

19.A changing face 8*8 dot matrix

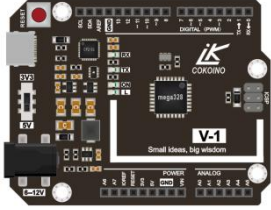




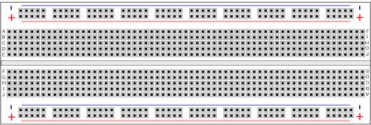

ABOUT THIS PROJECT:

You will learn:



Use a 8*8 dot matrix to show a changing face

1、 Things used in this project

Hardware components	Picture	Quantity
V-1 board		1 PCS
Type C USB Cable		1 PCS
8*8 dot matrix		1 PCS
Male to Male DuPont line		16 PCS
9V Battery Snap Connector		1 PCS
Breadboard		1 PCS
Breadboard power module		1 PCS

2、Introduction to 8*8 dot matrix

Difference between common anode and cathode 8*8 dot matrix:

- 1) Monochromatic dot matrix LED display originally had no distinction between common anode and common cathode. The name of common anode and common cathode appeared because of industry habits. The names of common anode and cathode for dot matrix LED display on the market are generally defined according to the polarity of the first pin of the dot matrix. The first pin of the dot-matrix LED display is anode and it is named common anode dot-matrix LED display, otherwise, it is named the common cathode dot-matrix LED display. As shown in Figure 1 below, it is named common anode dot-matrix LED display.
- 2) The common anode and common cathode that most sellers refer to should be the row common anode and row common cathode, as shown in the figure 2 below - common anode dot-matrix LED display

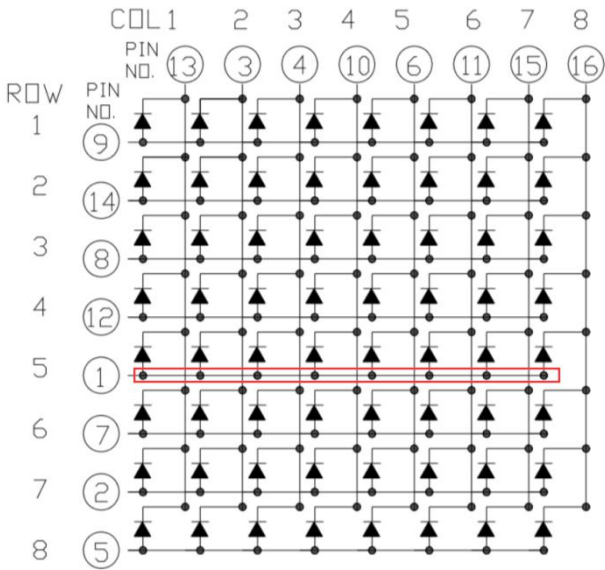


figure 1

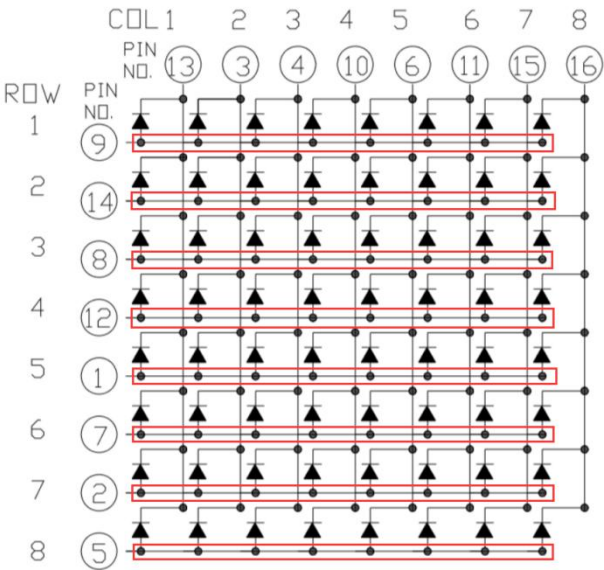


figure 2

Some dots are marked with the first pin behind, but some are not marked. Now people default that it is the same as the pin order of the IC. The first pin is generally on the side with the word on it. When we are facing the words on the dot matrix, we can know that its leftmost pin is pin 1, and then sort its pins counterclockwise, which are its pin 1 to pin 16, as shown in the following figure 3.

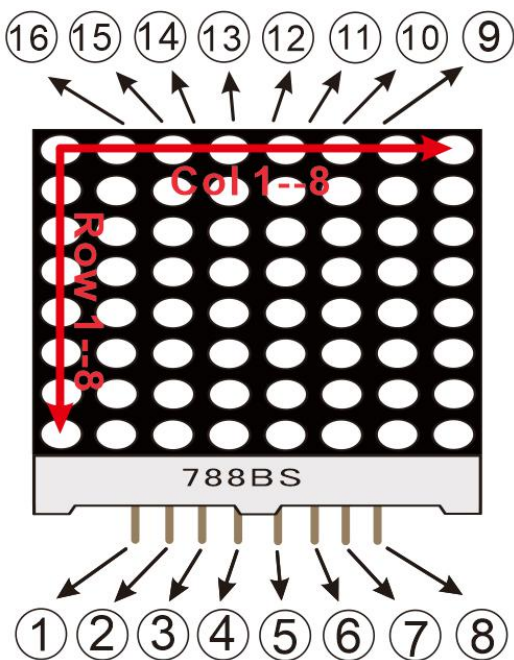


figure 3

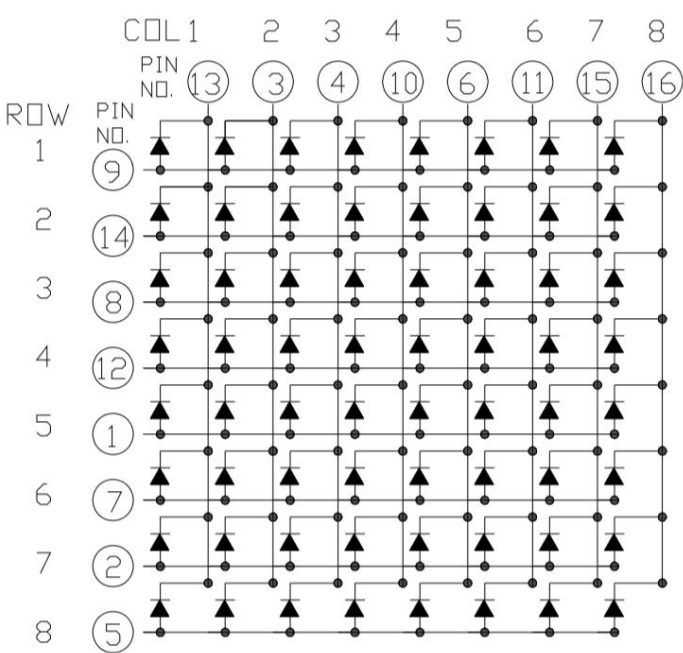


figure 4

The 8 * 8 dot matrix is composed of 64 LEDs, and each LED is placed at the intersection of the row and column lines. When a row is set to 1 level and a column is set to 0 level, there will be an LED that will light up; For example, to light the LED in the upper left corner(Row1, Col1), ⑨ pin is connected to high level, ⑬ pin Connected to low level, the first point will light up, as shown in Figure 5. If you want to light the first row LEDs, the ⑨ pin should be connected to a high level, and the ⑬③④⑩⑥⑪⑮⑯ pins should be connected to a low level, then the first line will light as shown in Figure 6. If you want to light the first column LEDs, pin ⑬ should be connected to low level, and ⑨⑭⑧⑫①⑦②⑤pin should be connected to high level, then the first column LEDs will light up, as shown in Figure 7.

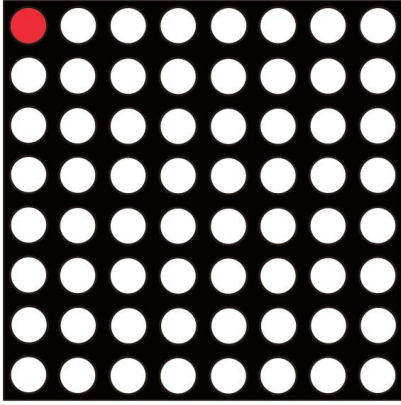


Figure 5

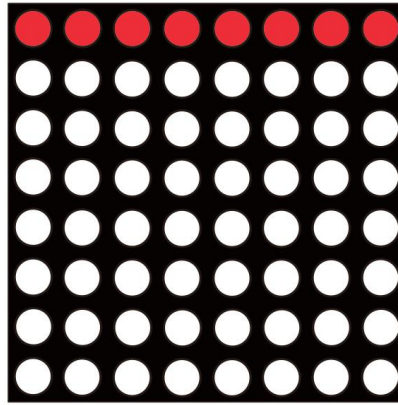


Figure 6

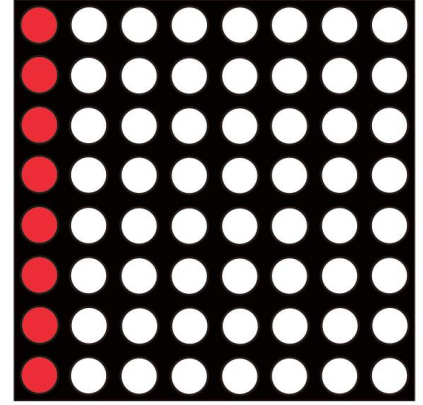
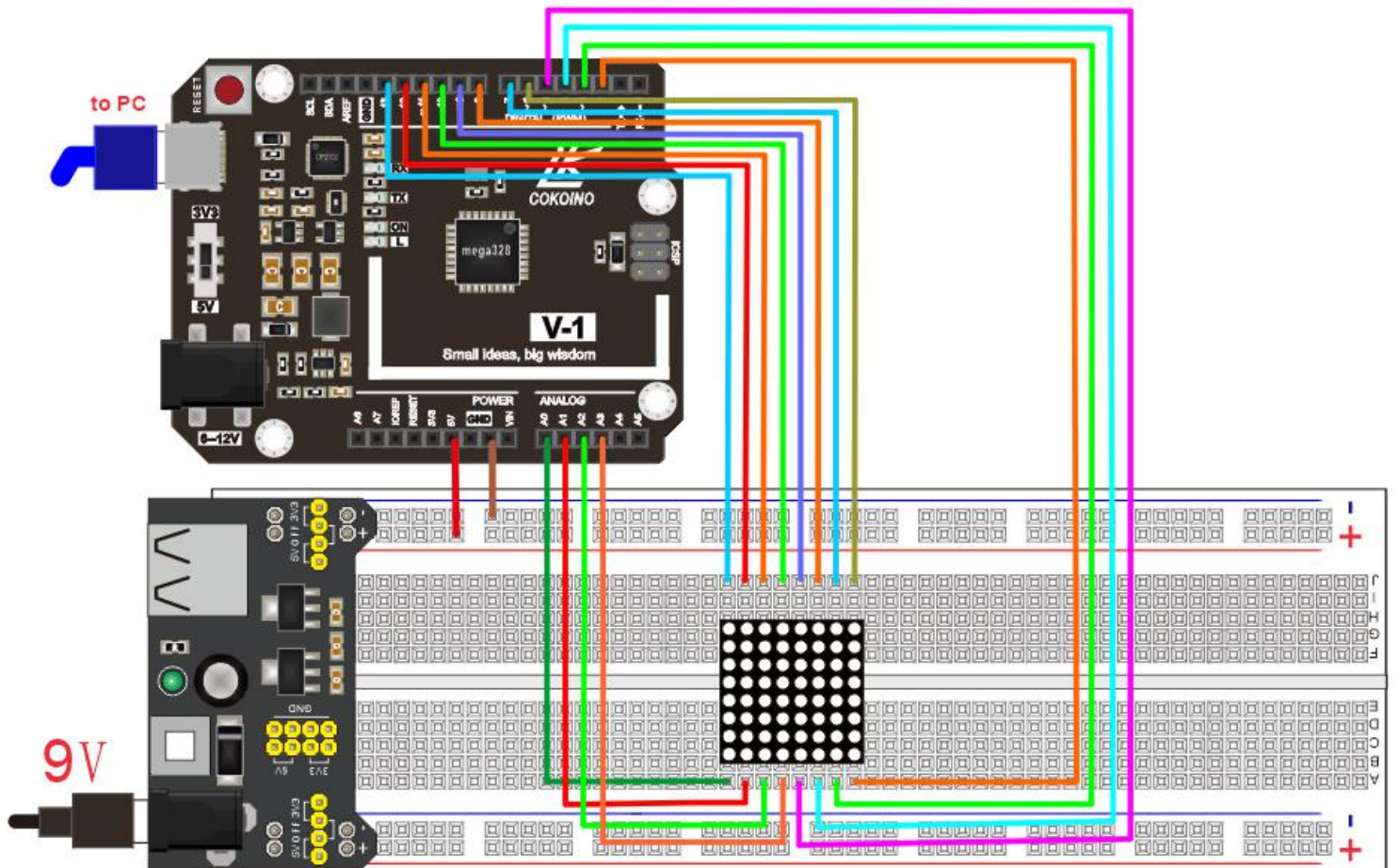


Figure 7

3、 Examples

3.1、 Connections diagram



3.2、Code

```
int leds[8] = {6, 11, 2, 9, 14, 3, 15, 5}; //Lattice screen the anode pin
int gnds[8] = {10, 16, 17, 7, 4, 8, 12, 13}; //Lattice screen negative pins
int Display_data[8][8]={
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 0, 0, 1, 0, 0, 1, 0, 0 },
    { 0, 0, 0, 1, 1, 0, 0, 0 },
};
//////////

void ledopen() {
    for (int i = 0; i < 8; i++){ //Higher dot matrix screen to the anode,
        digitalWrite(leds[i], HIGH); //cathode down,open display
        digitalWrite(gnds[i], LOW);
    }
}
//////////

void ledclean() {
    for (int i = 0; i < 8; i++){ //The positive ladies will lattice screen,
        digitalWrite(leds[i], LOW); // negative up, turn off display
        digitalWrite(gnds[i], HIGH);
    }
}
//////////

void Display(void){
    for(int a=0;a<8;a++){
        for(int b=0;b<8;b++){
            if(Display_data[a][b]==1){
                digitalWrite(gnds[a],LOW);
                digitalWrite(leds[b],HIGH);
                delayMicroseconds(50);
                digitalWrite(gnds[a],HIGH);
                digitalWrite(leds[b],LOW);
            }
        }
    }
}
//////////

void setup() {
    for (int i = 0; i < 8; i++){
        pinMode(leds[i], OUTPUT);
        pinMode(gnds[i], OUTPUT);
        digitalWrite(gnds[i], HIGH); //The cathode pin up, put out all the LED
```



```

}
ledopen(); //All open
delay(500);
ledclean(); //All closed
delay(500);
}
////////////////////
void loop() {
  Display();
}

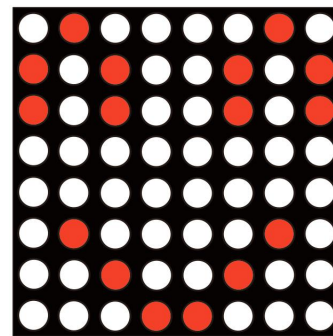
```

Analysis: Fill in the number 1 in the corresponding position of the two-dimensional array of the program, you can light the LED light in the corresponding position of the 8*8 dot matrix, as shown below:

```

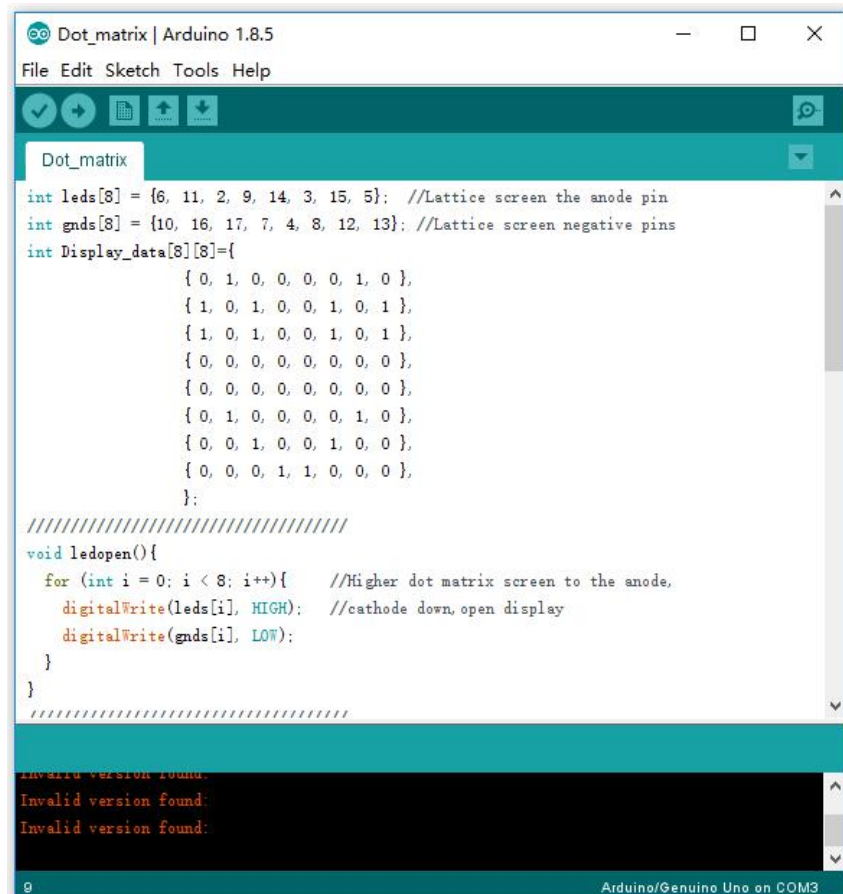
int Display_data[8][8]={
  { 0, 1, 0, 0, 0, 0, 1, 0 },
  { 1, 0, 1, 0, 0, 0, 1, 0 },
  { 1, 0, 1, 0, 0, 0, 1, 0 },
  { 0, 0, 0, 0, 0, 0, 0, 0 },
  { 0, 0, 0, 0, 0, 0, 0, 0 },
  { 0, 1, 0, 0, 0, 0, 1, 0 },
  { 0, 0, 1, 0, 0, 1, 0, 0 },
  { 0, 0, 0, 1, 1, 0, 0, 0 },
};

```

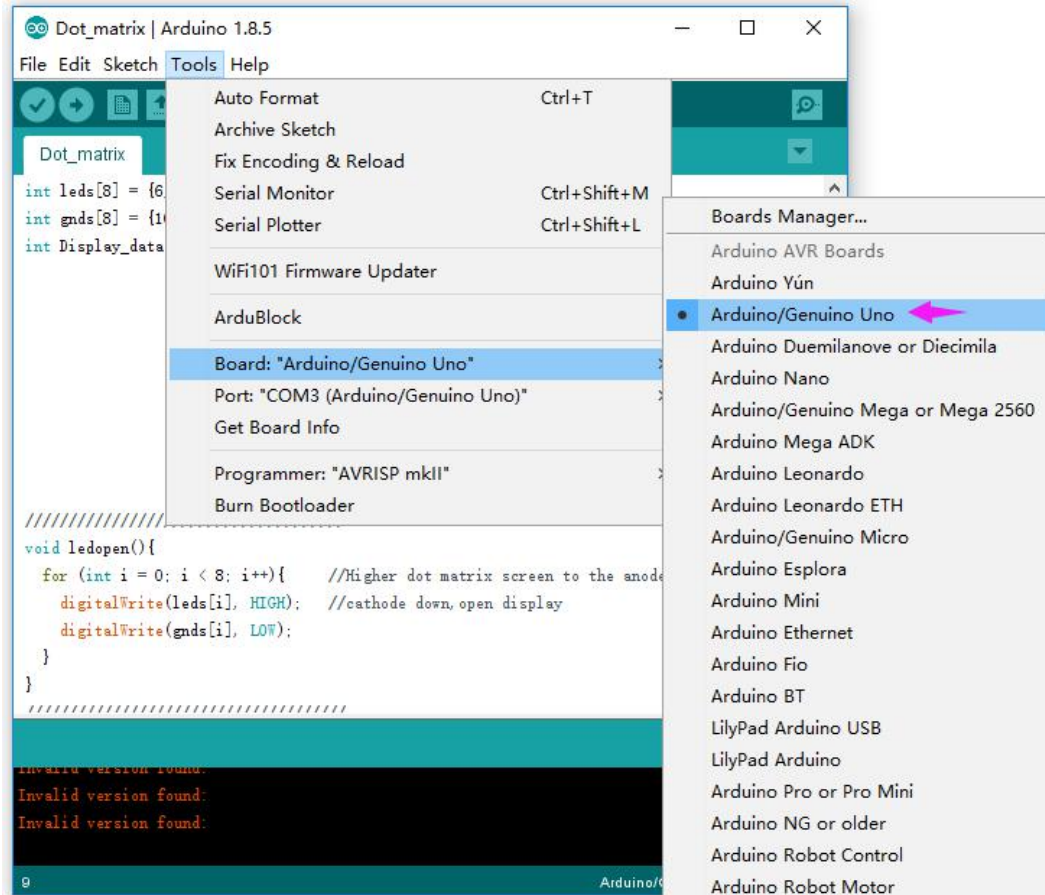


3.3、Compile and upload

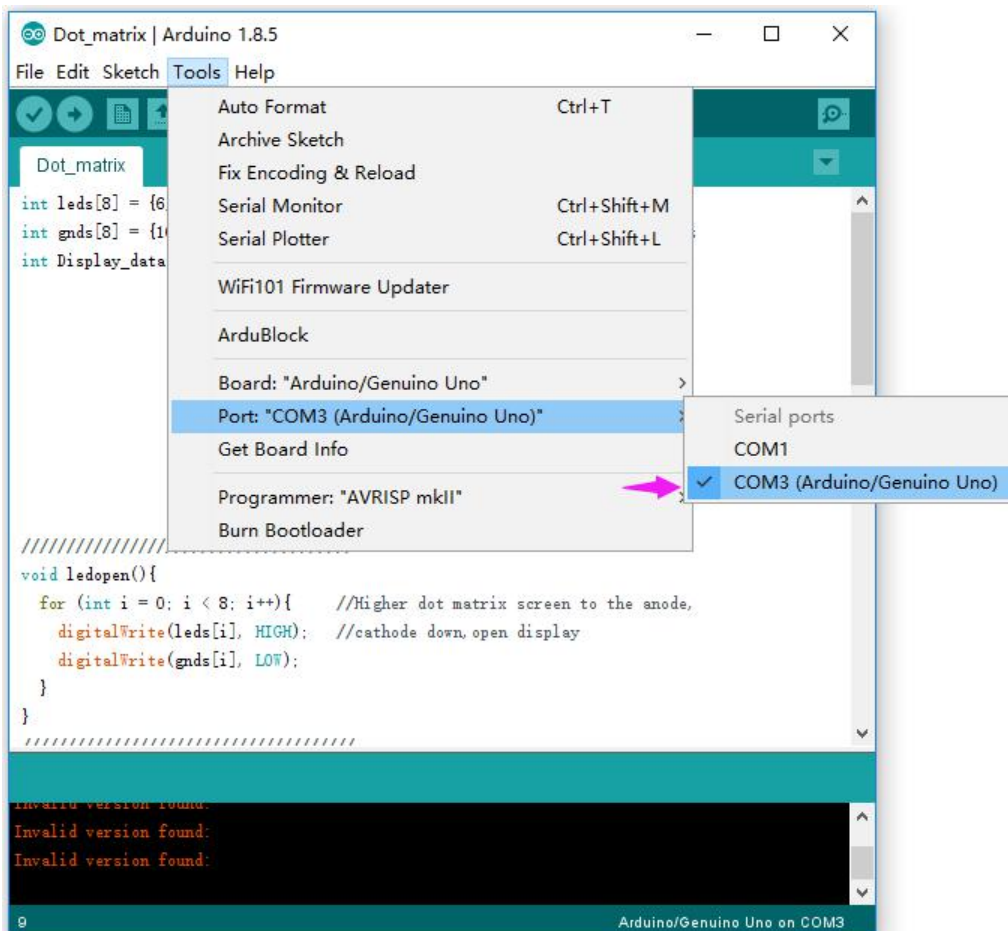
Open the Arduino IDE, copy the above code into the IDE



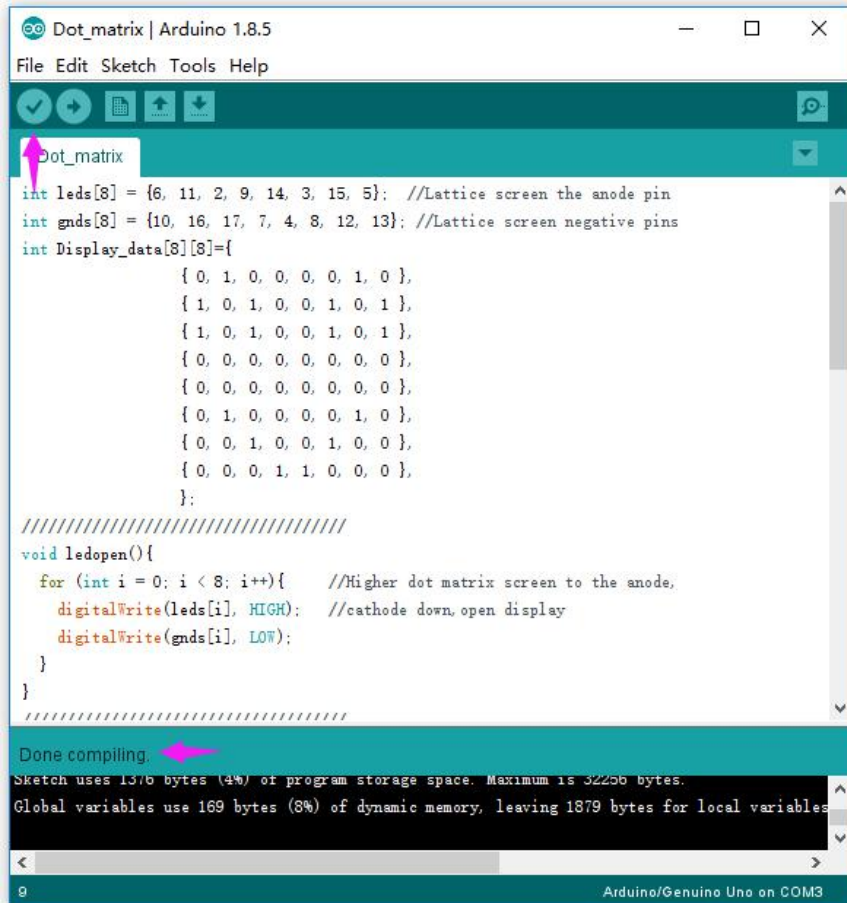
6.1、select corresponding board type



6.2、select corresponding port



6.3、compile this sketch



```
Dot_matrix | Arduino 1.8.5
File Edit Sketch Tools Help

Dot_matrix

int leds[8] = {6, 11, 2, 9, 14, 3, 15, 5}; //Lattice screen the anode pin
int gnds[8] = {10, 16, 17, 7, 4, 8, 12, 13}; //Lattice screen negative pins
int Display_data[8][8]={
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 0, 0, 1, 0, 0, 1, 0, 0 },
    { 0, 0, 0, 1, 1, 0, 0, 0 },
};

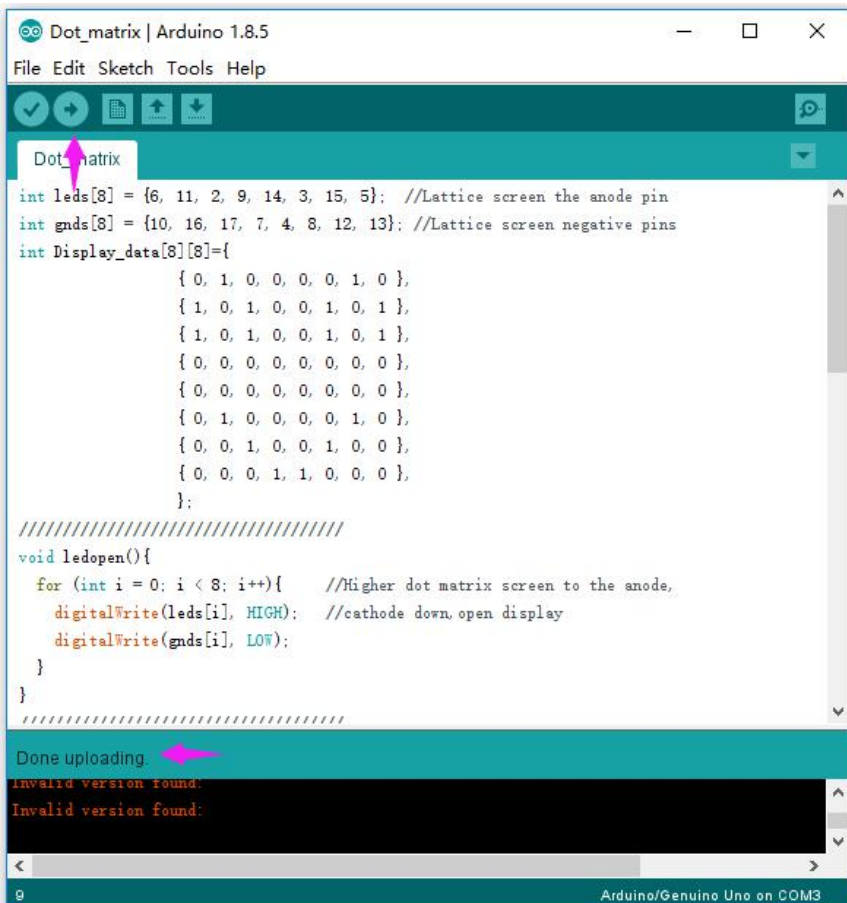
////////////////////////////////////
void ledopen(){
    for (int i = 0; i < 8; i++){ //Higher dot matrix screen to the anode,
        digitalWrite(leds[i], HIGH); //cathode down, open display
        digitalWrite(gnds[i], LOW);
    }
}

////////////////////////////////////

Done compiling.
Sketch uses 1376 bytes (4%) of program storage space. Maximum is 32256 bytes.
Global variables use 169 bytes (8%) of dynamic memory, leaving 1879 bytes for local variables

9 Arduino/Genuino Uno on COM3
```

6.4、simply click the “Upload” button in the environment



```
Dot_matrix | Arduino 1.8.5
File Edit Sketch Tools Help

Dot_matrix

int leds[8] = {6, 11, 2, 9, 14, 3, 15, 5}; //Lattice screen the anode pin
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int Display_data[8][8]={
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 1, 0, 1, 0, 0, 1, 0, 1 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 0, 0, 0, 0, 0, 0, 0 },
    { 0, 1, 0, 0, 0, 0, 1, 0 },
    { 0, 0, 1, 0, 0, 1, 0, 0 },
    { 0, 0, 0, 1, 1, 0, 0, 0 },
};

////////////////////////////////////
void ledopen(){
    for (int i = 0; i < 8; i++){ //Higher dot matrix screen to the anode,
        digitalWrite(leds[i], HIGH); //cathode down, open display
        digitalWrite(gnds[i], LOW);
    }
}

////////////////////////////////////

Done uploading.
Invalid version found.
Invalid version found.

9 Arduino/Genuino Uno on COM3
```

6.5、Running Result

A few seconds after the upload finishes, you can disconnect the V-1 board from the computer and use the external power supply to power the entire circuit. Turn on the switch on the power module, and the 8*8 dot matrix displays a smiley face, as shown below:

