毛巍仑的开源硬件作业

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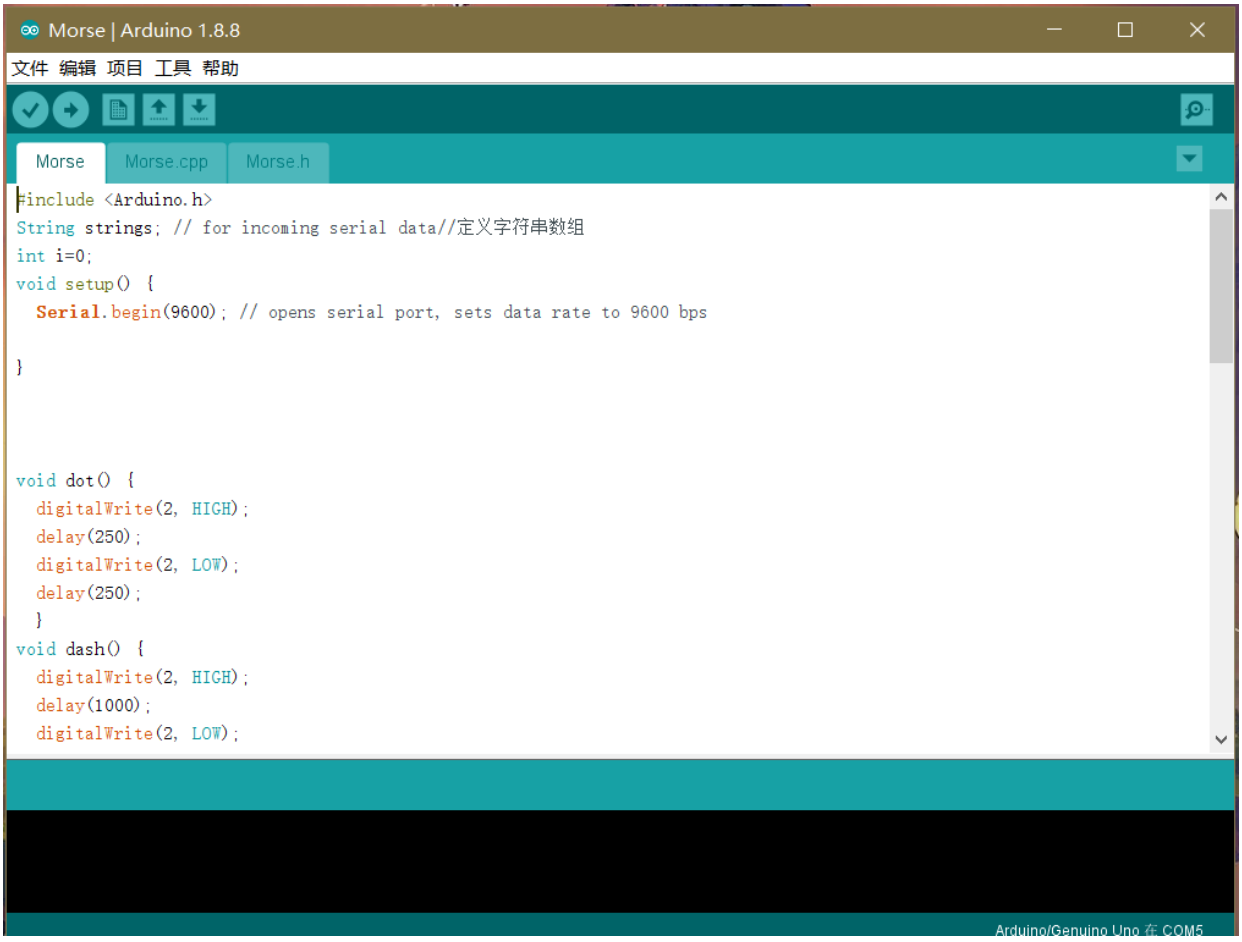
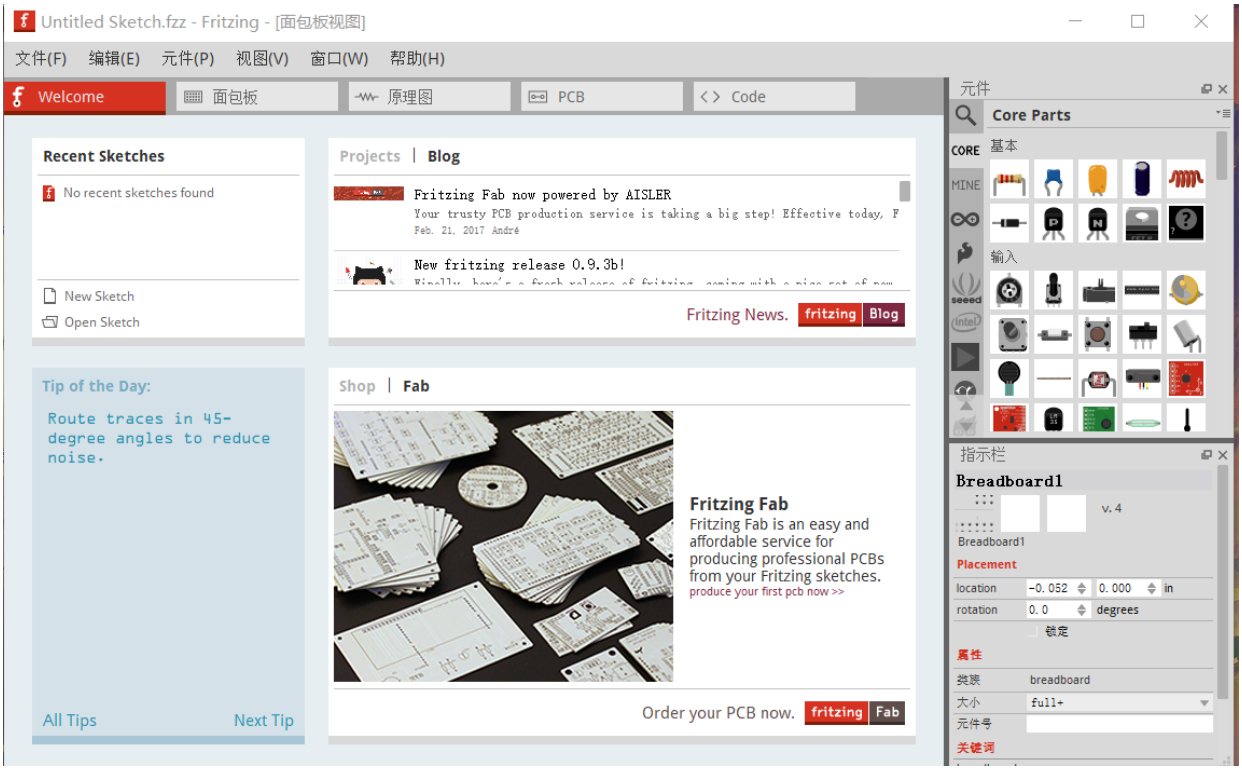
第一天

学习内容

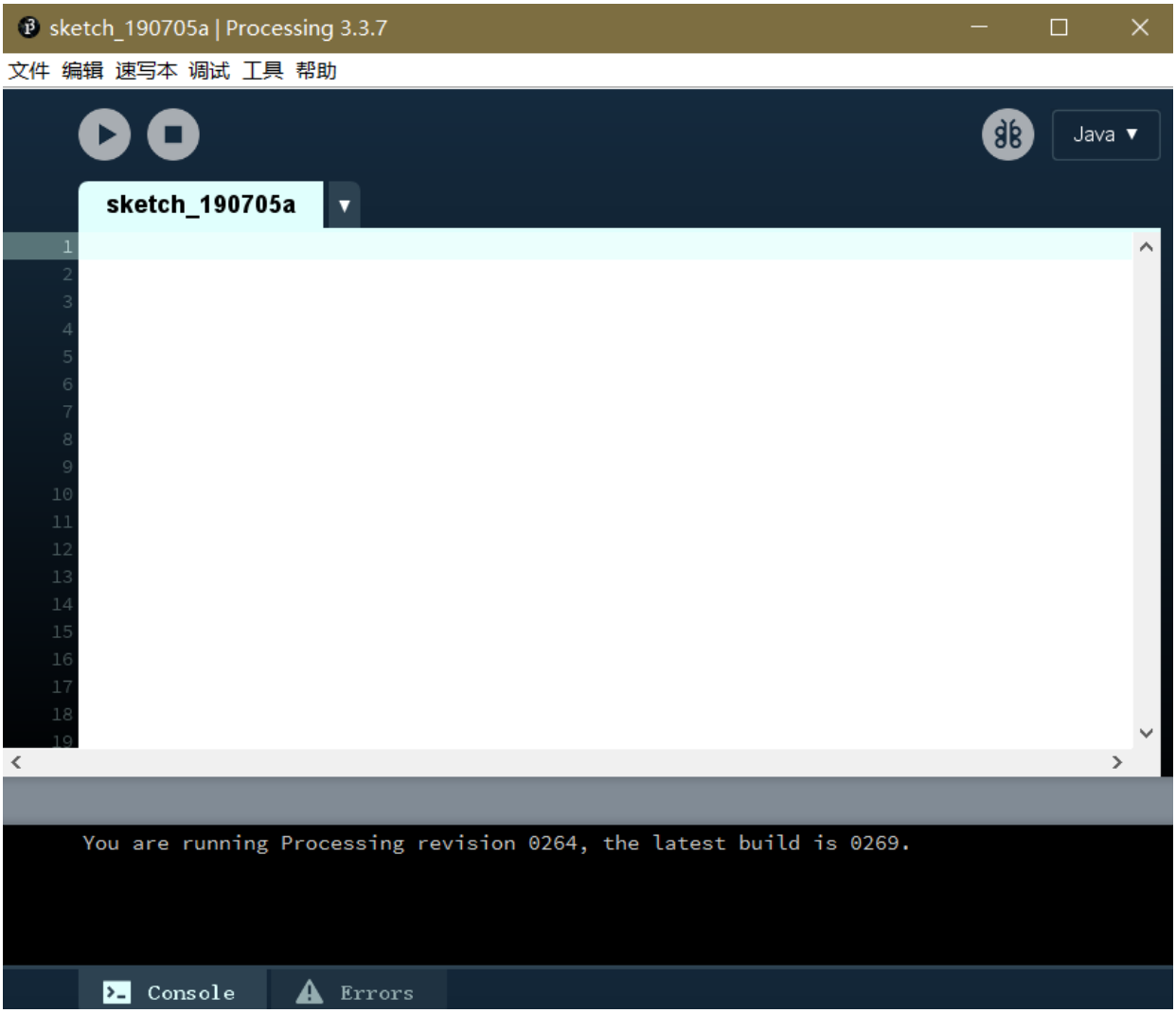
- 为什么要学习开源硬件
  因为之前做过STM 32的板子，来上这个课是想来查漏补缺，顺带巩固自己所学的知识与经验。
- 如何学习开源硬件
  就我之前的经验，在一个人的情况下，首先要大量查看资料，借助例程学习。然后在有一定的了解后不断借助板子实验，有问题就用板子验证自己的想法。久而久之，你就熟能生巧了。
- 三个软件
  Arduino



Fritzing



processing



- 几个常用的网站
  https://www.arduino.cc/

https://github.com/
https://www.tinkercad.com

第二天

Arduino编程

Morse.h

```
#ifndef Morse_h
#define Morse_h
#include “Arduino.h”
class Morse {
public:
Morse (int pin);
void dot();
void dash();
void c_space();
private:
int _pin; };
#endif
```

Morse.cpp

```
#include “Arduino.h”
#include “Morse.h”
Morse::Morse(int pin) {
pinMode(pin, OUTPUT);
_pin = pin;
}
void Morse::dot() {
digitalWrite(_pin, HIGH);
delay(250);
digitalWrite(_pin, LOW);
delay(250);
}
void Morse::dash() {
digitalWrite(_pin, HIGH);
delay(1000);
digitalWrite(_pin, LOW);
delay(250);
}
void Morse::c_space() {
digitalWrite(_pin, LOW);
delay(250*3);
}
```

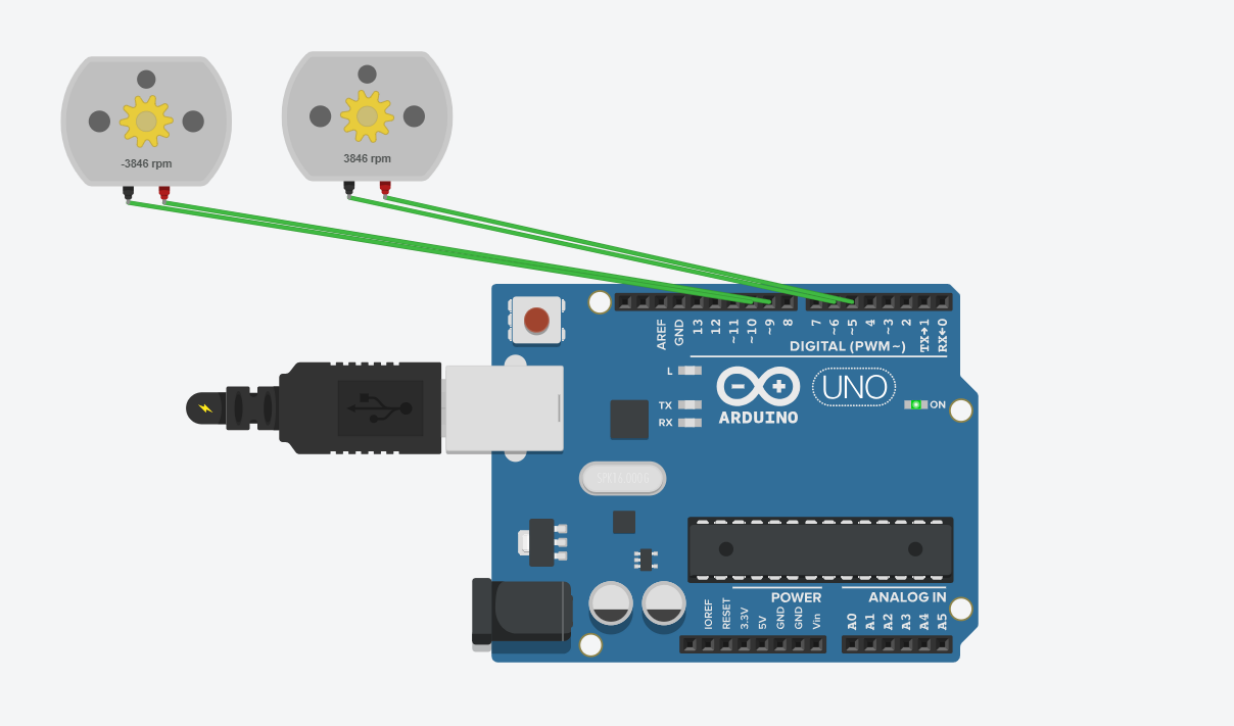
Morse.ino

```
#include <Morse.h>
Morse test(13);
String strings; // for incoming serial data//定义字符串数组
int i=0;
void setup() {
Serial.begin(9600); // opens serial port, sets data rate to 9600 bps
}
void loop()
{
// reply only when you receive data:
while(Serial.available() > 0)
{
strings += char(Serial.read());//读取字符串
}
for(i=0;i<sizeof(strings)-1;i++)//逐个将字符串里的字符转换成摩尔斯码
{
switch(strings[i])
{ case 'a':test.dot();test.dash();break;
case 'b':test.dash();test.dot();test.dot();test.dot();break;
case 'c':test.dash();test.dot();test.dash();test.dot();break;
case 'd':test.dash();test.dot();test.dot();break;
case 'e':test.dot();break;
case 'f':test.dot();test.dot();test.dash();test.dot();break;
case 'g':test.dash();test.dash();test.dot();break;
case 'h':test.dot();test.dot();test.dot();test.dot();break;
case 'i':test.dot();test.dot();break;
case 'j':test.dot();test.dash();test.dash();test.dash();break;
case 'k':test.dash();test.dot();test.dash();break;
case 'l':test.dot();test.dash();test.dot();test.dot();break;
case 'm':test.dash();test.dash();break;
case 'n':test.dash();test.dot();break;
case 'o':test.dash();test.dash();test.dash();test.dash();break;
case 'p':test.dot();test.dash();test.dash();test.dot();break;
case 'q':test.dash();test.dash();test.dot();test.dash();break;
case 'r':test.dot();test.dash();test.dot();break;
case 's':test.dot();test.dot();test.dot();break;
case 't':test.dash();break;
case 'u':test.dot();test.dot();test.dash();break;
case 'v':test.dot();test.dot();test.dot();test.dash();break;
case 'w':test.dot();test.dash();test.dash();break;
case 'x':test.dash();test.dot();test.dot();test.dash();break;
case 'y':test.dash();test.dot();test.dash();test.dash();break;
case 'z':test.dash();test.dash();test.dot();test.dot();break;
}
delay(1);
```

```
}
delay(1.5);
}
```

第三天

小车电路图：

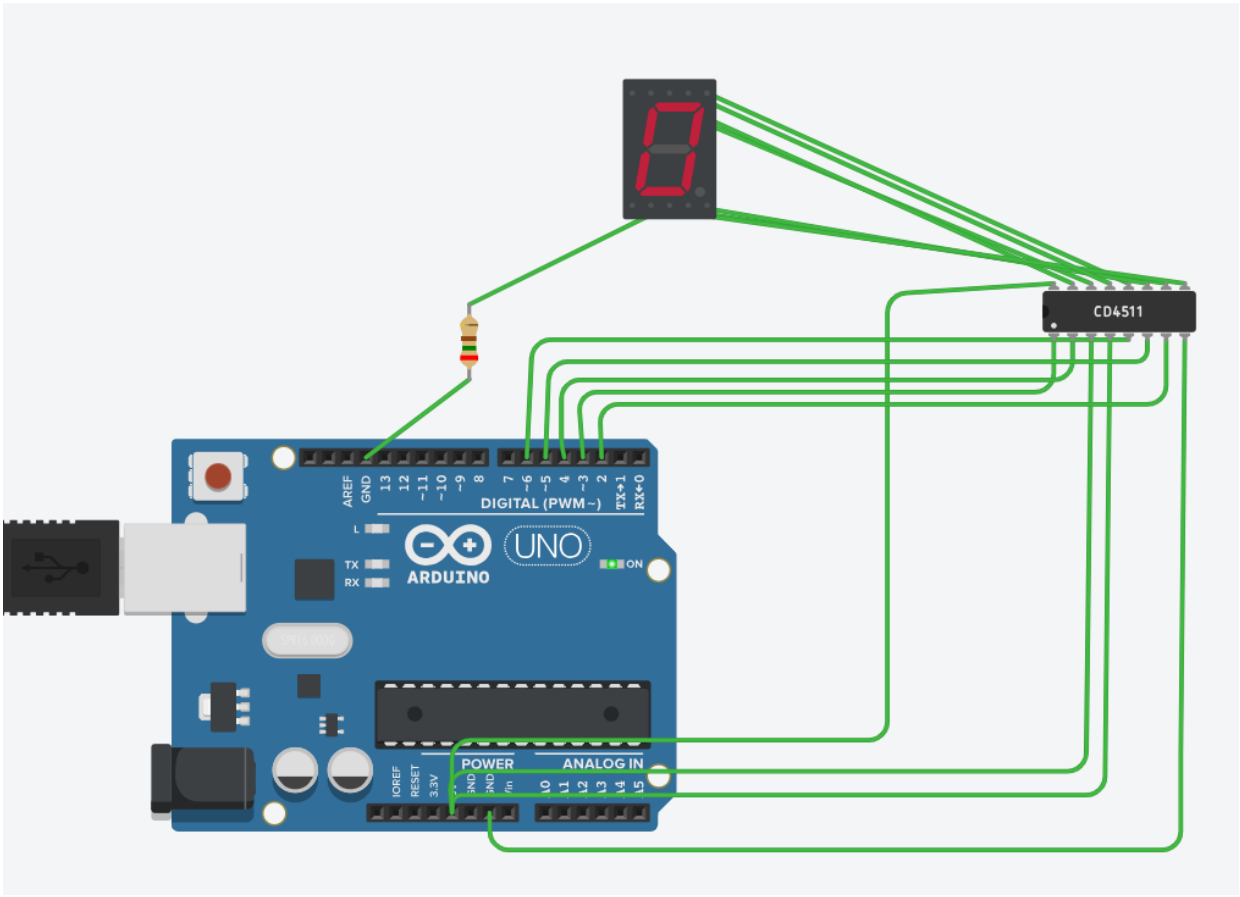


Car.ino

```
//f 前进 b后退 l左转 r右转 s停止

void setup()
{
Serial.begin(9600);
pinMode(5, OUTPUT);
pinMode(6, OUTPUT);
pinMode(9, OUTPUT);
pinMode(10, OUTPUT);
}
int income=0;
void loop()
{
if(Serial.available()>0)
{
income=Serial.read();
}
switch(income)
{
```

```
case ‘f’:forward();break;
case ‘b’:backward();break;
case ‘l’:left();break;
case ‘r’:right();break;
case ‘s’:stop();break;
default:break;

}
}
void forward()
{
digitalWrite(9,1);
digitalWrite(6,1);
digitalWrite(10,0);
digitalWrite(5,0);
}
void backward()
{
digitalWrite(10,HIGH);
digitalWrite(5,HIGH);
digitalWrite(9,LOW);
digitalWrite(6,LOW);
}
void left()
{
digitalWrite(9,LOW);
digitalWrite(6,LOW);
digitalWrite(10,HIGH);
digitalWrite(5,HIGH);

}
void right()
{
digitalWrite(9,HIGH);
digitalWrite(6,HIGH);
digitalWrite(10,LOW);
digitalWrite(5,LOW);

}
void stop()
{
digitalWrite(5,LOW);
digitalWrite(6,LOW);
digitalWrite(9,LOW);
digitalWrite(10,LOW);

}
```

七位数码管电路图



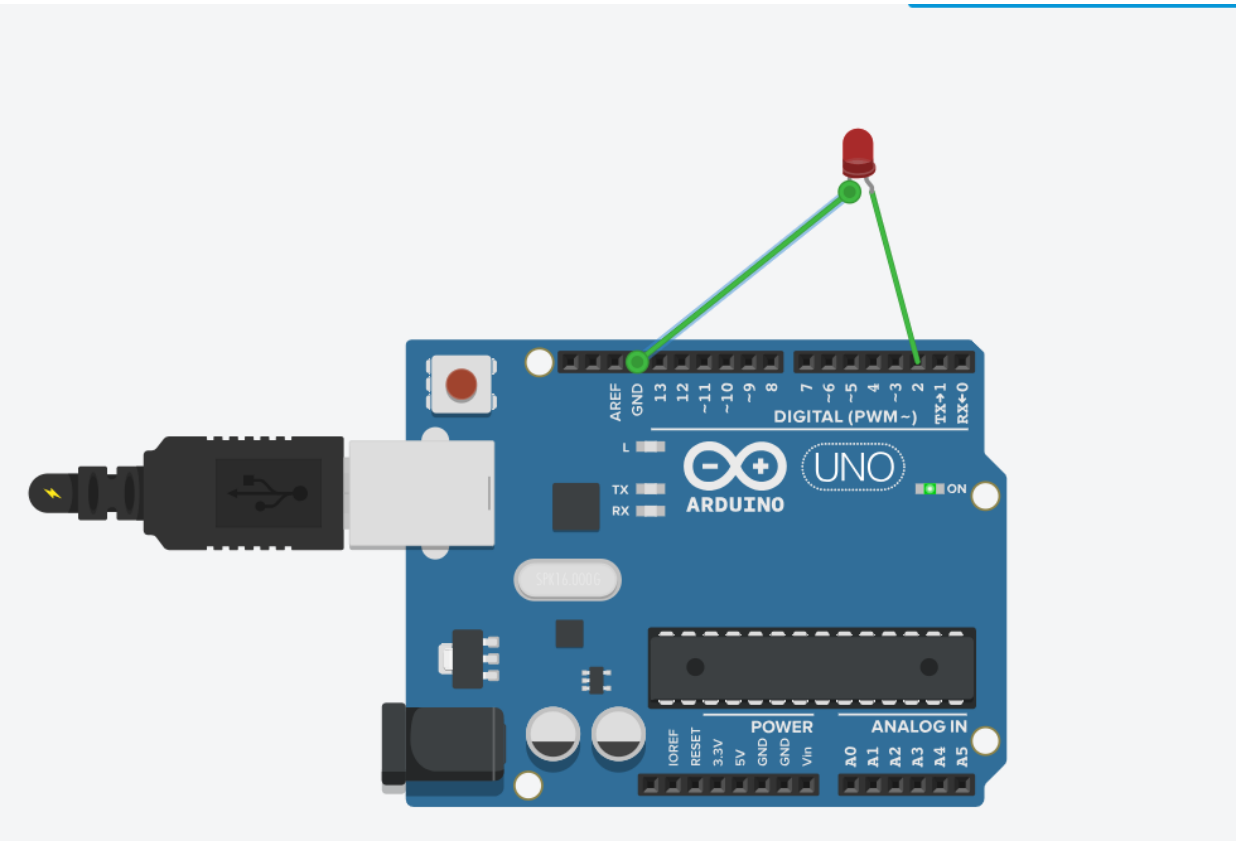
Led7.ino

```
//f 前进 b后退 l左转 r右转 s停止

void setup()
{
Serial.begin(9600);
pinMode(2, OUTPUT);
pinMode(3, OUTPUT);
pinMode(4, OUTPUT);
pinMode(5, OUTPUT);
pinMode(6, OUTPUT);

}

void loop()
{

digitalWrite(2,0);
digitalWrite(3,0);
digitalWrite(4,0);
digitalWrite(5,0);//四位输入管脚分配
digitalWrite(6,0);//锁存管脚分配

int income;
if(Serial.available()>0)
```

```
{
income=Serial.read()-‘0’;
if((income&1) == 1)
digitalWrite(2,1);//当用户输入1时，四位输入的最低位，也就是2号管脚置高，其他位为零
if((income>>1&1) == 1)
digitalWrite(3,1);//当用户输入2时，四位输入的最低位，也就是3号管脚置高，其他位为零
if((income>>2&1) == 1)
digitalWrite(4,1);//当用户输入4时，四位输入的最低位，也就是4号管脚置高，其他位为零
if((income>>3&1) == 1)
digitalWrite(5,1);//当用户输入8时，四位输入的最低位，也就是5号管脚置高，其他位为零
delay(1500);
}
}
```

第四天

字符串在thinkercad上转换为Morse码的电路图



代码如下：

```
#include <Arduino.h>
String strings; // for incoming serial data//定义字符串数组
int i=0;
void setup() {
Serial.begin(9600); // opens serial port, sets data rate to 9600 bps
}
void dot() {
```

```
digitalWrite(2, HIGH);
delay(250);
digitalWrite(2, LOW);
delay(250);
}
void dash() {
digitalWrite(2, HIGH);
delay(1000);
digitalWrite(2, LOW);
delay(250);
}
void c_space() {
digitalWrite(2, LOW);
delay(250*3);
} //定义2号管脚为摩尔斯码的输出管脚
void loop()
{
// reply only when you receive data:
while(Serial.available() > 0)
{
strings += char(Serial.read());//读取字符串
}
for(i=0;i<sizeof(strings)-1;i++)//逐个将字符串里的字符转换成摩尔斯码
{
switch(strings[i])
{ case ‘a’:dot();dash();break;
case ‘b’:dash();dot();dot();dot();break;
case ‘c’:dash();dot();dash();dot();break;
case ‘d’:dash();dot();dot();break;
case ‘e’:dot();break;
case ‘f’:dot();dot();dash();dot();break;
case ‘g’:dash();dash();dot();break;
case ‘h’:dot();dot();dot();dot();break;
case ‘i’:dot();dot();break;
case ‘j’:dot();dash();dash();dash();break;
case ‘k’:dash();dot();dash();break;
case ‘l’:dot();dash();dot();dot();break;
case ‘m’:dash();dash();break;
case ‘n’:dash();dot();break;
case ‘o’:dash();dash();dash();dash();break;
case ‘p’:dot();dash();dash();dot();break;
case ‘q’:dash();dash();dot();dash();break;
case ‘r’:dot();dash();dot();break;
case ‘s’:dot();dot();dot();break;
case ‘t’:dash();break;
case ‘u’:dot();dot();dash();break;
case ‘v’:dot();dot();dot();dash();break;
```

```
case ‘w’:dot();dash();dash();break;
case ‘x’:dash();dot();dot();dash();break;
case ‘y’:dash();dot();dash();dash();break;
case ‘z’:dash();dash();dot();dot();break;
}
delay(1);
}
delay(1.5);
}
```