Fingerprint recognition

1. Learning target

In this course, we will learn how to use Arduino and fingerprint recognition module to achieve fingerprint recognition function.

2. Preparation

The fingerprint recognition module uses UART communication, and the program uses a virtual serial port. Connect the TX and RX of the module to the D2 and D3 pins of the arduino UNO board. V+/Vi and GND are connected to 3.3V and GND of arduino UNO respectively.

3. About code

3.1 Configure virtual serial port pins

```
#if (defined(__AVR__) || defined(ESP8266)) && !defined(__AVR_ATmega2560__)
// For UNO and others without hardware serial, we must use software serial...
// pin #2 is IN from sensor (GREEN wire)
// pin #3 is OUT from arduino  (WHITE wire)
// Set up the serial port to use softwareserial..
SoftwareSerial mySerial(2, 3);
```

3.2 Initialize serial communication

```
 Serial.begin(9600);
 while (!Serial);  // For Yun/Leo/Micro/Zero/...
 delay(100);
 Serial.println("\n\nAdafruit finger detect test");
```

3.3 Initialize the module, the communication baud rate is 57600

```
// set the data rate for the sensor serial port
finger.begin(57600);
delay(5);
if (finger.verifyPassword()) {
  Serial.println("Found fingerprint sensor!");
} else {
  Serial.println("Did not find fingerprint sensor :(");
  while (1) { delay(1); }
}
```

3.4 Serial input, delete fingerprint, ID input

```
Serial.println(F("Reading sensor parameters"));
finger.getParameters();
Serial.print(F("Status: 0x")); Serial.println(finger.status_reg, HEX);
Serial.print(F("Sys ID: 0x")); Serial.println(finger.system_id, HEX);
Serial.print(F("Capacity: ")); Serial.println(finger.capacity);
Serial.print(F("Security level: ")); Serial.println(finger.security_level);
Serial.print(F("Device address: ")); Serial.println(finger.device_addr, HEX);
Serial.print(F("Packet len: ")); Serial.println(finger.packet_len);
Serial.print(F("Baud rate: ")); Serial.println(finger.baud_rate);
```

Read the fingerprint of the finger, upload and compare, and return the ID

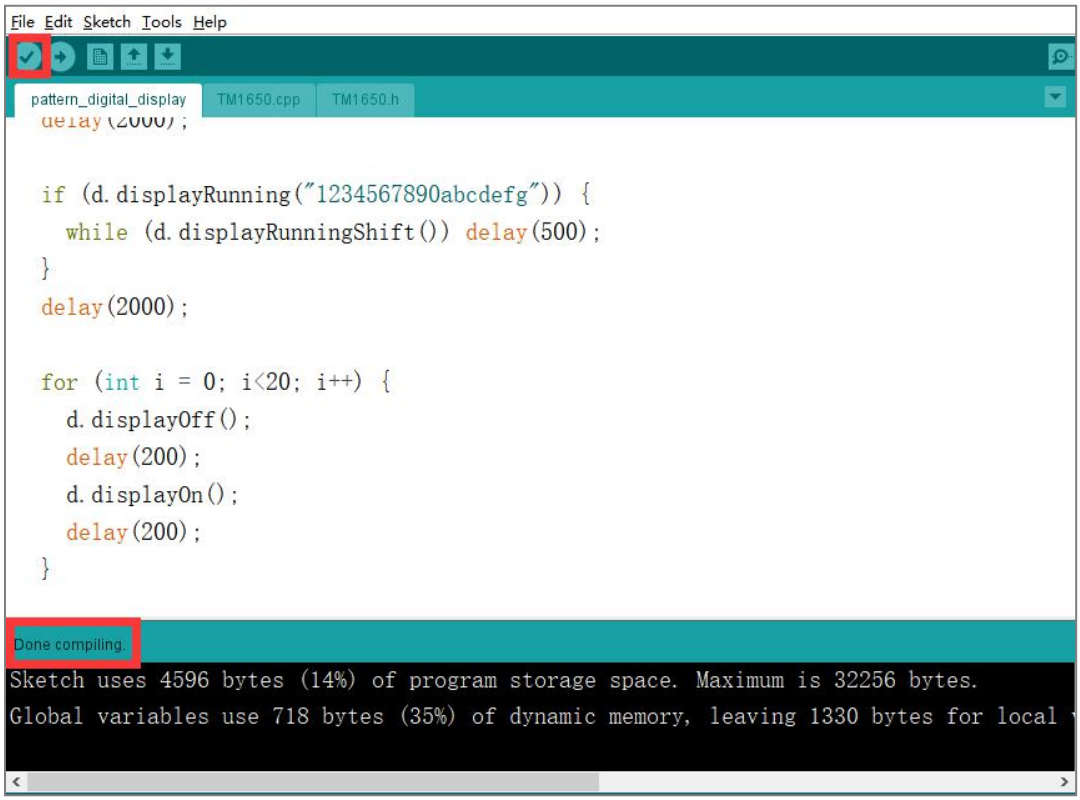
```
uint8_t p = finger.getImage();
```

```
p = finger.image2Tz();
```

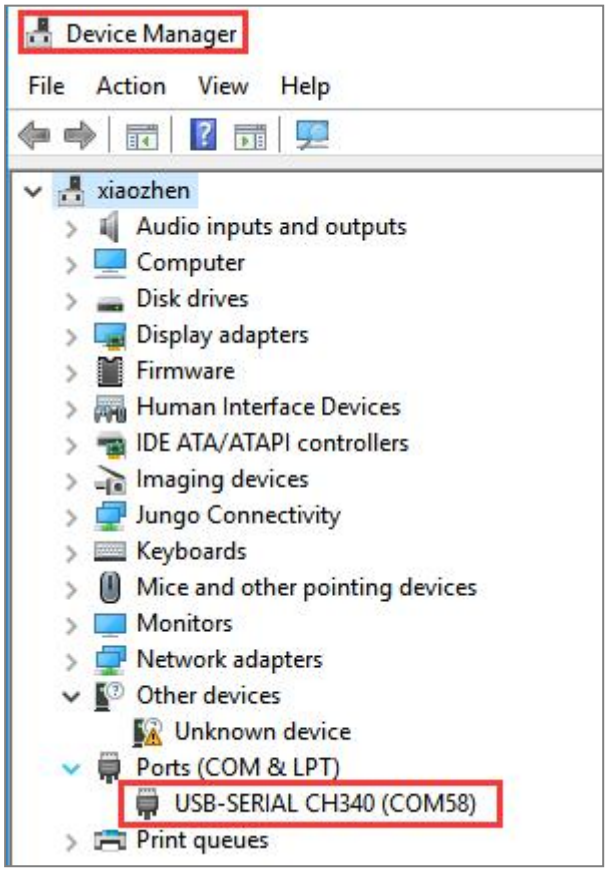
```
p = finger.fingerSearch();
```

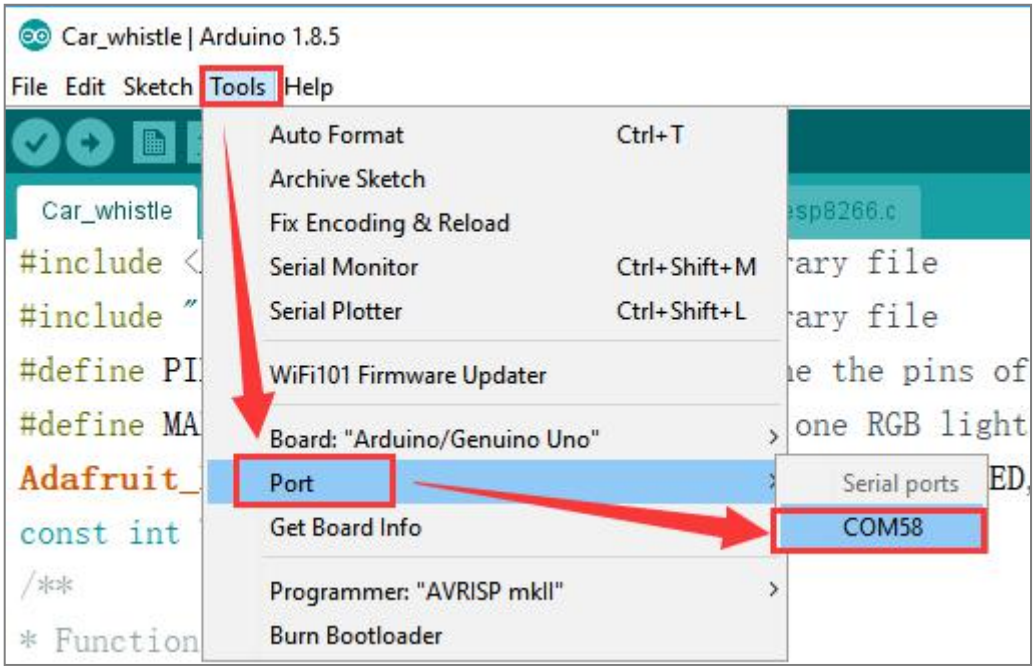
4. Compiling and downloading code

4.1 We need to open the **.ino** file by Arduino IDE software. Then click“√”under the menu bar to compile the code, and wait for the word "Done compiling " in the lower left corner, as shown in the figure below.

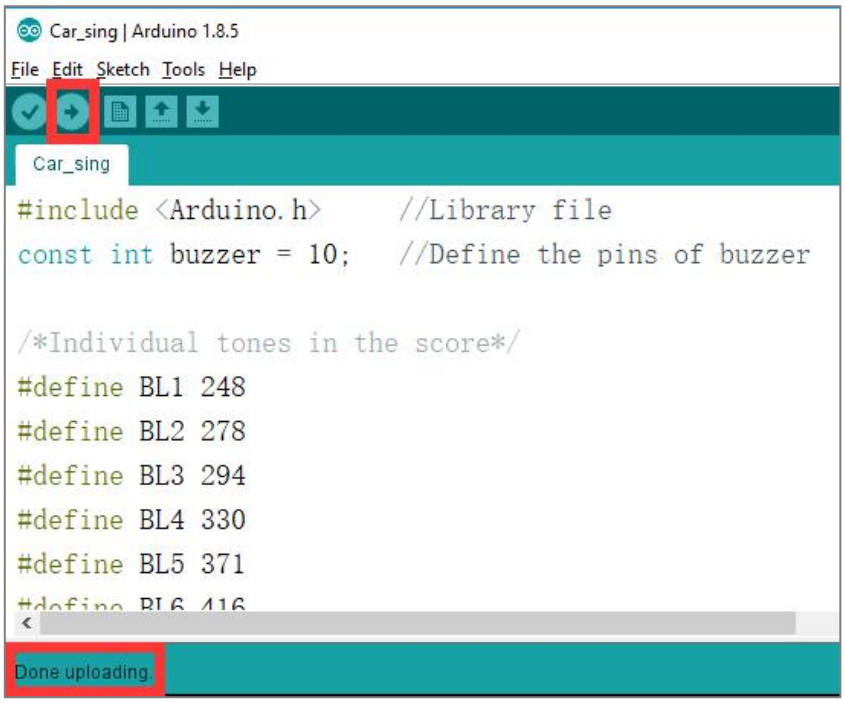


4.2 In the menu bar of Arduino IDE, we need to select【Tools】---【Port】--- selecting the port that the serial number displayed by the device manager just now, as shown in the figure below.



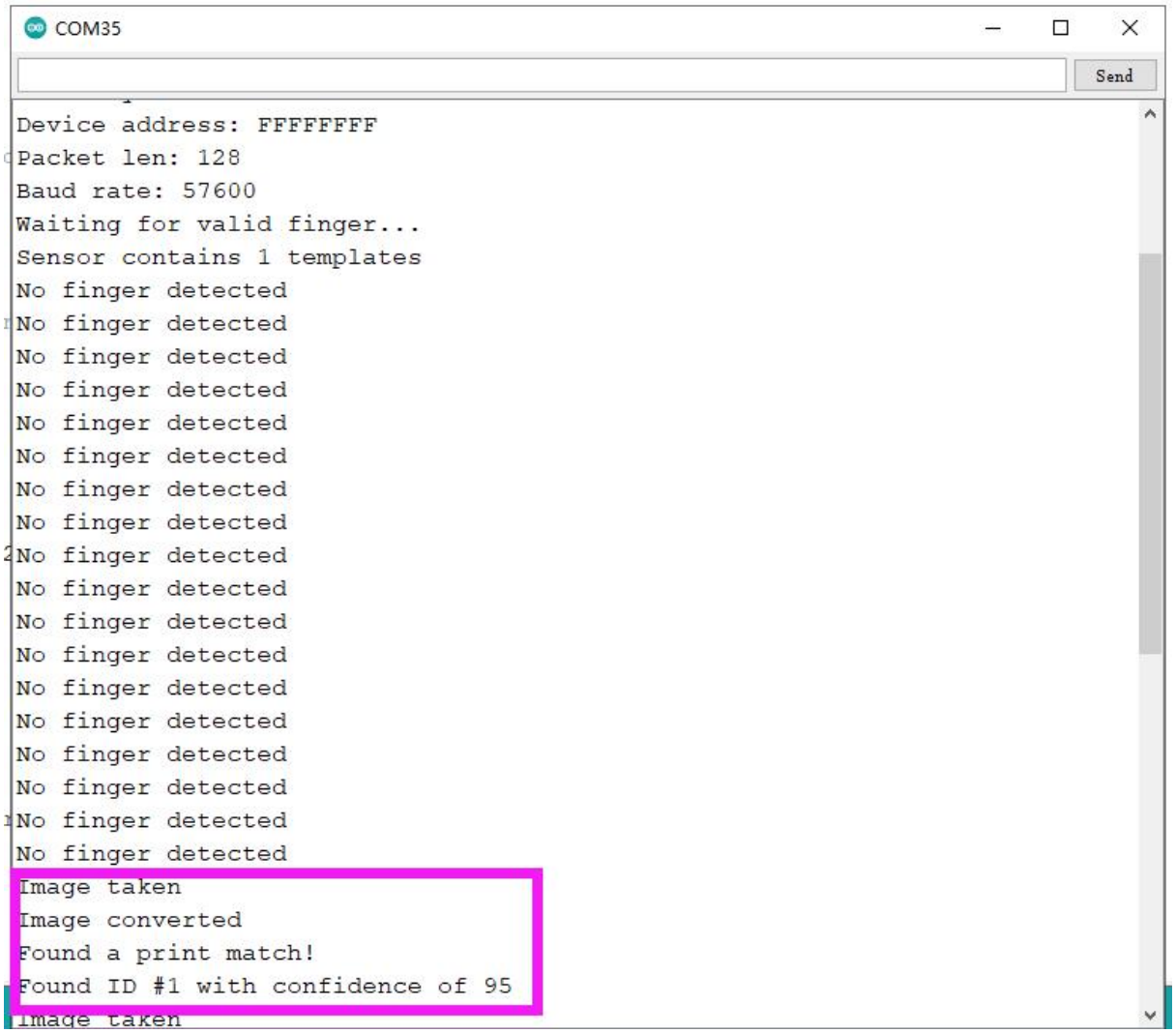


4.3 After the selection is completed, you need to click "→"under the menu bar to upload the code to the UNO board. When the word "Done uploading" appears in the lower left corner, the code has been successfully uploaded to the UNO board, as shown in the figure below.



5. Phenomenon

After the program is downloaded successfully. Open the serial monitor and set the baud rate to 9600, when the fingerprint is recognized, the serial port will print out the information as shown below.


COM35
Send
Device address: FFFFFFFF
Packet len: 128
Baud rate: 57600
Waiting for valid finger...
Sensor contains 1 templates
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
No finger detected
Image taken
Image converted
Found a print match!
Found ID #1 with confidence of 95
Image taken