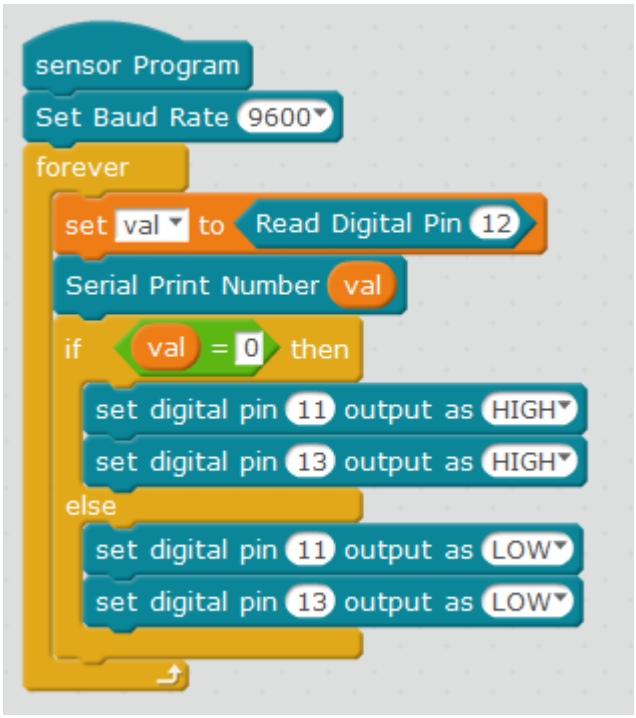
--Read the value of the numeric pin



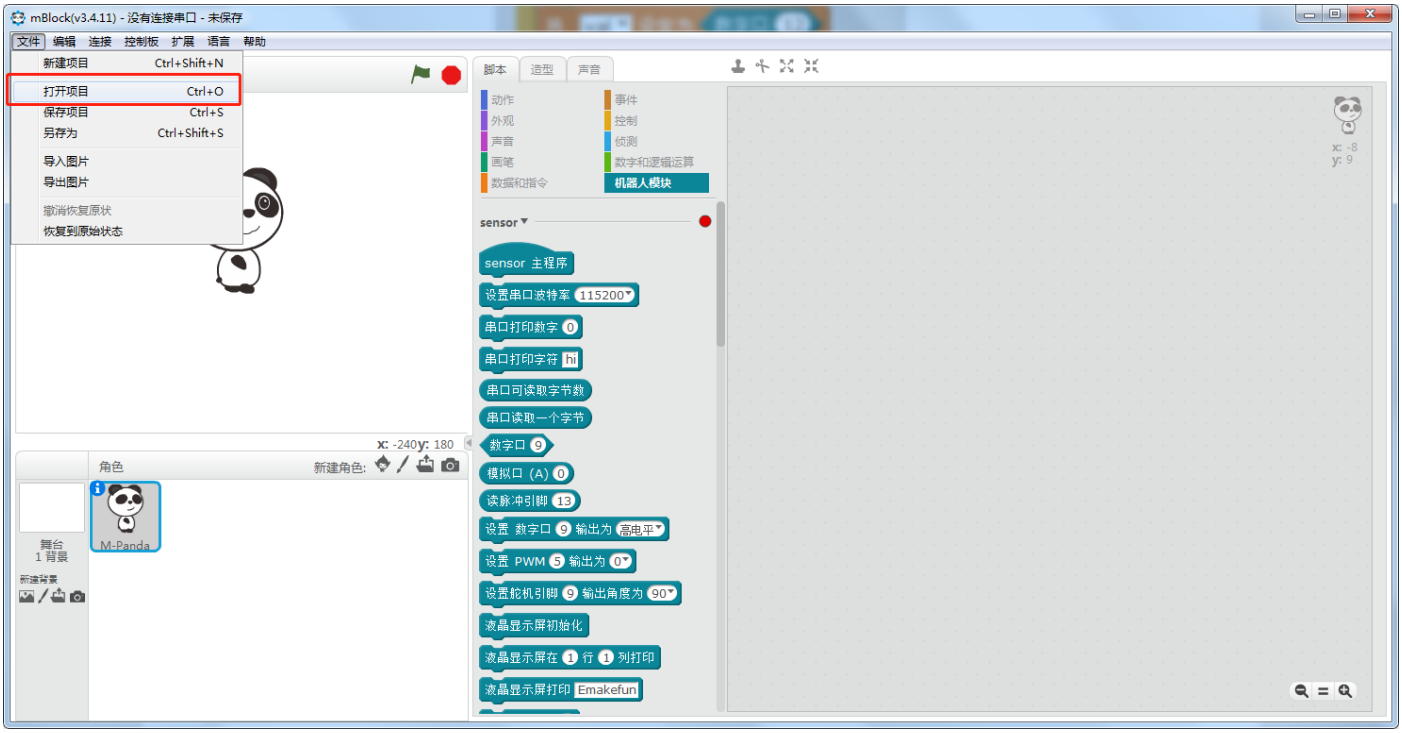
--Serial print variables

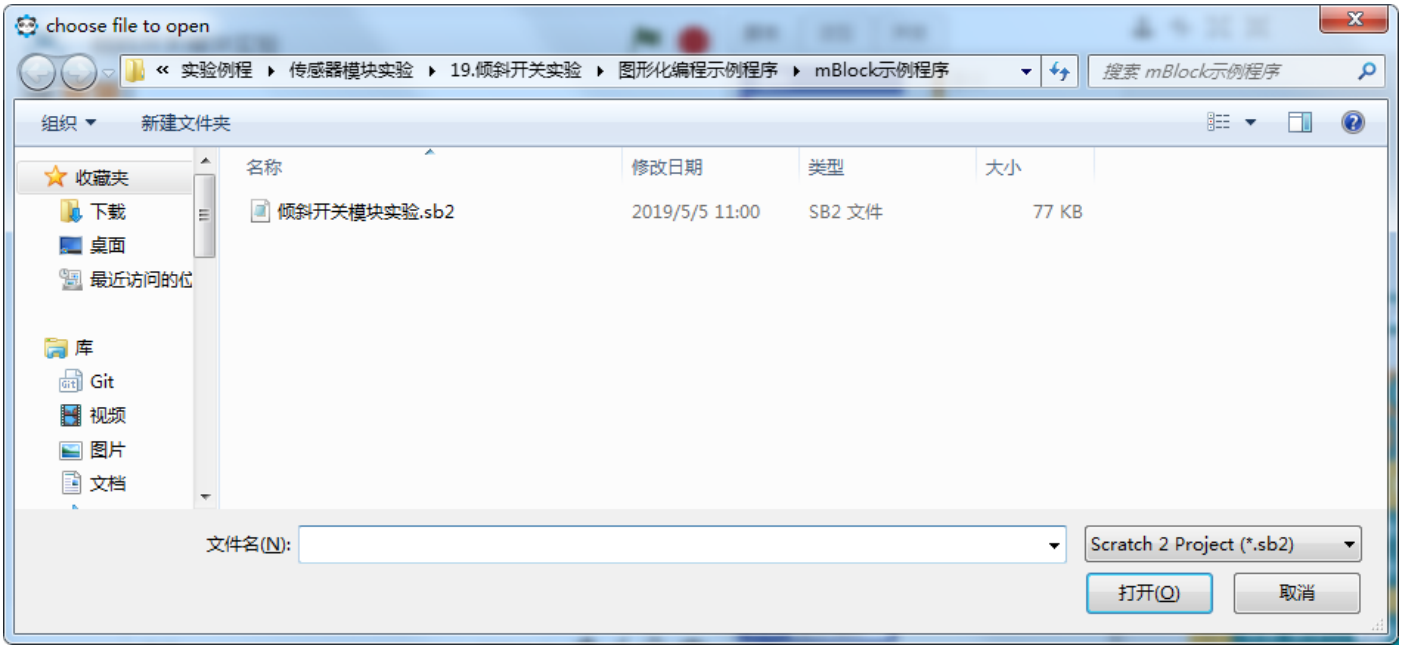
--Sets the state of the digital pin output

MBlock writes the tilting switch program as shown in the figure below:



You can also use mBlcock to directly open the written program file, which is a.sb2 file. Here are the steps to open it:


mBlock(v3.4.11) - 没有连接串口 - 未保存
文件 编辑 连接 控制板 扩展 语言 帮助
新建项目 Ctrl+Shift+N
打开项目 Ctrl+O
保存项目 Ctrl+S
另存为 Ctrl+Shift+S
导入图片
导出图片
撤消恢复原状
恢复到原始状态
脚本 造型 声音
动作 外观 声音 画笔 数据和指令
事件 控制 侦测 数字和逻辑运算 机器人模块
sensor
sensor 主程序
设置串口波特率 115200
串口打印数字 0
串口打印字符 hi
串口可读取字节数
串口读取一个字节
数字口 9
模拟口 (A) 0
读脉冲引脚 13
设置 数字口 9 输出为 高电平
设置 PWM 5 输出为 0
设置舵机引脚 9 输出角度为 90
液晶显示屏初始化
液晶显示屏在 1 行 1 列打印
液晶显示屏打印 Emakefun
角色
新建角色:
M-Panda
舞台
1 背景


choose file to open
« 实验例程 ▸ 传感器模块实验 ▸ 19.倾斜开关实验 ▸ 图形化编程示例程序 ▸ mBlock示例程序
搜索 mBlock示例程序
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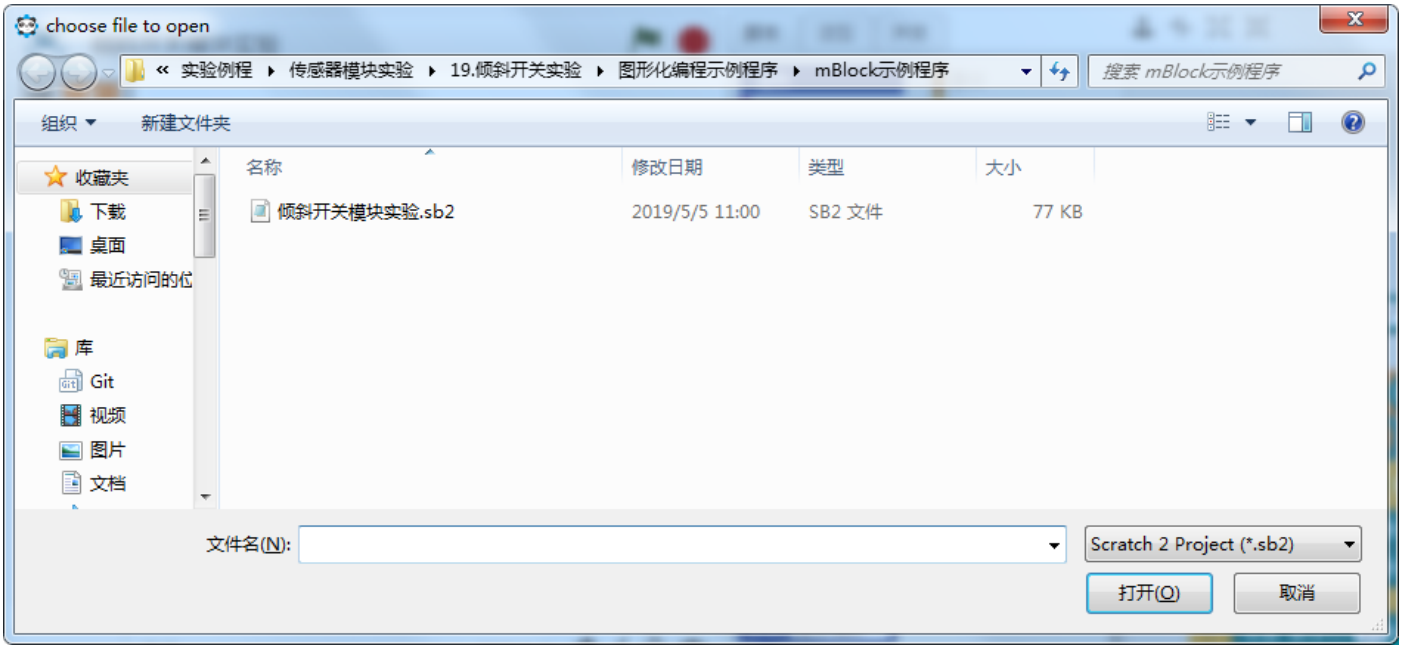
新建文件夹
收藏夹
下载
桌面
最近访问的位
库
Git
视频
图片
文档
名称
修改日期
类型
大小
倾斜开关模块实验.sb2
2019/5/5 11:00
SB2 文件
77 KB
文件名(N):
Scratch 2 Project (*.sb2)
打开(O)
取消


choose file to open
« 实验例程 ▸ 传感器模块实验 ▸ 19.倾斜开关实验 ▸ 图形化编程示例程序 ▸ mBlock示例程序
搜索 mBlock示例程序
组织
新建文件夹
收藏夹
下载
桌面
最近访问的位
库
Git
视频
图片
文档
名称
修改日期
类型
大小
倾斜开关模块实验.sb2
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SB2 文件
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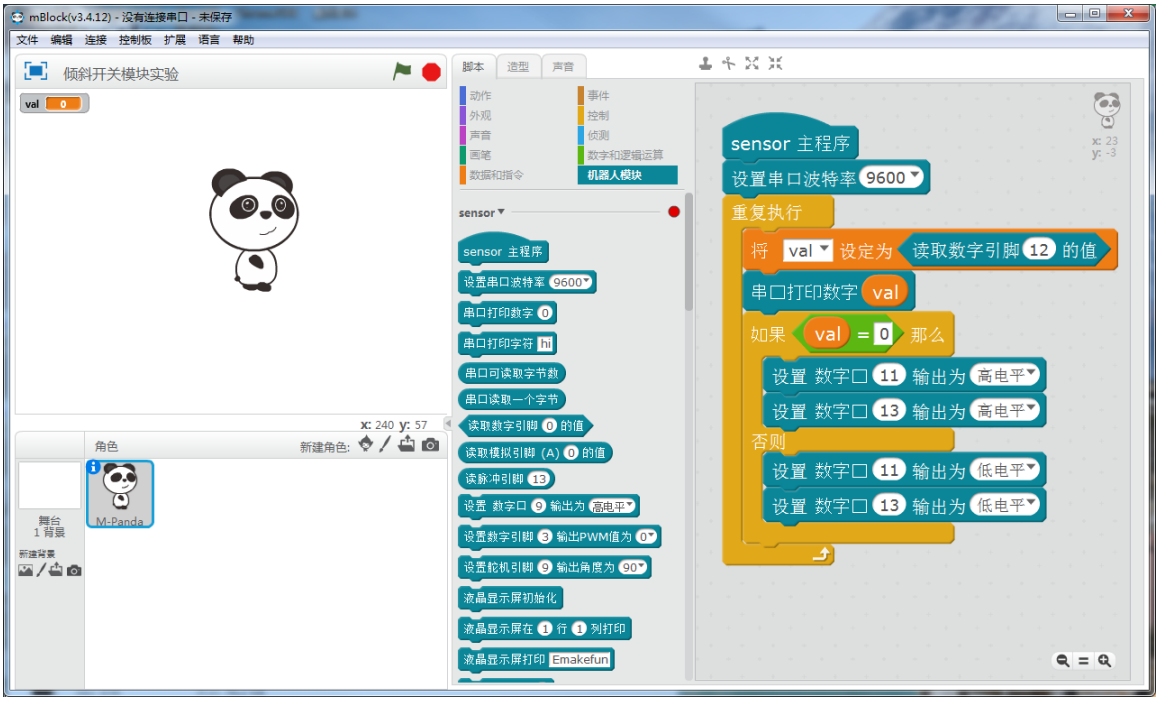
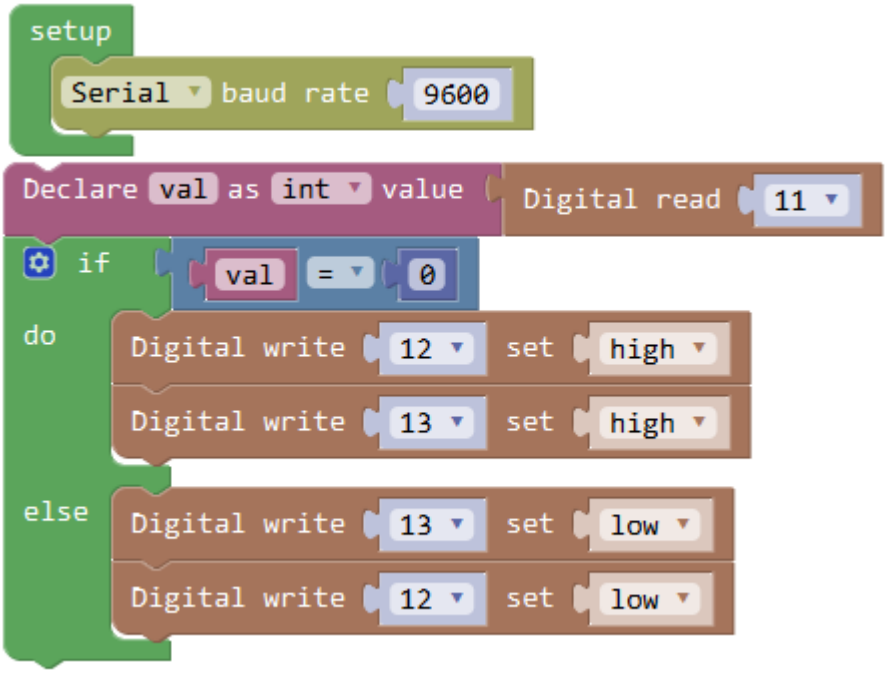
Scratch 2 Project (*.sb2)
打开(O)
取消


mBlock(v3.4.12) - 没有连接串口 - 未保存
文件 编辑 连接 控制板 扩展 语言 帮助
倾斜开关模块实验
脚本 造型 声音
机器人模块
sensor 主程序
设置串口波特率 9600
重复执行
将 val 设定为 读取数字引脚 12 的值
串口打印数字 val
如果 val = 0 那么
设置 数字口 11 输出为 高电平
设置 数字口 13 输出为 高电平
否则
设置 数字口 11 输出为 低电平
设置 数字口 13 输出为 低电平
角色
新建角色:
M-Panda
舞台
1 背景

Mixly graphical programming program



MagicBlock graphical programming program