Fingerprint recognition broadcast

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);
```

3.5 Initialize the speech synthesis broadcast module, set the speech rate and intonation, etc.

```
uint8_t n = 1;
static void XFS_Init()
{

  xfs.Begin(0x30);
  delay(n);
  xfs.SetReader(XFS5152CE::Reader_XiaoYan);
  delay(n);
  xfs.SetEncodingFormat(XFS5152CE::GB2312);
  delay(n);
    xfs.SetLanguage(xfs.Language_Auto);
    delay(n);
    xfs.SetStyle(XFS5152CE::Style_Continue);
    delay(n);
    xfs.SetArticulation(XFS5152CE::Articulation_Letter);
    delay(n);
    xfs.SetSpeed(5);
    delay(n);
    xfs.SetIntonation(5);
    delay(n);
    xfs.SetVolume(10);
    delay(n);
}

unsigned char result = 0xFF;

Adafruit_Fingerprint finger = Adafruit_Fingerprint(&mySerial);
```

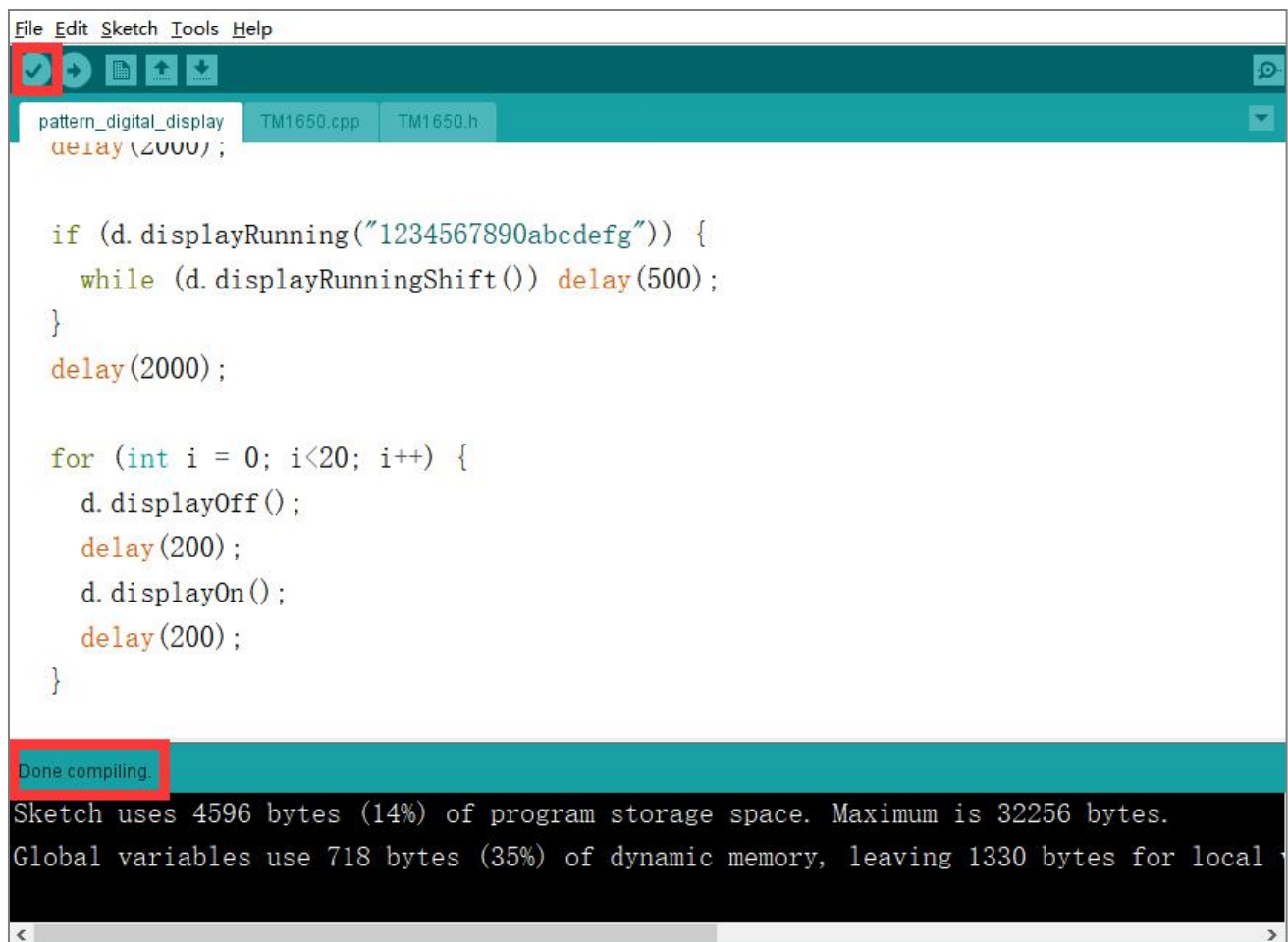3.6 When detect fingerprint-1, speecj module will broadcast "Welcome".

```
if(getFingerprintID() == 1){
  xfs.StartSynthesis(TextTab1[0]);
  while(xfs.GetChipStatus() != xfs.ChipStatus_Idle)
  {
    delay(30);
  }
}
```

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.

```
File Edit Sketch Tools Help

pattern_digital_display    TM1650.cpp    TM1650.h
  delay(2000);

  if (d.displayRunning("1234567890abcdefg")) {
    while (d.displayRunningShift()) delay(500);
  }
  delay(2000);

  for (int i = 0; i<20; i++) {
    d.displayOff();
    delay(200);
    d.displayOn();
    delay(200);
  }

Done compiling.
Sketch uses 4596 bytes (14%) of program storage space. Maximum is 32256 bytes.
Global variables use 718 bytes (35%) of dynamic memory, leaving 1330 bytes for local
```

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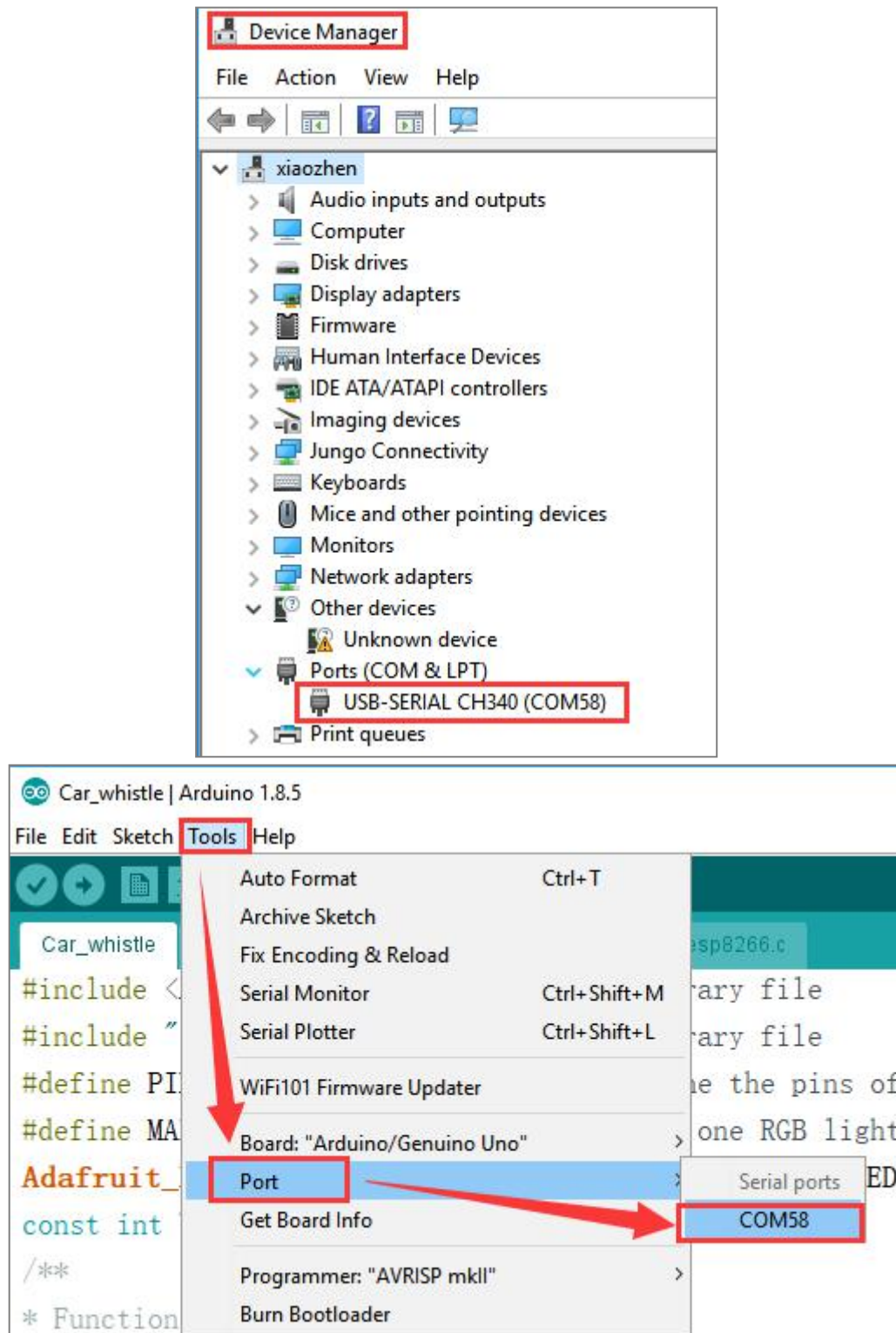
4.3 After the selection is completed, you need to click "→"under the menu bar to upload the code to the UNO board. When the word "Done uploading" appears in the lower left corner, the code has been successfully uploaded to the UNO board, as shown in the figure below.
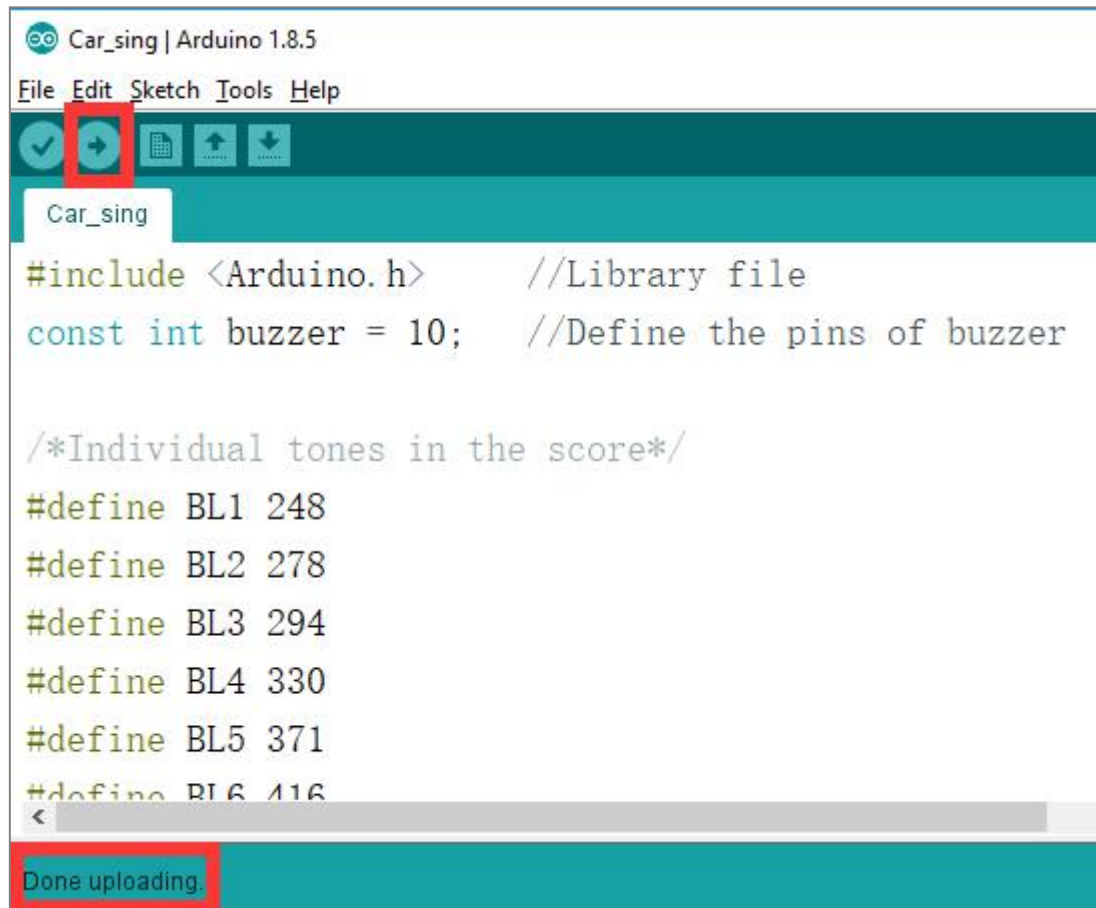
5. Phenomenon

After the program is downloaded successfully. Press the finger of ID1, the voice will announce "Hello, Welcome", and the other fingers will not announce.