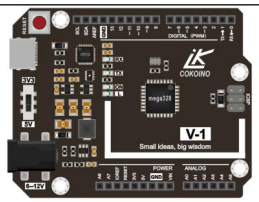
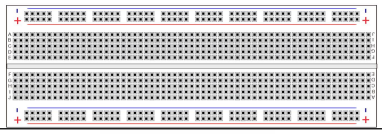
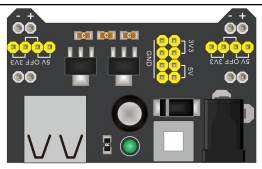
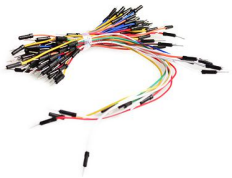
22.Let the LCD display display text

ABOUT THIS PROJECT：

You will learn：

- Use the V1 board to control the text of the LCD display

1. Things used in this project

Hardware components	Picture	Quantity
V-1 board		1 PCS
Breadboard		1 PCS
9V Battery Snap Connector		1 PCS
Breadboard power module		1 PCS
Male to Male DuPont line		15 PCS
Type C USB Cable		1 PCS
1602 LCD		1 PCS
Adjustable potentiometer		1 PCS

2. Overview

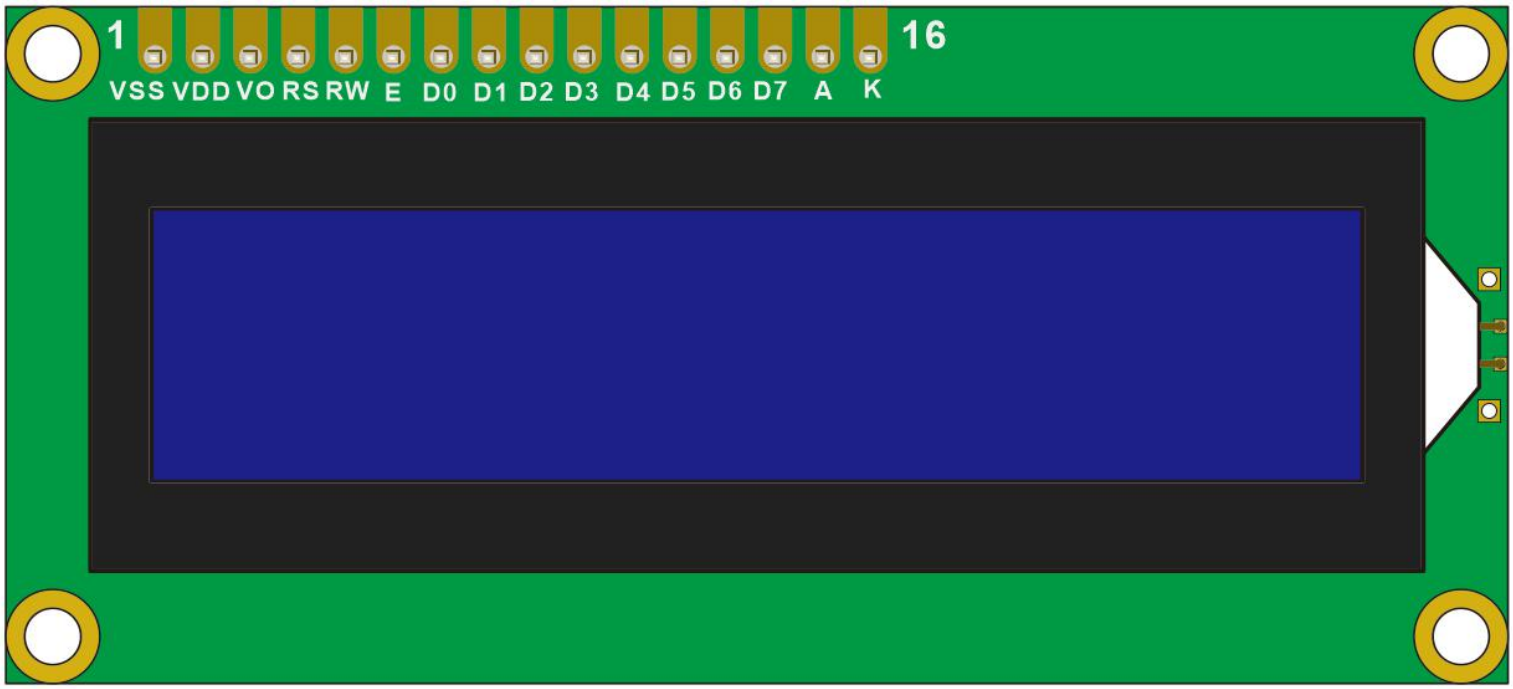
The 1602 liquid crystal is also called the 1602 character liquid crystal. It is a kind of dot-matrix liquid crystal module used to display letters, Numbers, symbols, etc.

1602LCD refers to the display content is 2 lines, each line of 16 characters.Most of the character liquid crystal on the market is based on the HD44780 liquid crystal chip, the control principle is exactly the same, so based on the HD44780 written procedures can be easily applied to the majority of the character liquid crystal on the market.

Combining sensors or modules such as Arduino board, it can be combined into various interesting products, such as smart clock display, thermometer and moisture meter display, calculator display and so on.

3. Specification：

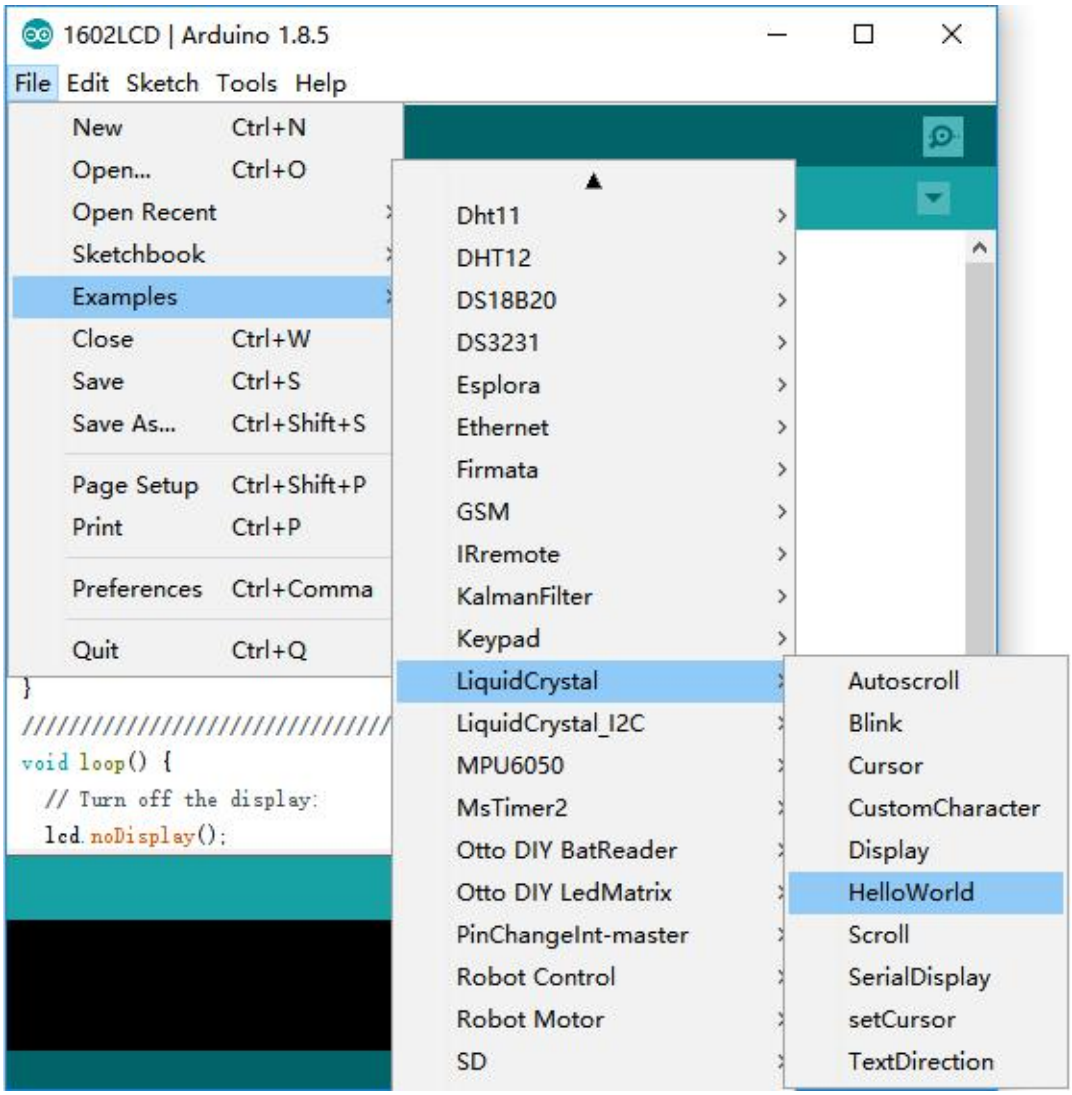
(1) Working voltage: 4.5--5.5V
(2) Working current: 15--20mA
(3) Display style: 5 × 8 (1 Cursor) dots, 16 × 2 Characters
(4) Driver chip: PCF8574T
(5) Communication method: IIC (PCF8574T driver 1602LCD screen)
(6) Working temperature: -20 --- +70 ° C
(7) Interface: XH2.54-4P
Remarks: Distribute PCF8574T data sheet, 1602 screen data sheet.



Note: please refer to the specifications provided in the course folder for more information.

4. Let the LCD display display text

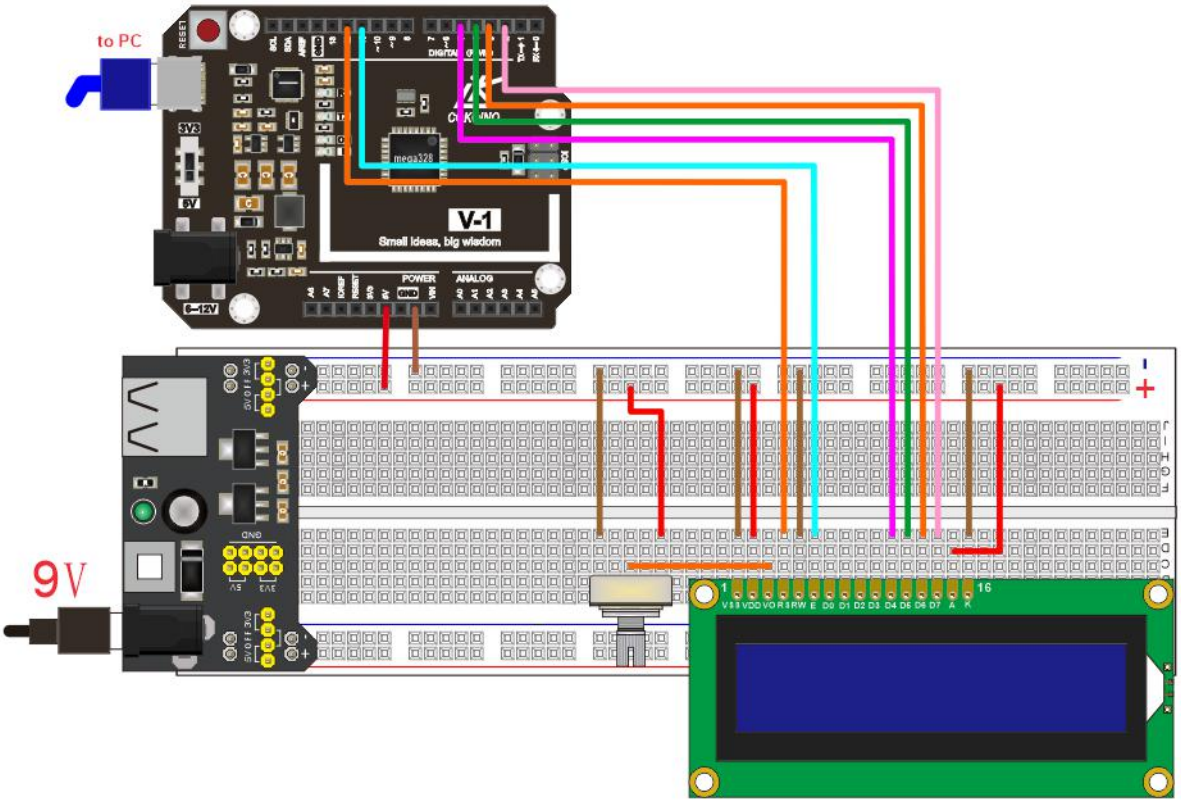
The 1602CLD has 8 bit and 4 bit communication modes. Here we use the 4-bit communication method. It make the wiring simple and can be directly compatible with the Arduino IDE. The IDE comes with a corresponding library file, which can be found in File--->Examples--- >LiquidCrystal. The official website has detailed instructions for the library, please refer to the following web link:
https://www.arduino.cc/en/Reference/LiquidCrystal



4.1 Code:

```
#include <LiquidCrystal.h>
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
////////////////////////////////////////////////
void setup() {
   lcd.begin(16, 2);    // set up the LCD's number of columns and rows:
   lcd.setCursor(1, 0);
   lcd.print("hello, world!"); // Print a message to the LCD.
   lcd.setCursor(1, 1);
   lcd.print("cokoino!");
}
////////////////////////////////////////////////
void loop() {
   lcd.noDisplay();    // Turn off the display:
   delay(1000);
   lcd.display();       // Turn on the display:
   delay(1000);
}
```

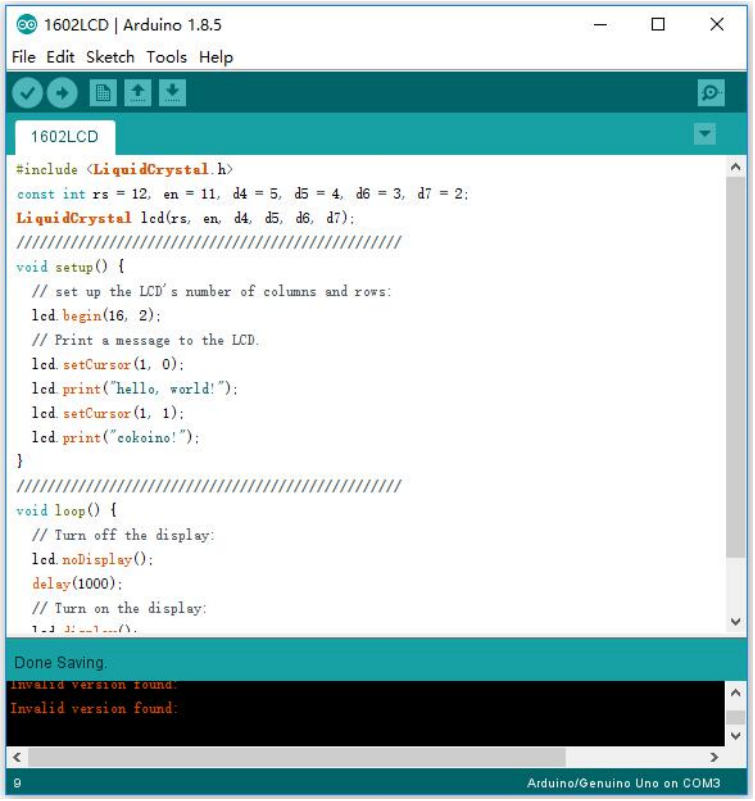
4.2 Connections diagram



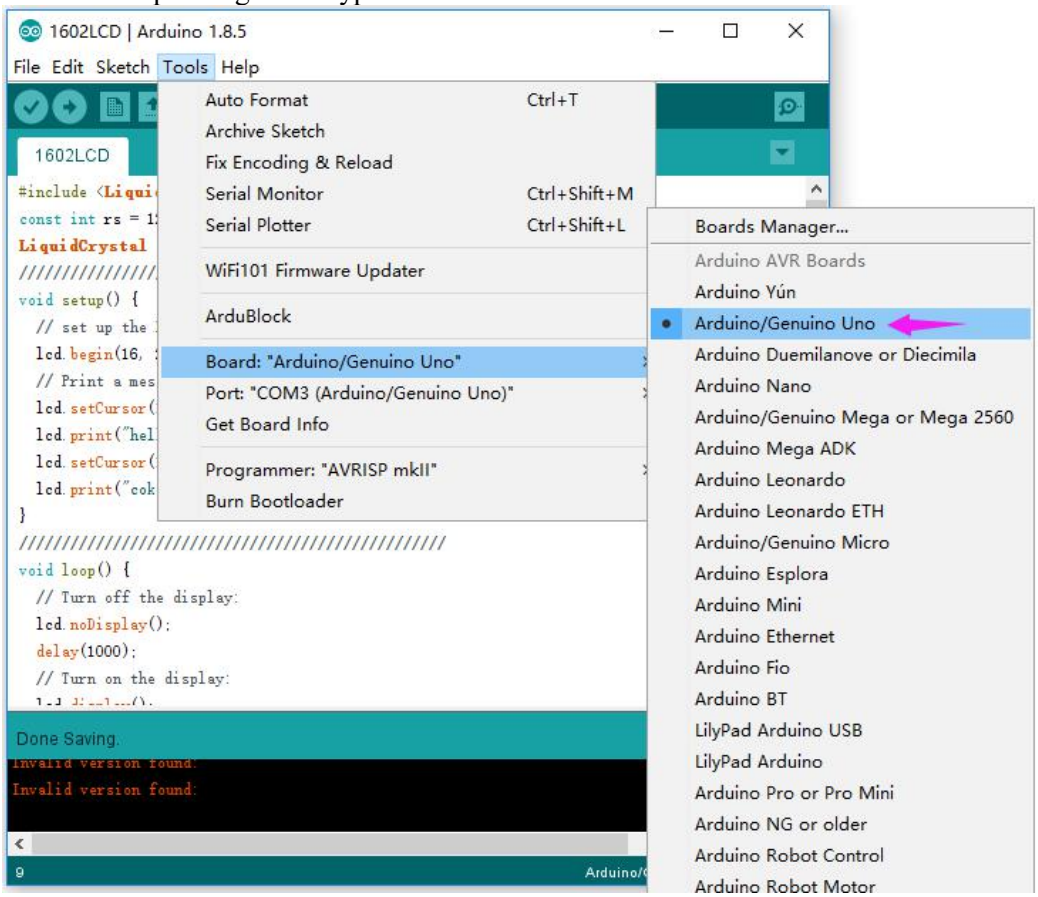
Remark: The potentiometer in the above figure is used to adjust the sharpness of the displayed text on the screen. Turn the potentiometer clockwise, the resolution of the screen becomes lower, and the potentiometer is rotated counterclockwise, and the sharpness of the screen becomes higher.

4.3 Compile and upload

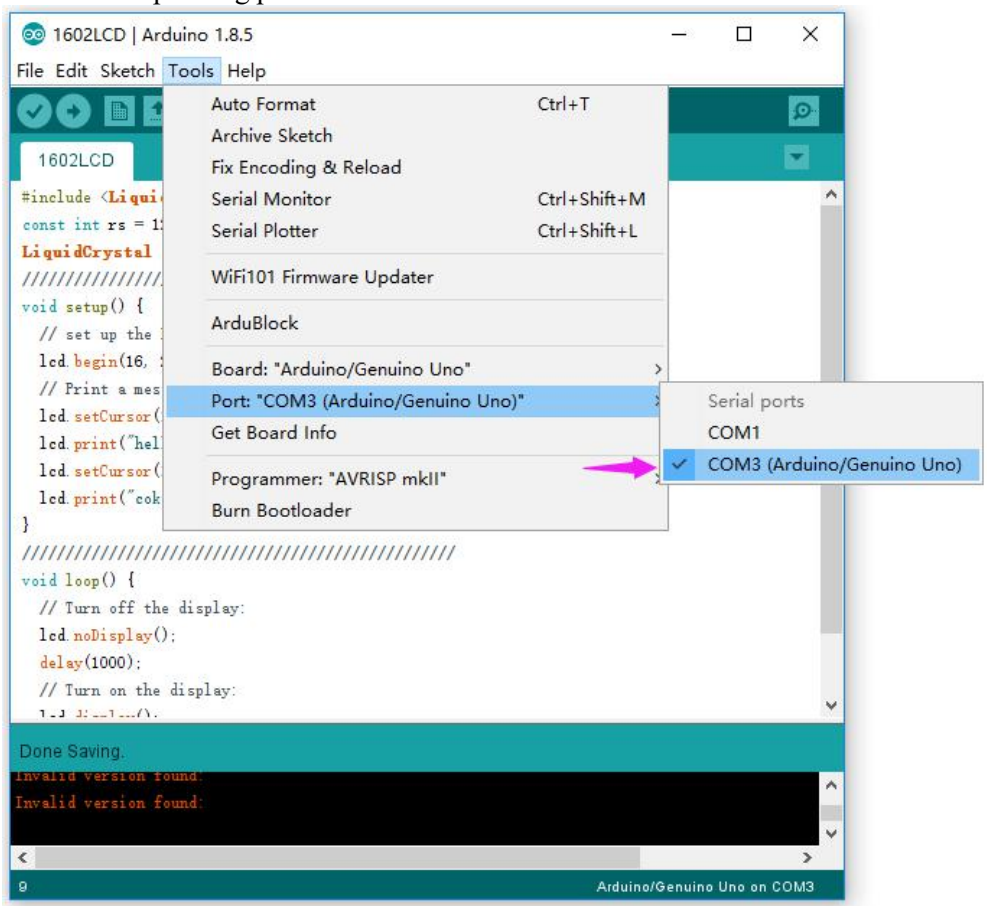
Using USB cable to connect computer to V-1 board，Open the Arduino IDE，copy the above code into the IDE：



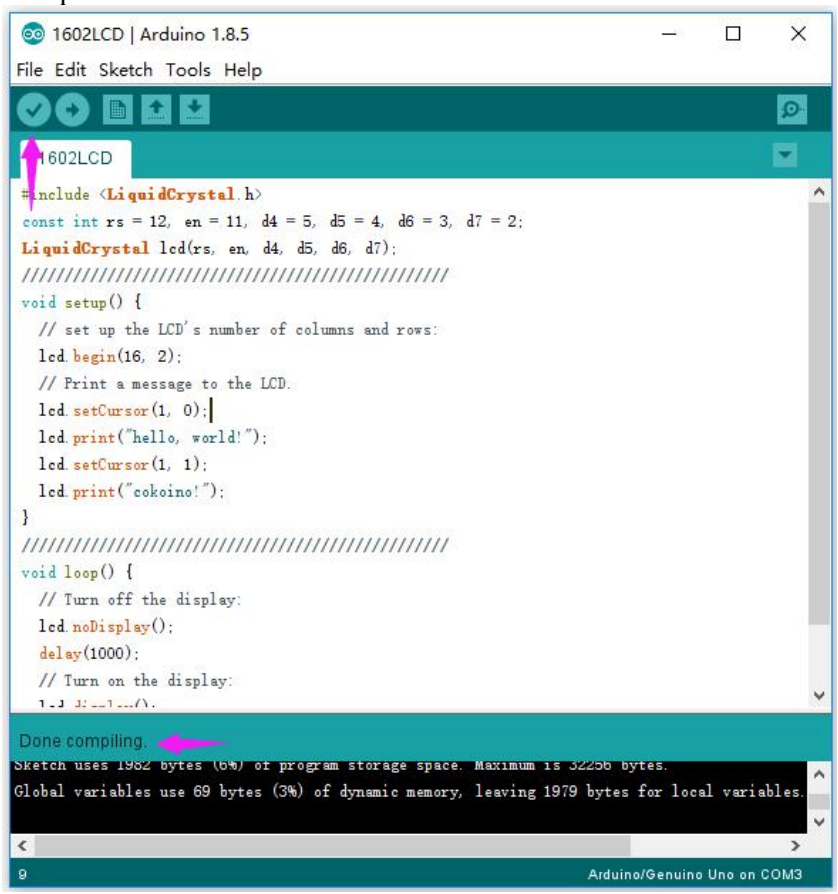
Select corresponding board type



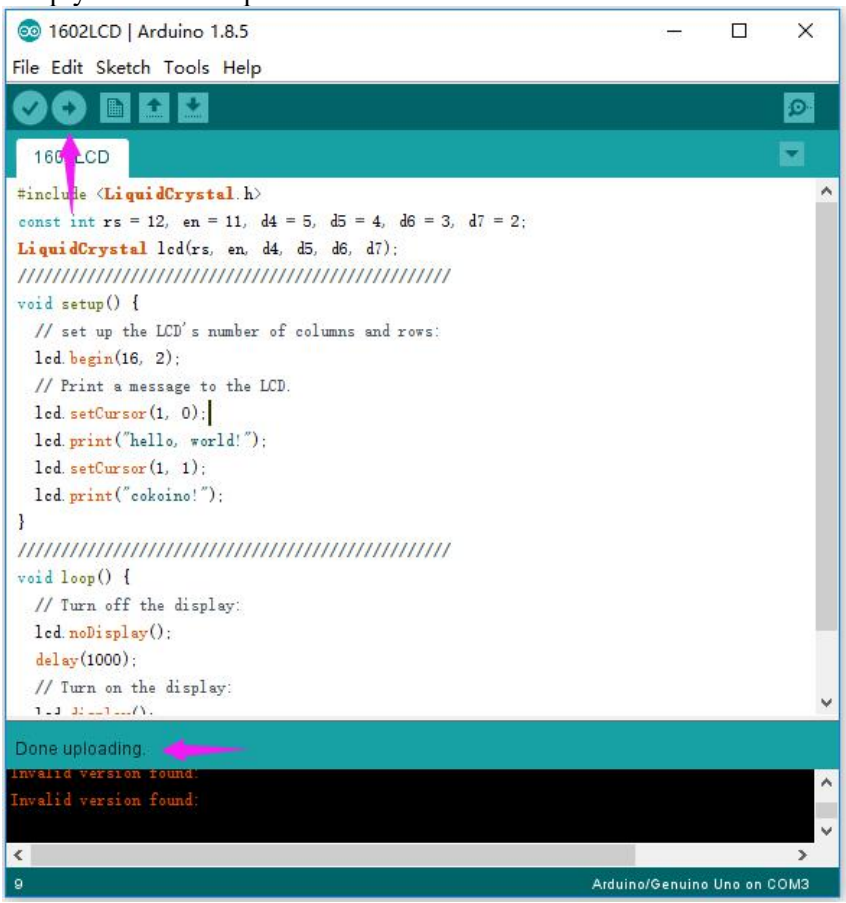
Select corresponding port



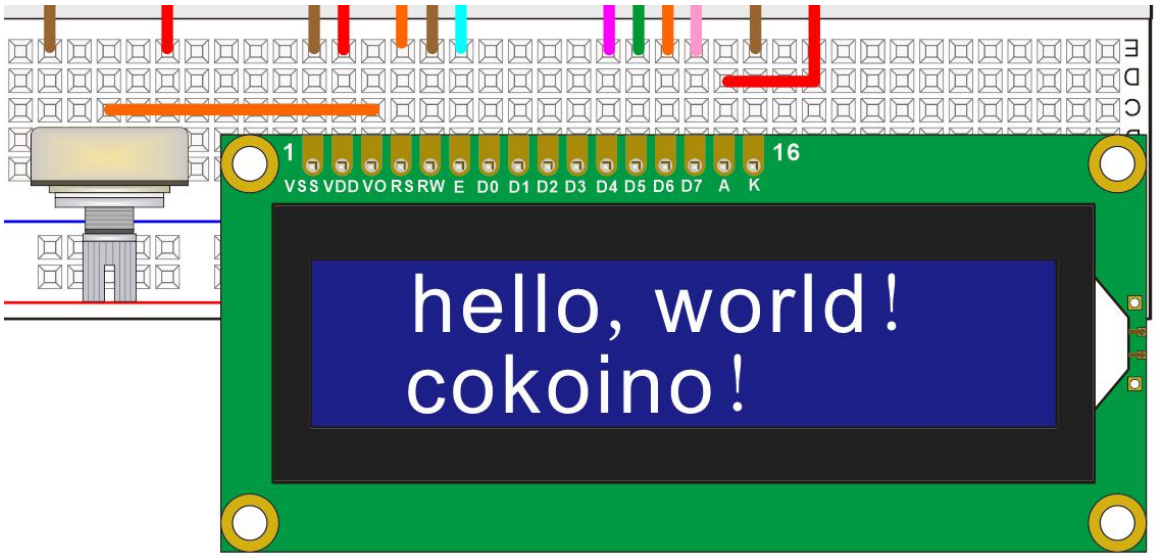
Compile this sketch



Simply click the "Upload" button in the environment



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， Adjust the potentiometer so that the sharpness is just right, the 1602LCD flashes display hello, world! Cokoino! As shown below:



End !