

Fingerprint entry

1. Learning target

In this course, we will learn how to use Arduino and fingerprint recognition module to achieve fingerprint entry 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);
```

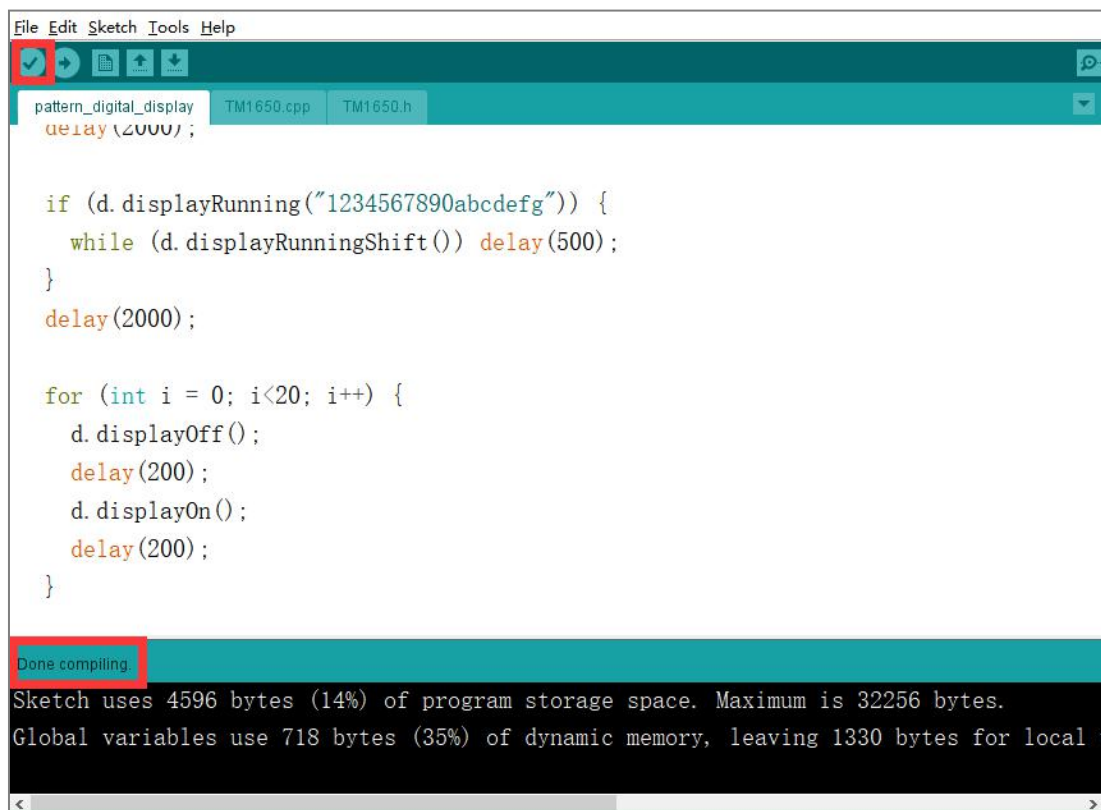
Serial print following information

```
Serial.println("Ready to enroll a fingerprint!");
Serial.println("Please type in the ID # (from 1 to 127)");
id = readnumber();
if (id == 0) { // ID #0 not allowed, try again!
    return;
}
Serial.print("Enrolling ID #");
Serial.println(id);

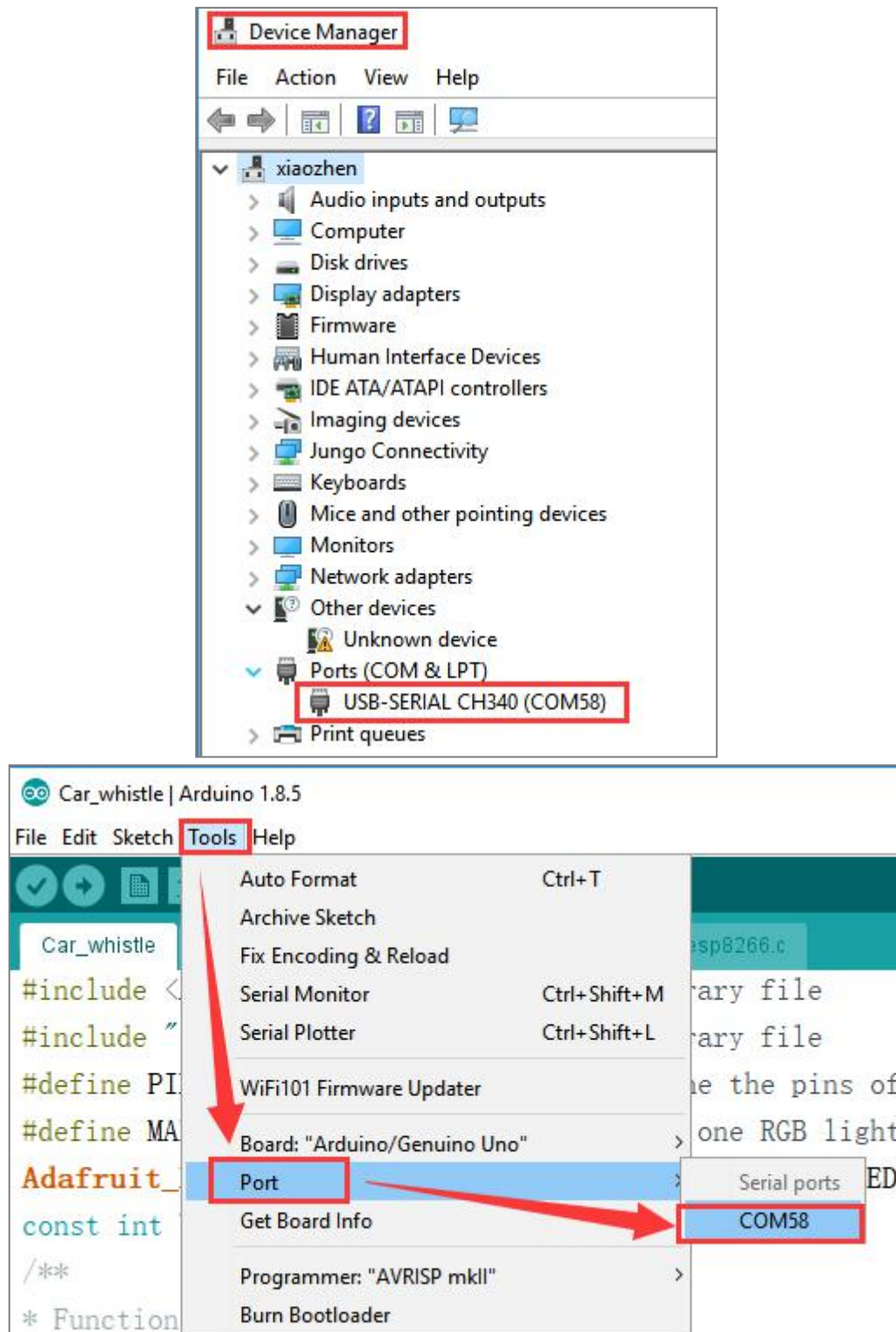
while (! getFingerprintEnroll() );
```

4. Compiling and downloading code

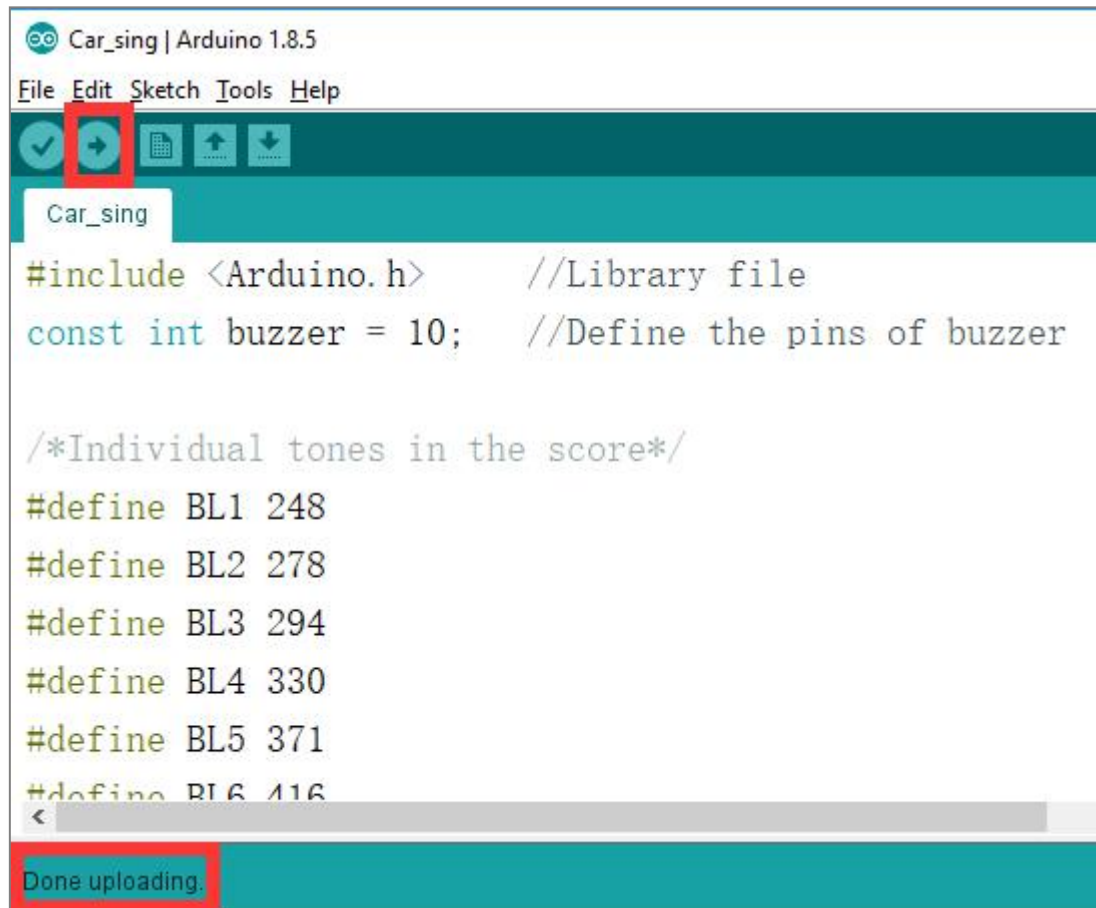
4.1 We need to open the .ino file by Arduino IDE software. Then click "v" under the menu bar to compile the code, and wait for the word "Done compiling" in the lower left corner, as shown in the figure below.



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.

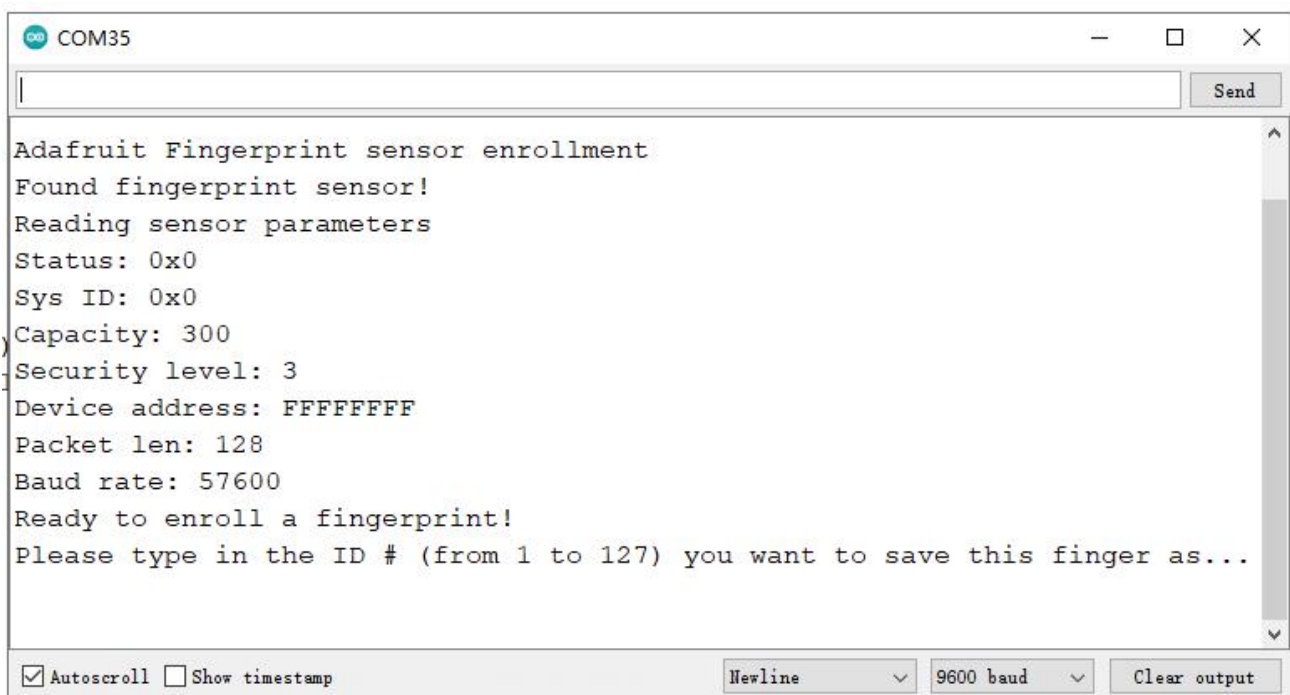


4.3 After the selection is completed, you need to click “→” under the menu bar to upload the code to the UNO board. When the word “Done uploading” appears in the lower left corner, the code has been successfully uploaded to the UNO board, as shown in the figure below.



5. Phenomenon

After the program is downloaded successfully. Open the serial monitor and set the baud rate to 9600, you will see the information as shown in the figure below printed out.



Send the number 1 through the serial port, and then the serial port will print out the tutorial as shown in the figure below.

The first screenshot shows a serial port window titled 'COM35'. The input field contains the number '1', and the 'Send' button is highlighted. The output text reads: 'Adafruit Fingerprint sensor enrollment', 'Found fingerprint sensor!', 'Reading sensor parameters', 'Status: 0x0', 'Sys ID: 0x0', 'Capacity: 300', 'Security level: 3', 'Device address: FFFFFFFF', 'Packet len: 128', 'Baud rate: 57600', 'Ready to enroll a fingerprint!', and 'Please type in the ID # (from 1 to 127) you want to save this finger as...'. The second screenshot shows the same window after sending the number 1. The output text continues with 'Packet len: 128', 'Baud rate: 57600', 'Ready to enroll a fingerprint!', 'Please type in the ID # (from 1 to 127) you want to save this finger as...', 'Enrolling ID #1', and 'Waiting for valid finger to enroll as #1'. Below this, there are three dots indicating a pause or waiting period.

```

COM35
1 Send
Adafruit Fingerprint sensor enrollment
Found fingerprint sensor!
Reading sensor parameters
Status: 0x0
Sys ID: 0x0
Capacity: 300
Security level: 3
Device address: FFFFFFFF
Packet len: 128
Baud rate: 57600
Ready to enroll a fingerprint!
Please type in the ID # (from 1 to 127) you want to save this finger as...

COM35
Send
Packet len: 128
Baud rate: 57600
Ready to enroll a fingerprint!
Please type in the ID # (from 1 to 127) you want to save this finger as...
Enrolling ID #1
Waiting for valid finger to enroll as #1
.
.
.

```

Record the same fingerprint twice according to the prompt of serial port printing.

The screenshot shows the serial port window displaying the following text: 'Image taken', 'Image converted', 'Remove finger', 'ID 1', 'Place same finger again', '.....Image taken', 'Image converted', 'Creating model for #1', 'Prints matched!', 'ID 1', 'Stored!', 'Ready to enroll a fingerprint!', and 'Please type in the ID # (from 1 to 127) you want to save this finger as...'. This indicates that the fingerprint has been successfully enrolled and verified.

```

Image taken
Image converted
Remove finger
ID 1
Place same finger again
.....Image taken
Image converted
Creating model for #1
Prints matched!
ID 1
Stored!
Ready to enroll a fingerprint!
Please type in the ID # (from 1 to 127) you want to save this finger as...

```