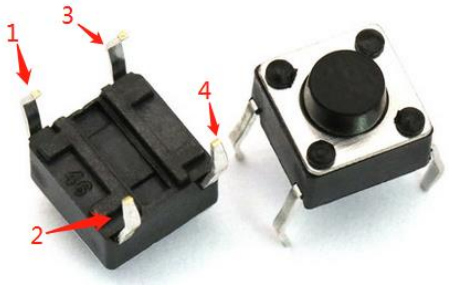
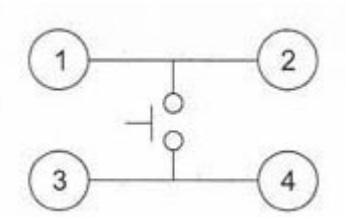
Button Experiment

Introduction

The meaning of digital I/O port is the INPUT and OUTPUT interface, during the former LED running lights experiment, we only use OUTPUT function of the GPIO. Let's try to use the INPUT function of I/O in the Arduino, namely , the function is to read output value from an external device in this experiment. We use a key and an LED lamp to complete an experiment of using INPUT and OUTPUT as a combination.





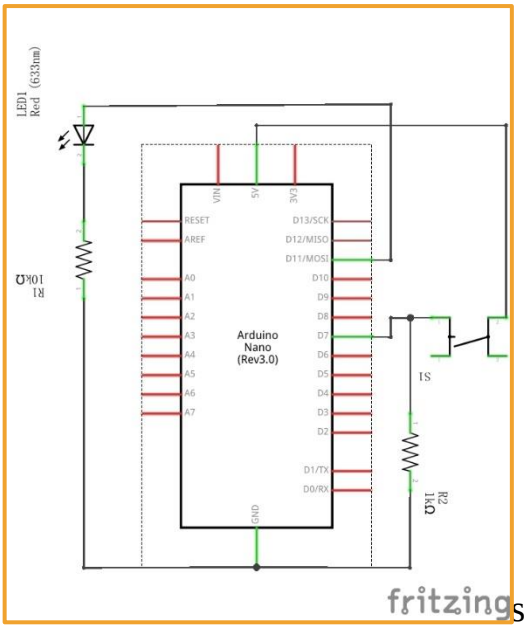
Experiment Purpose

We connect the button to number 7 interface, and the red light to number 11 interface (All 0-13 digital I/O interfaces in Arduino controller can be used to connect keys and lights, but try not to choose number 0 and 1 interfaces, because 0 and 1 are for interface function reuse, they are also used as a serial communication interface in addition to the function of I/O port. When downloading programs, the device is communicating with PC. so we should keep number 0 and 1 interfaces dangling. In order to avoid the trouble of plugging lines, we don't choose number 0 and 1 interfaces).

Component List

- Arduino Nano Mainboard
- Breadboard
- USB cable
- 1K Resistor * 1
- 10K Resistor * 1
- Button * 1
- LED * 1
- Several jumper wires

Schematic Diagram

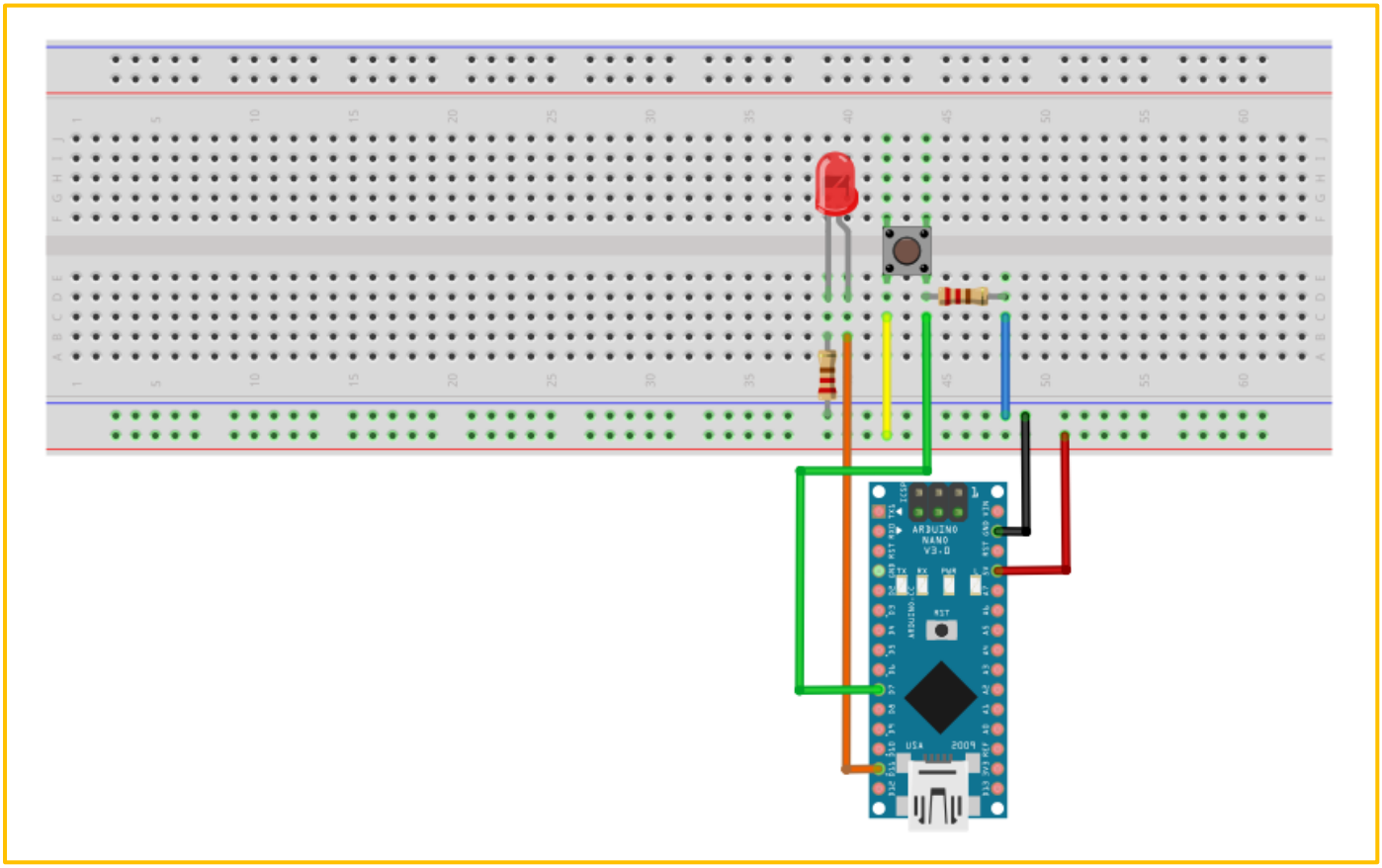


Wiring of Circuit

Arduino Nano	LED
11	+

Arduino Nano	Keypad
7	1

1K Resistor	LED -
10K Resistor	Keypad 2



Experiment Principle

By analyzing the circuit we can know, when pressing the button, number 7 interface is at high level, it leads the output of number 11 to high level, this can make the light on. When number 7 interface reads as low level, number 11 output stays at low level, now the light is off. The principle is the same as above.

Code

```
int led out = 11;          //GPIO 11  LED pin
int keypad pin = 7;        // GPIO 7 key pin
int value;
void setup()
{
   pinMode(led out,OUTPUT);          // init led pin output
   pinMode(keypad pin,INPUT);       // init key pin input
}
void loop()
{
   value= digitalRead(keypad pin); // read key pad pin vaule
    if( value == LOW )
    {
      digitalWrite(led_out,LOW);  // if key value is down  turn off LED
    }
    else
    {
      digitalWrite(led_out,HIGH); // if key value is down  turn on LED
    }
}
```

When the program is downloaded , the light with keys experiment is done. The principle of the experiment is very simple, widely used in all kinds of circuits and electric appliances. In our real life, it is also not difficult to find this in a variety of devices, such as everyone's cell phone, when pressing a random button, the backlight will be on, clicking on a elevator’s button, indicator lights on the elevator will light up, and so on.

Experiment Result