

# 开源硬件实战课程

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## 第一天入门介绍

- 为什么要学习开源硬件
- 如何学习开源硬件
- 几个常用软件

## 第二天软件操作

- Arduino安装
- Arduino文档
- Arduino基本操作
- Arduino类库操作

### mose

```
1  #include <Morse.h>
2  Morse morse(13);
3  void setup() {
4      pinMode(13,OUTPUT);
5      Serial.begin(9600);
6  }
7  void loop()
8  {
9      while(Serial.available()> 0)
10     {
11         char x = Serial.read();
12         switch(x)
13         {
14             case 'a':A();break;
15             case 'b':B();break;
16             case 'c':C();break;
17             case 'd':D();break;
18             case 'e':E();break;
19             case 'f':f();break;
20             case 'g':G();break;
21             case 'h':H();break;
22             case 'i':I();break;
```

```
23     case 'j':J();break;
24     case 'k':K();break;
25     case 'l':L();break;
26     case 'm':M();break;
27     case 'n':N();break;
28     case 'o':O();break;
29     case 'p':P();break;
30     case 'q':Q();break;
31     case 'r':R();break;
32     case 's':S();break;
33     case 't':T();break;
34     case 'u':U();break;
35     case 'v':V();break;
36     case 'w':W();break;
37     case 'x':X();break;
38     case 'y':Y();break;
39     case 'z':Z();break;
40     case ' ':
41     case '\n':space();break;
42
43     }
44 }
45 }
46 void space()
47 {
48     digitalWrite(13, LOW);
49     delay(2000);
50 }
51 void A()
52 {
53     morse.dot();
54     morse.dash();
55 }
56 void B()
57 {
58     morse.dash();
59     morse.dot();
60     morse.dot();
61     morse.dot();
62 }
63 void C()
64 {
65     morse.dash();
66     morse.dot();
67     morse.dash();
68     morse.dot();
69 }
70 void D()
71 {
72     morse.dash();
73     morse.dot();
74     morse.dot();
75 }
```

```
76 void E()
77 {
78     morse.dot();
79 }
80 void f()
81 {
82     morse.dot();
83     morse.dot();
84     morse.dash();
85     morse.dot();
86 }
87 void G()
88 {
89     morse.dash();
90     morse.dash();
91     morse.dot();
92 }
93 void H()
94 {
95     morse.dot();
96     morse.dot();
97     morse.dot();
98     morse.dot();
99 }
100 void I()
101 {
102     morse.dot();
103     morse.dot();
104 }
105 void J()
106 {
107     morse.dot();
108     morse.dash();
109     morse.dash();
110     morse.dash();
111 }
112 void K()
113 {
114     morse.dash();
115     morse.dot();
116     morse.dash();
117 }
118 void L()
119 {
120     morse.dot();
121     morse.dash();
122     morse.dot();
123     morse.dot();
124 }
125 void M()
126 {
127     morse.dash();
128     morse.dash();
```

```
129 }
130 void N()
131 {
132     morse.dash();
133     morse.dot();
134 }
135 void O()
136 {
137     morse.dash();
138     morse.dash();
139     morse.dash();
140 }
141 void P()
142 {
143     morse.dot();
144     morse.dash();
145     morse.dash();
146     morse.dot();
147 }
148 void Q()
149 {
150     morse.dash();
151     morse.dash();
152     morse.dot();
153     morse.dash();
154 }
155 void R()
156 {
157     morse.dot();
158     morse.dash();
159     morse.dot();
160 }
161 void S()
162 {
163     morse.dot();
164     morse.dot();
165     morse.dot();
166 }
167 void T()
168 {
169     morse.dash();
170 }
171 void U()
172 {
173     morse.dot();
174     morse.dot();
175     morse.dash();
176 }
177 void V()
178 {
179     morse.dot();
180     morse.dot();
181     morse.dot();
```

```
182     morse.dash();
183 }
184 void w()
185 {
186     morse.dot();
187     morse.dash();
188     morse.dash();
189 }
190 void x()
191 {
192     morse.dash();
193     morse.dot();
194     morse.dot();
195     morse.dash();
196 }
197 void y()
198 {
199     morse.dash();
200     morse.dot();
201     morse.dash();
202     morse.dash();
203 }
204 void z()
205 {
206     morse.dash();
207     morse.dash();
208     morse.dot();
209     morse.dot();
210 }
211
```

## mose.h

```
1  #ifndef Morse_h
2  #define Morse_h
3  #include "Arduino.h"
4  class Morse
5  {
6  public:
7      Morse(int pin);
8      void dot();
9      void dash();
10 private:
11     int _pin;
12 };
13 #endif
```

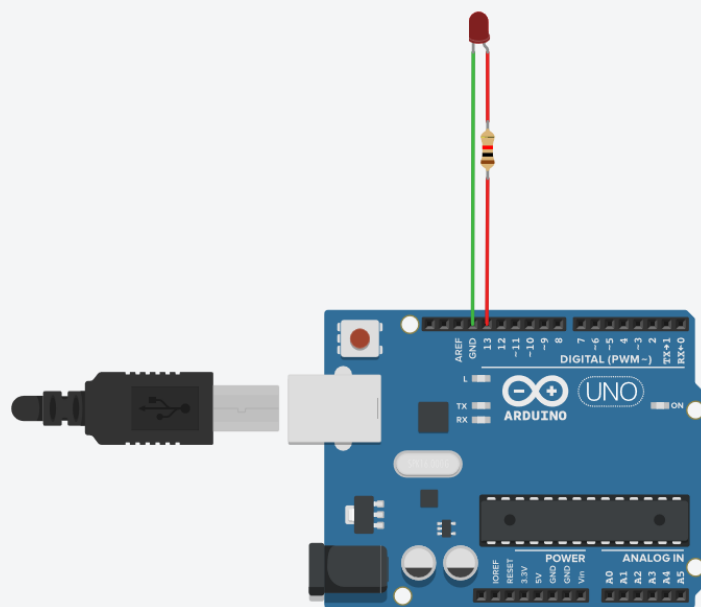
## mose.cpp

```
1  #include "Arduino.h"
```

```

2  #include "Morse.h"
3
4  Morse::Morse(int pin)
5  {
6      pinMode(pin, OUTPUT);
7      _pin = pin;
8  }
9
10 void Morse::dot()
11 {
12     digitalWrite(_pin, HIGH);
13     delay(250);
14     digitalWrite(_pin, LOW);
15     delay(250);
16 }
17
18 void Morse::dash()
19 {
20     digitalWrite(_pin, HIGH);
21     delay(1000);
22     digitalWrite(_pin, LOW);
23     delay(250);
24 }
25

```



## 第三天元器件及电路图

- 使用在线模拟网站

- 小车电路及代码
- 7位译码器使用
- CD4511IC使用

## 小车代码

```
1 void setup()
2 {
3   pinMode(5,OUTPUT);
4   pinMode(6,OUTPUT);
5   pinMode(9,OUTPUT);
6   pinMode(10,OUTPUT);
7   Serial.begin(9600);
8 }
9 int income=0;
10 void loop()
11 {
12   if(Serial.available()>0)
13   {
14     income=Serial.read();
15     switch(income)
16     {
17       case 'f':
18         forward();
19         break;
20       case 'b':
21         backward();
22         break;
23       case 'l':
24         left();
25         break;
26       case 'r':
27         right();
28         break;
29       case 's':
30         stop();
31         break;
32       default:
33         break;
34     }
35   }
36 }
37
38 void forward()
39 {
40   digitalWrite(5,HIGH);
41   digitalWrite(6,LOW);
42   digitalWrite(9,HIGH);
43   digitalWrite(10,LOW);
44   while(1)
45   {
46     digitalWrite(8, HIGH);
```

```
47     delay(250);
48     digitalWrite(8, LOW);
49     delay(250);
50 }
51 }
52 void backward()
53 {
54     digitalWrite(5,LOW);
55     digitalWrite(6,HIGH);
56     digitalWrite(9,LOW);
57     digitalWrite(10,HIGH);
58     while(1)
59     {
60         digitalWrite(2, HIGH);
61         delay(250);
62         digitalWrite(2, LOW);
63         delay(250);
64     }
65 }
66 void right()
67 {
68     digitalWrite(5,HIGH);
69     digitalWrite(6,LOW);
70     digitalWrite(9,LOW);
71     digitalWrite(10,HIGH);
72     while(1)
73     {
74         digitalWrite(3, HIGH);
75         delay(250);
76         digitalWrite(3, LOW);
77         delay(250);
78     }
79 }
80 void left()
81 {
82     digitalWrite(5,LOW);
83     digitalWrite(6,HIGH);
84     digitalWrite(9,HIGH);
85     digitalWrite(10,LOW);
86     while(1)
87     {
88         digitalWrite(4, HIGH);
89         delay(250);
90         digitalWrite(4, LOW);
91         delay(250);
92     }
93 }
94 void stop()
95 {
96     digitalWrite(5,LOW);
97     digitalWrite(6,LOW);
98     digitalWrite(9,LOW);
99     digitalWrite(10,LOW);
```



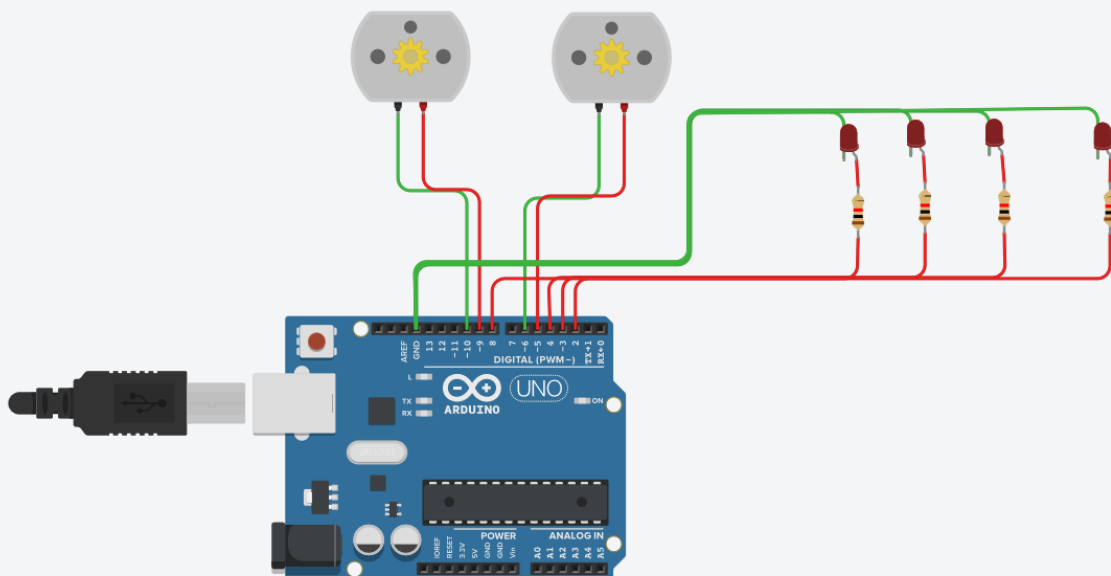
## 小车代码2

```
1 void setup()
2 {
3     pinMode(5,OUTPUT);
4     pinMode(6,OUTPUT);
5     pinMode(9,OUTPUT);
6     pinMode(10,OUTPUT);
7     Serial.begin(9600);
8 }
9 int income=0;
10 void loop()
11 {
12     if(Serial.available()>0)
13     {
14         income=Serial.read();
15         switch(income)
16         {
17             case 'f':
18                 forward();
19                 break;
20             case 'b':
21                 backward();
22                 break;
23             case 'l':
24                 left();
25                 break;
26             case 'r':
27                 right();
28                 break;
29             case 's':
30                 stop();
31                 break;
32             default:
33                 break;
34         }
35     }
36 }
37
38 void forward()
39 {
40     digitalWrite(5,HIGH);
41     digitalWrite(6,LOW);
42     digitalWrite(9,HIGH);
43     digitalWrite(10,LOW);
44     digitalWrite(8, HIGH);
45
46 }
47 void backward()
48 {
49     digitalWrite(5,LOW);
50     digitalWrite(6,HIGH);
51     digitalWrite(9,LOW);
52     digitalWrite(10,HIGH);
53     digitalWrite(2, HIGH);
```

```

54
55 }
56 void right()
57 {
58     digitalWrite(5,HIGH);
59     digitalWrite(6,LOW);
60     digitalWrite(9,LOW);
61     digitalWrite(10,HIGH);
62     digitalWrite(3, HIGH);
63
64 }
65 void left()
66 {
67     digitalWrite(5,LOW);
68     digitalWrite(6,HIGH);
69     digitalWrite(9,HIGH);
70     digitalWrite(10,LOW);
71     digitalWrite(4, HIGH);
72
73 }
74 void stop()
75 {
76     digitalWrite(5,LOW);
77     digitalWrite(6,LOW);
78     digitalWrite(9,LOW);
79     digitalWrite(10,LOW);
80 }

```



```
1 void setup()
2 {
3     pinMode(2,OUTPUT);
4     pinMode(3,OUTPUT);
5     pinMode(4,OUTPUT);
6     pinMode(5,OUTPUT);
7     Serial.begin(9600);
8 }
9 void loop()
10 {
11     if(Serial.available()> 0)
12     {
13         int data = Serial.read()-'0';
14         switch(data)
15         {
16             case 0:a();break;
17             case 1:b();break;
18             case 2:c();break;
19             case 3:d();break;
20             case 4:e();break;
21             case 5:f();break;
22             case 6:g();break;
23             case 7:h();break;
24             case 8:i();break;
25             case 9:j();break;
26
27         }
28     }
29 }
30
31
32 }
33
34 void a()
35 {
36     digitalWrite(2,LOW);
37     digitalWrite(3,LOW);
38     digitalWrite(4,LOW);
39     digitalWrite(5,LOW);
40
41 }
42 void b()
43 {
44     digitalWrite(2,HIGH);
45     digitalWrite(3,LOW);
46     digitalWrite(4,LOW );
47     digitalWrite(5,LOW);
48 }
49 void c()
50 {
51     digitalWrite(2,LOW);
52     digitalWrite(3,HIGH);
53     digitalWrite(4,LOW );
```

```
54     digitalWrite(5,LOW);
55 }
56 void d()
57 {
58     digitalWrite(2,HIGH );
59     digitalWrite(3,HIGH );
60     digitalWrite(4,LOW);
61     digitalWrite(5,LOW);
62 }
63 void e()
64 {
65     digitalWrite(2,LOW );
66     digitalWrite(3,LOW );
67     digitalWrite(4,HIGH );
68     digitalWrite(5,LOW );
69 }
70 void f()
71 {
72     digitalWrite(2,HIGH);
73     digitalWrite(3,LOW);
74     digitalWrite(4,HIGH);
75     digitalWrite(5,LOW);
76 }
77 void g()
78 {
79     digitalWrite(2,LOW);
80     digitalWrite(3,HIGH);
81     digitalWrite(4,HIGH);
82     digitalWrite(5,LOW);
83 }
84 void h()
85 {
86     digitalWrite(2,HIGH);
87     digitalWrite(3,HIGH);
88     digitalWrite(4,HIGH);
89     digitalWrite(5,LOW);
90 }
91 void i()
92 {
93     digitalWrite(2,LOW);
94     digitalWrite(3,LOW);
95     digitalWrite(4,LOW);
96     digitalWrite(5,HIGH);
97 }
98 void j()
99 {
100     digitalWrite(2,HIGH);
101     digitalWrite(3,LOW);
102     digitalWrite(4,LOW);
103     digitalWrite(5,HIGH);
104 }
```

