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Introduction

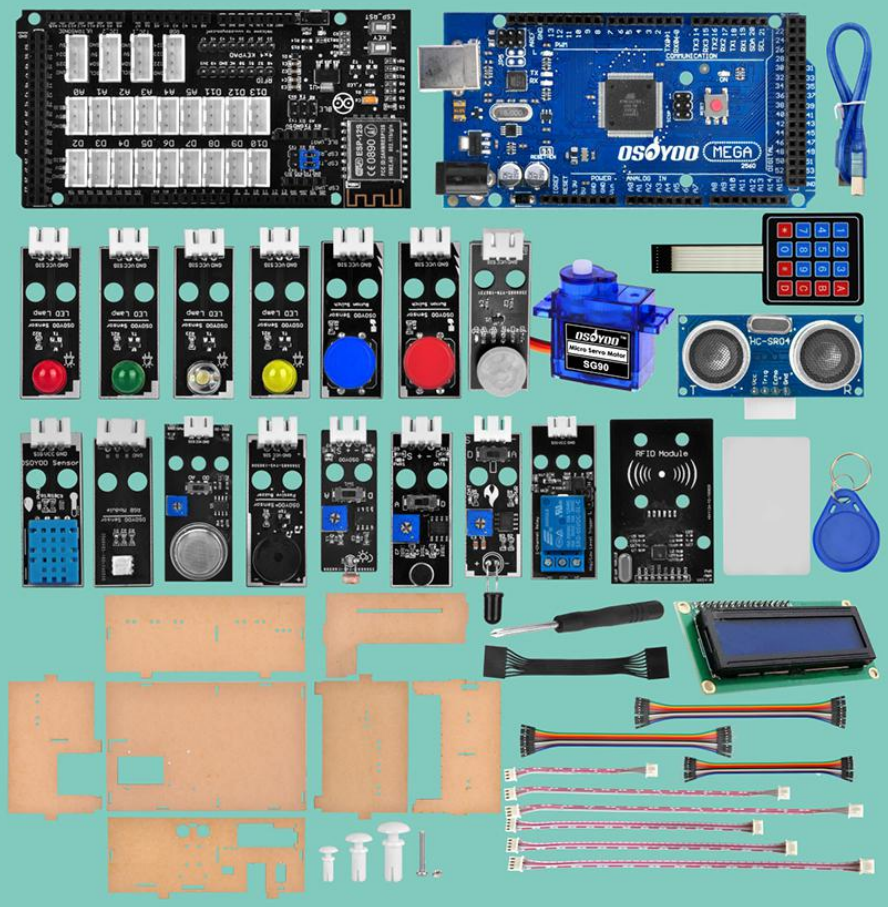
About this kit

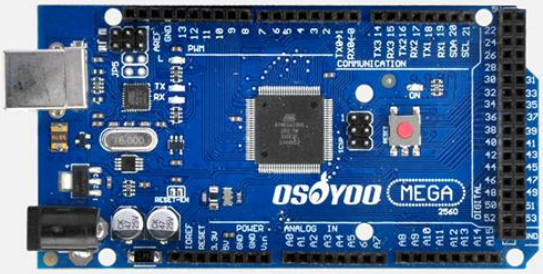
OSOYOO Smart Home IoT Learning Kit was designed to facilitate developers to quickly learn Arduino and IoT technologies.It help users to turn the idea into a practical application and make the Internet of Things a reality.

256KB of Flash | 8KB of RAM | 54 DIGITAL GPIO (15PWM, 6 ADC) | Based on Arduino ecosystem

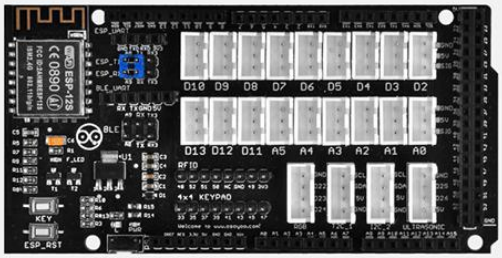
RFID Access Control | Password Control Open&Close | PIR Humen Motion Detection | Temperature& Humidity Monitoring

Plug and Play: The kit includes a MEGA-IoT Extension Board which makes sensors and actuators installation much easier than before.



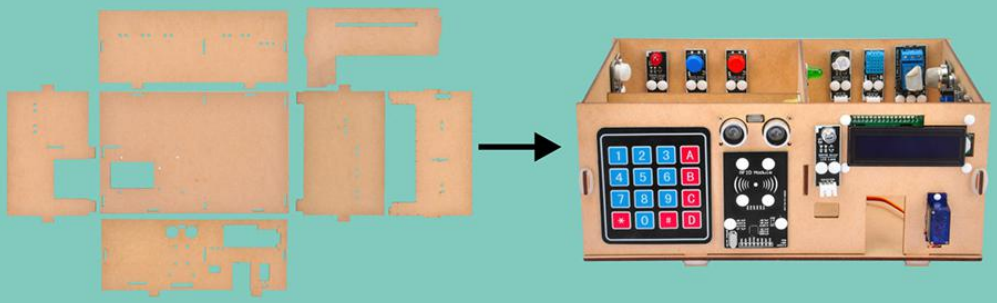


Outstanding performance and various interfaces make mega2560 a powerful Arduino board.



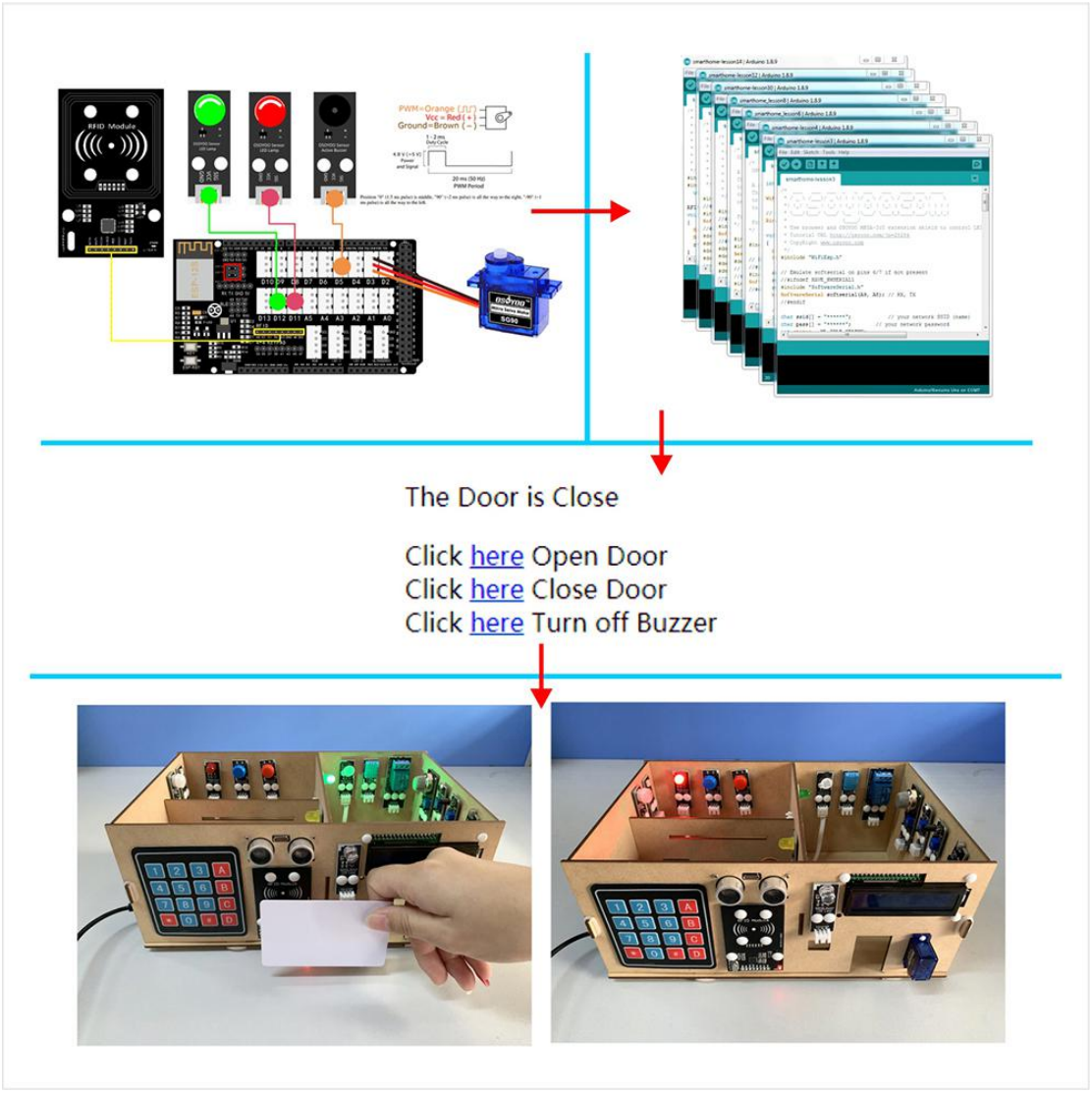
With the rich Plug and Play(PnP) connectors on the OSOYOO MEGA-IoT Extension Board, you can connect standardized OSOYOO sensor/actuator modules with the MEGA2560 conveniently!

Over here, we will show you how to implement a simple DIY home automation setup using this OSOYOO Smart Home IoT Learning Kit.



Features:

⊙Complete IoT Hardware Kit for beginner
⊙Based on Arduino ecosystem
⊙OSOYOO MEGA2560 (Arduino MEGA2560 compatible) as main controller
⊙Uses Arduino IDE as programming IDE and program loading
⊙256KB of Flash
⊙8KB of RAM
⊙54 DIGITAL GPIO (15PWM, 6 ADC)


The Door is Close
Click here Open Door
Click here Close Door
Click here Turn off Buzzer

OSOYOO MEGA-IoT Shield

WHAT IS OSOYOO MEGA-IOT SHIELD?

This ESP8266 is an ultra-low power UART WiFi module. The OSOYOO MEGA-IoT Shield is based on the ESP-12s with the ESP8266 WiFi chip. This shield is designed to easily connect your Arduino to the IoT world.

It is an Arduino shield which integrates famous ESP-12S WiFi module and provides low cost WiFi solution with any Arduino MEGA2560 projects. It is compatible with Arduino Mega2560, and possibly other pin compatible main boards.

Because of IoT (Internet of Thing), everything should be connected to Internet, a crucial element is WiFi that provides wireless connection to Internet. We have been carrying ESP module and many have used it. However it is not user friendly enough for beginner. The module is 3.3V powered and the pins are not properly broken out. Intergrating it to your microcontroller e.g.: Arduino will require some skill and electronics interface.

With this OSOYOO MEGA-IoT Shield, it will be plug and use for Arduino user. The shield come preassembled with ESP12S module which offers WiFi connection to your Arduino MEGA2560 board or project. No additional soldering or wiring needed, just stack the shield on to Arduino or any compatible Arduino main board, select the pins for serial communication with mini jumpers and the hardware connection is completed! Focus in program development, and the good news, there are plenty of libraries that you can utilize, we will show you the steps!

The ESP12S comes pre-flashed with an AT-command firmware, so it can be controlled by any UART/Serial, but it also breaks out and provides command access to all of the ESP8266’s I/O. The shield itself does not limit to AT command, we have breakout most of the IO and you can program the ESP12S module directly. Whether you want to add AT commands of your own, or flash custom firmware on the ESP8266, this feature may come in handy especially with it utilizing the UART pin selectors.

FEATURES

1. Standard pin interface to achieve full compatibility with the pitch Arduino Uno, Mega and so on. (Unless the standard size Arduino, such as Nano, Mini)

2. 3.3V power supply using advanced chip (with the official expansion board power

chip ESP12S same), so 3.3V Arduino board provided more accurate, so ESP8266 as official chip work as normal, there is no gap.

3. It leads to a WiFi module power supply / service interface to facilitate developers to extend the power supply and maintenance.

4. Onboard ESP8266-12 stable industrial grade serial WiFi module, using an enhanced PCB antenna, signal better.

5. You can quickly switch DIP switch ESP8266-12 industrial grade WiFi stable operation mode (such as operating mode and upgrade mode) module, integrated serial chip, quickly flashing the firmware.

6. Built-in 5V to 3.3V TTL level converter to prevent high-pressure Arduino TTL level of the WiFi module damage.

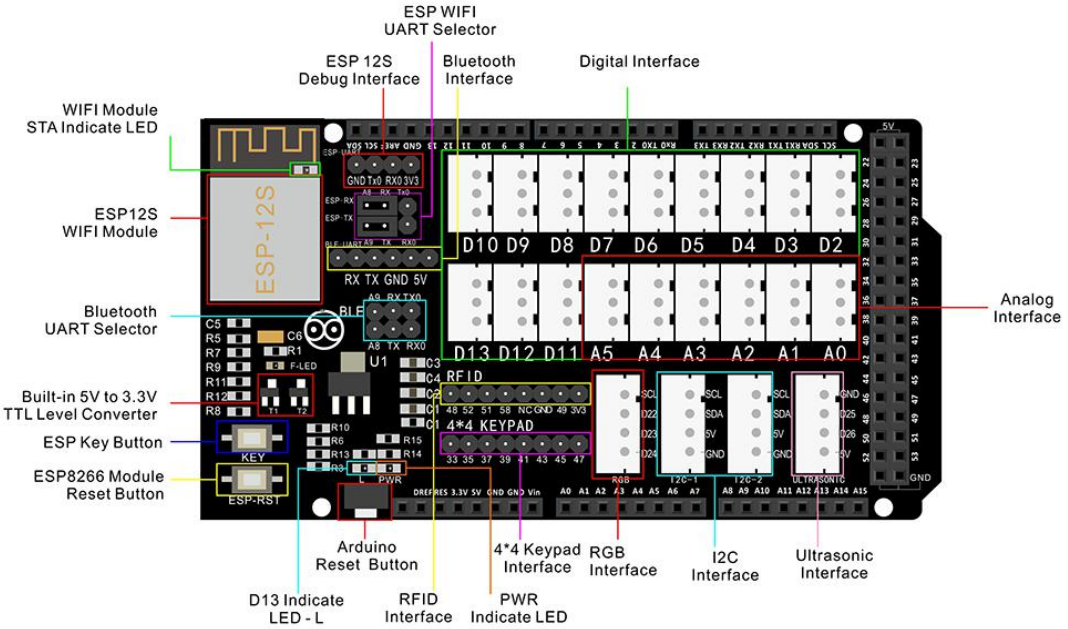
7. Onboard ESP8266-12 stable industrial grade WiFi module with a metal shield, immunity to interference.

8. Onboard ESP8266-12 standard pitch leads to a stable industrial grade WiFi module all interfaces, enabling developers to easily develop deep.

9. Use stackable design, it can continue to accumulate above the other modules, easy to use.

10. Onboard four LED displays the status of ESP8266, namely PWR, L, STA

SPECIFICATIONS



Input Voltage: +5VDC Internal Source+7V to 9VDC[External Source)

ESP8266 Module Supply: +3.3VDC

ESP Shield Default Baudrate Settings are 9600 kbps baudrate, 8 bit data, 1 stop bit and no parity

Onboard ESP12S WiFi module with preloaded AT firmware

Jumper selectors for software or hardware UART and PC-ESP communication.

Stackable Digital I/O header: This header pin is Digital I/O pin stacked to the OSOYOO MEGA2560 board. Other Arduino shield can be stacked on top of this stackable header.

Stackable Analog Input pin header: This header pin is Analog Input pin stacked to the OSOYOO MEGA2560 board. Other Arduino shield can be stacked on top of this stackable header.

Serial Selector: User may select A8 as the RX pin, select A9 as the TX pin from OSOYOO MEGA2560 board with the mini jumpers.

Lesson 1: Internet of Things

WHAT IS THE INTERNET OF THINGS?

In a nutshell, the Internet of Things is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a giant network of connected things and people – all of which collect and share data about the way they are used and about the environment around them.

The Internet of Things is actually a pretty simple concept, it means taking all the things in the world and connecting them to the internet.

There are three key elements of IoT:

- **Devices** — Rather than conventional devices like smartphones and computers, “devices” in IoT can be anything from a toaster to complex machines in industries.
- **Data** — This is where IoT holds its value. Data is of utmost importance, as this is the basis for intelligent decision making.
- **Connectivity** – Obviously, the devices require some sort of network connection to communicate. There are a bunch of network architectures available today, which can be used for seamless transmission of data. A lot of IoT-specific networks are also in the works.

Why IoT Matters?

In short words, IoT will improve our life quality and productivity in an amazing way. In

next 5 to 10 years, as the 5G network being deployed to every corner of our world, IoT will be part of daily life and generate a lot of business opportunities and job positions. So it is never too late to learn IoT technology in the coming smart society.

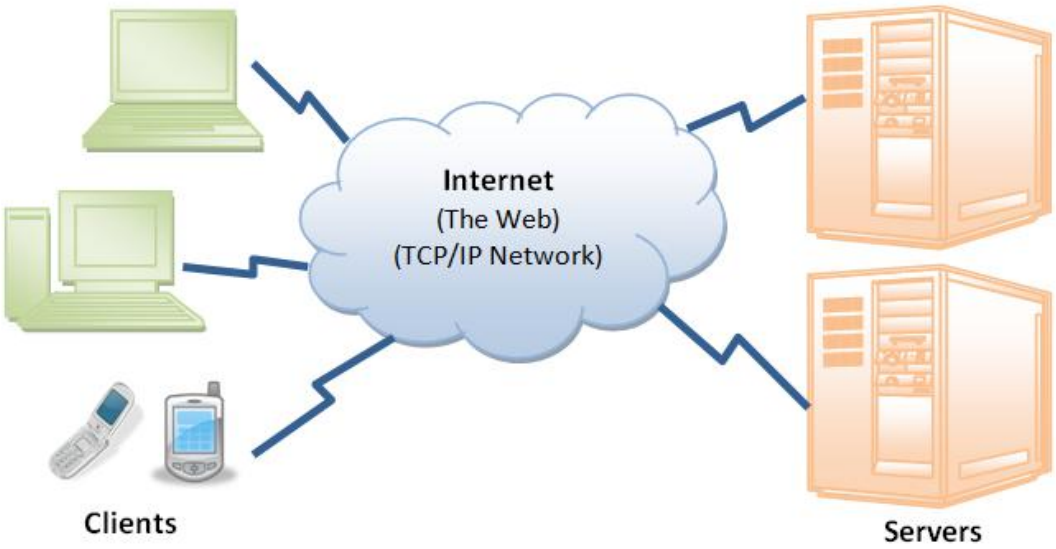
WHAT IS HTTP?

HTTP stands for **H**yper **T**ext **T**ransfer **P**rotocol.

Introduction

The WEB

Internet (or The Web) is a massive distributed client/server information system as depicted in the following diagram.



Many applications are running concurrently over the Web, such as web browsing/surfing, e-mail, file transfer, audio & video streaming, and so on. In order for proper communication to take place between the client and the server, these applications must agree on a specific application-level protocol such as HTTP, FTP, SMTP, POP, and etc.

WORLD WIDE WEB COMMUNICATION

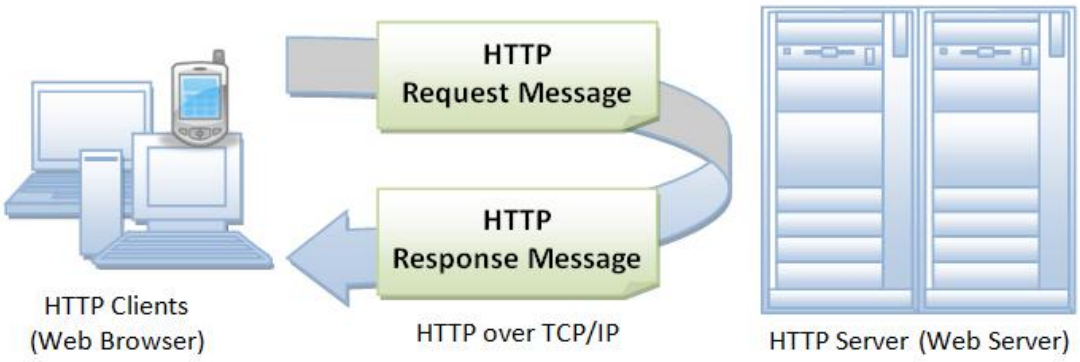
The World Wide Web is about communication between web **clients** and web **servers**.

Clients are often browsers (Chrome, Edge, Safari), but they can be any type of program or device.

Servers are most often computers in the cloud.

HYPERTEXT TRANSFER PROTOCOL (HTTP)

- HTTP (Hypertext Transfer Protocol) is perhaps the most popular application protocol used in the Internet (or The WEB).
- HTTP is an asymmetric request-response client-server protocol as illustrated. An HTTP client sends a request message to an HTTP server. The server, in turn, returns a response message. In other words, HTTP is a pull protocol, the client pulls information from the server (instead of server pushes information down to the
  client).



- HTTP is a stateless protocol. In other words, the current request does not know what has been done in the previous requests.
- HTTP permits negotiating of data type and representation, so as to allow systems to be built independently of the data being transferred.
- Quoting from the RFC2616: “The Hypertext Transfer Protocol (HTTP) is an application-level protocol for distributed, collaborative, hypermedia information systems. It is a generic, stateless, protocol which can be used for many tasks beyond its use for hypertext, such as name servers and distributed object management systems, through extension of its request methods, error codes and headers.”

HTTP REQUEST / RESPONSE

Communication between clients and servers is done by **requests** and **responses**:

A client (a browser) sends an **HTTP request** to the web
An web server receives the request
The server runs an application to process the request
The server returns an **HTTP response** (output) to the browser
The client (the browser) receives the response

WHAT IS HTML?

HTML is the standard markup language for creating Web pages.

- HTML stands for Hyper Text Markup Language
- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements are represented by tags
- HTML tags label pieces of content such as “heading”, “paragraph”, “table”, and so on
- Browsers do not display the HTML tags, but use them to render the content of the page

A SIMPLE HTML DOCUMENT

Example

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>

<h1>My First Heading</h1>
<p>My first paragraph.</p>

</body>
</html>
```

Try it Yourself »

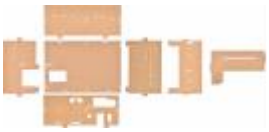
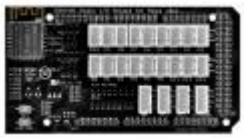
Example Explained

- The `<!DOCTYPE html>` declaration defines this document to be HTML5
- The `<html>` element is the root element of an HTML page
- The `<head>` element contains meta information about the document
- The `<title>` element specifies a title for the document
- The `<body>` element contains the visible page content
- The `<h1>` element defines a large heading
- The `<p>` element defines a paragraph

You can learn more about HTML from: https://www.w3schools.com/html/default.asp

Lesson 2: Model Installation

PARTS & DEVICES

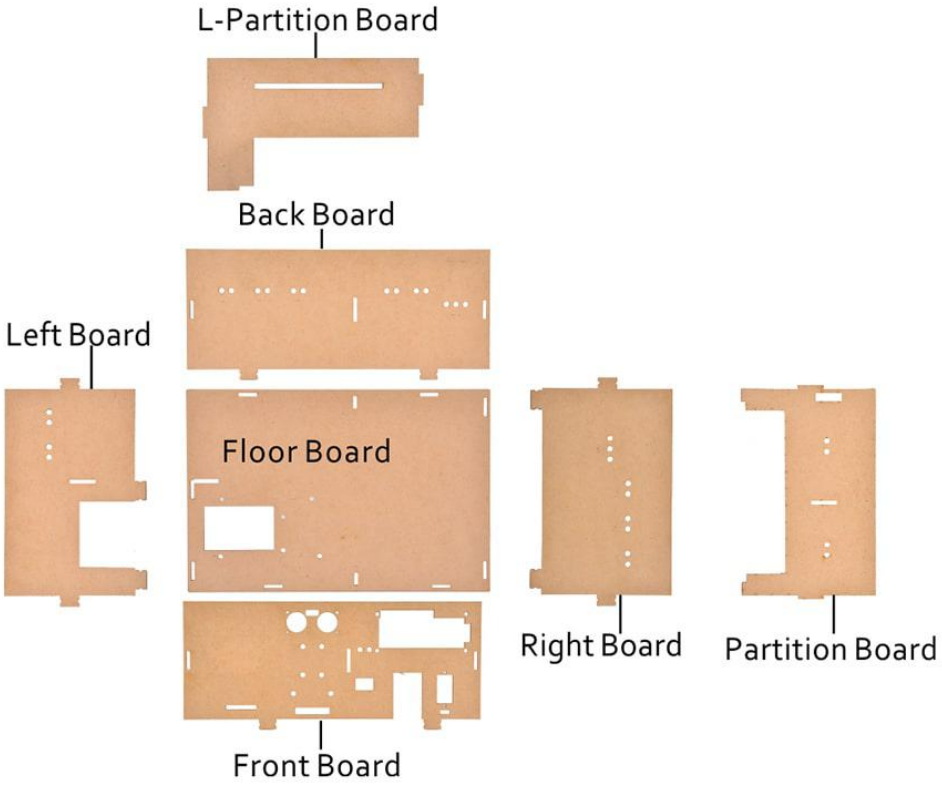
No.	Device	Picture	Qty.	Accessories
1	Wooden House Model		1	Rubber Rings
2	OSOYOO MEGA2560 Board		1	
3	OSOYOO MEGA-IoT Extension Board		1	
4	Photosensitive Sensor		1	
5	Temp & Hum Sensor		1	
6	Buzzer Module		1	
7	Flame Detection Sensor		1	

8	1-Channel Relay		1	
9	Micro Servo Motor		1	
10	RGB Module		1	
11	Ultrasonic Sensor		1	
12	PIR Motion Sensor		1	
13	Microphone Module		1	
14	1602 I2C LCD Screen		1	
15	Gas Detection Module		1	
16	RFID Module		1	

17	4*4 Keypad		1	
18	Yellow LED Module		1	
19	Red LED Module		1	
20	Green LED Module		1	
21	White LED Module		1	
22	Red Button Module		1	
23	Blue Button Module		1	
24	Philips Screwdriver		1	
25	M1.4*10 Screws & Nuts		4	

26	M2 Push Pin Rivets		2	
27	M3 Push Pin Rivets		10	
28	M4 Push Pin Rivets		38	

MODEL INSTALLATION

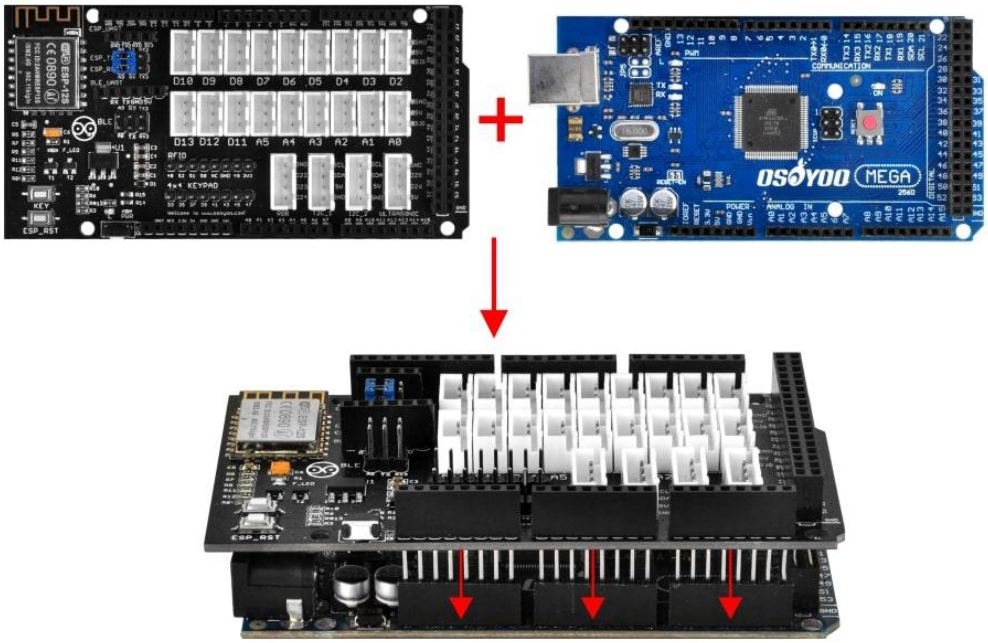


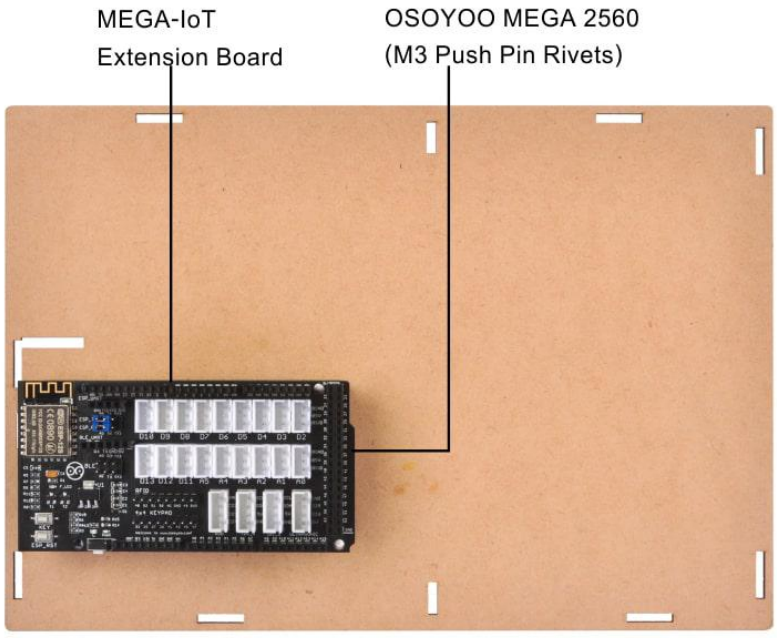
1. FLOOR BOARD

Please plug **OSOYOO MEGA-IoT Extension Board** in OSOYOO Mega2560 board.
(If the extension board has been plugged, please keep it.)

Then use **M3 Push Pin Rivets** to install **OSOYOO Mega2560 board** on the wooden floor board.

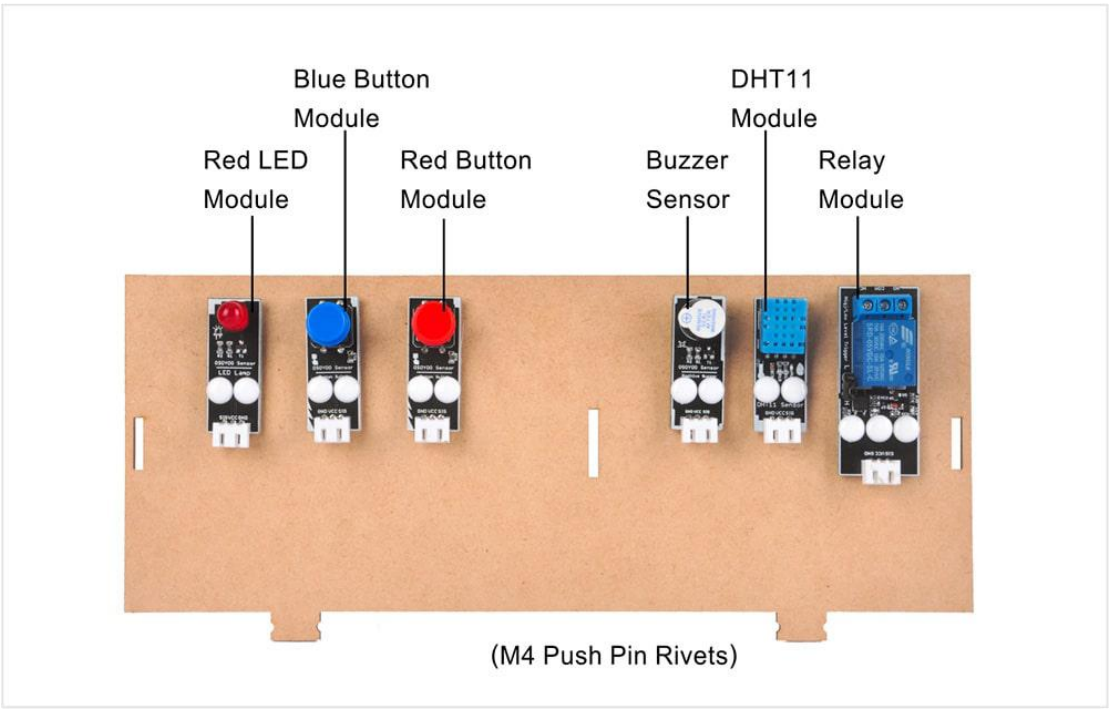
Notice: Please install the **M3 Push Pin Rivets** from the back side of the floor board.





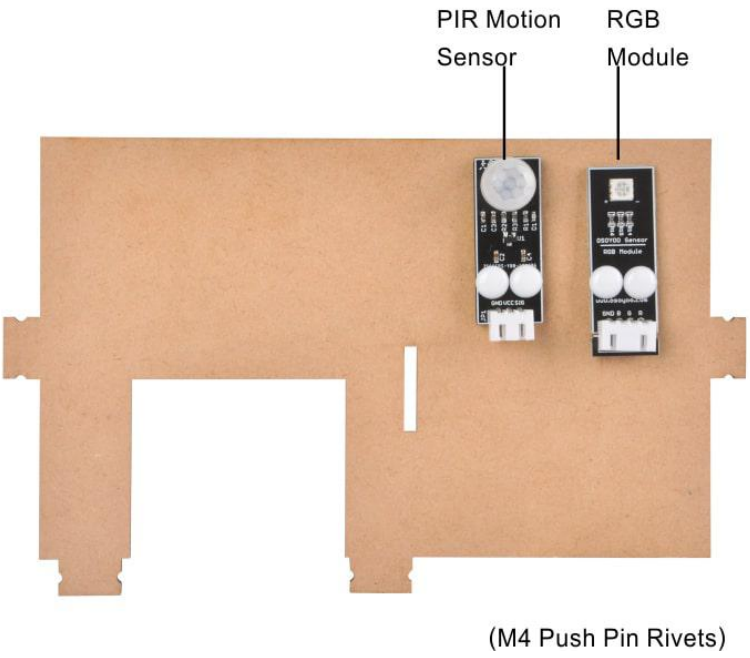
2 BACK BOARD

Use **M4 Plastic Fastener** to install the following modules on the back board:



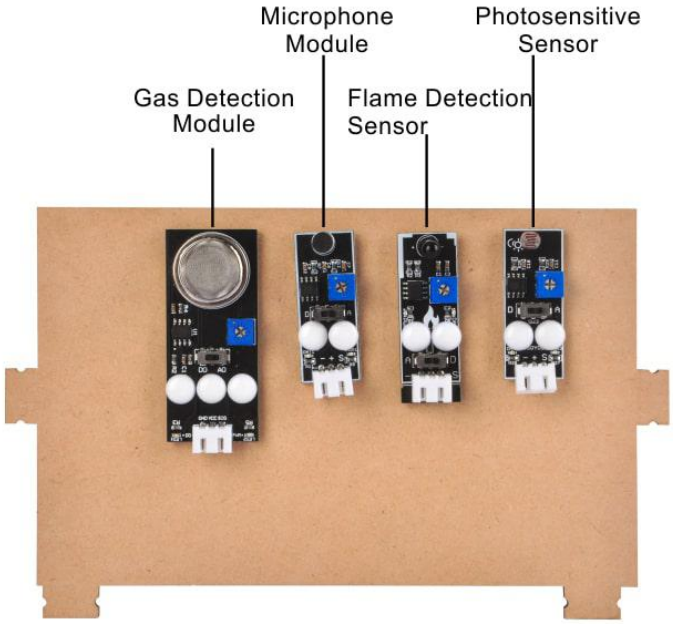
3 LEFT BOARD

Use **M4 Plastic Fastener** to install the following modules on the left board:



4 RIGHT BOARD

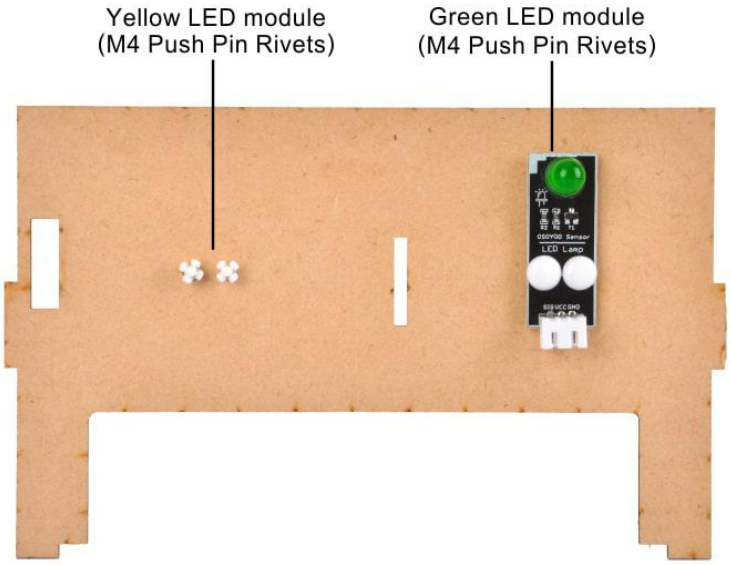
Use **M4 Plastic Fastener** to install the following modules on the right board:



(M4 Push Pin Rivets)

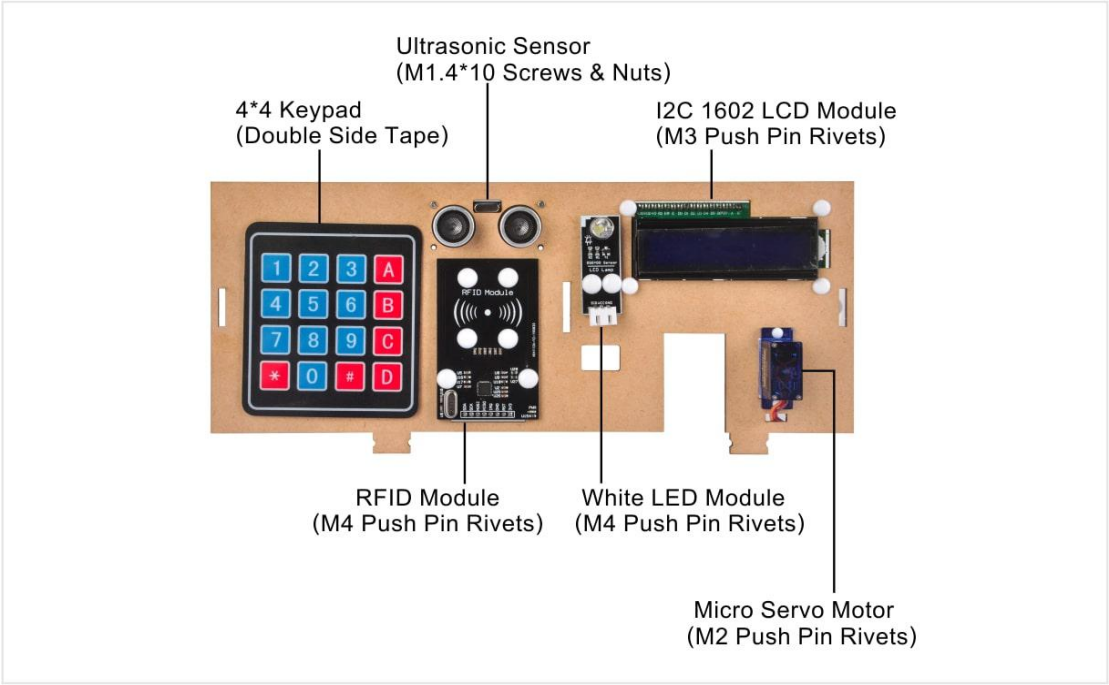
5 PARTITION BOARD

Use **M4 Plastic Fastener** to install the following modules on the partition board:



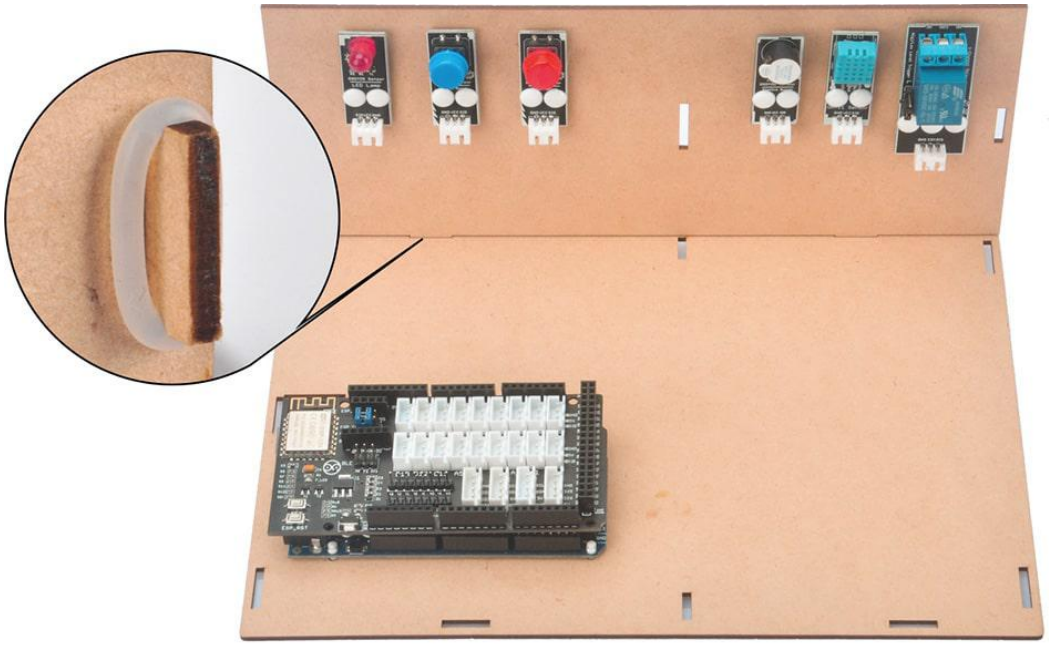
6 FRONT BOARD

Install the following modules on the partition board:

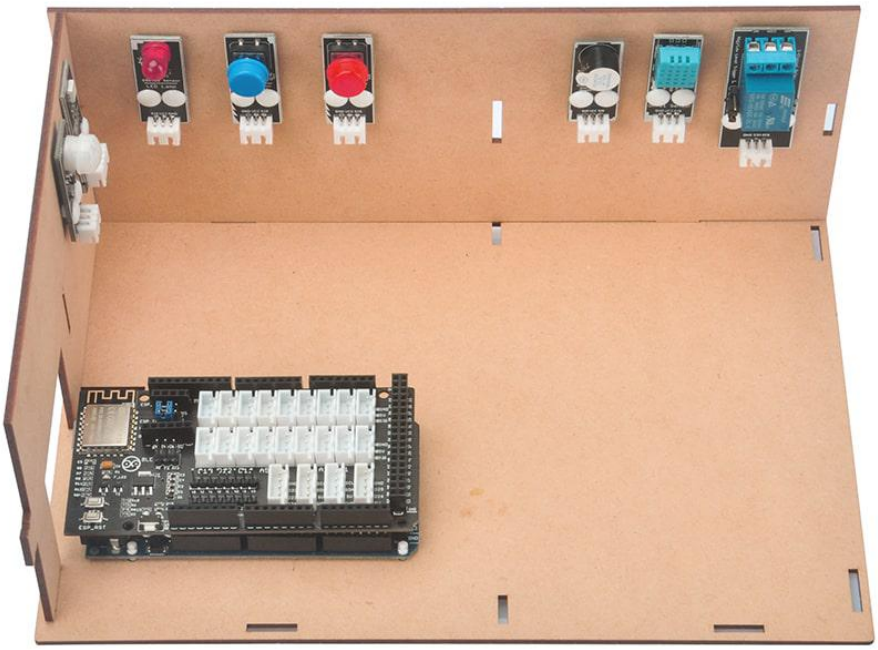


7 ASSEMBLE

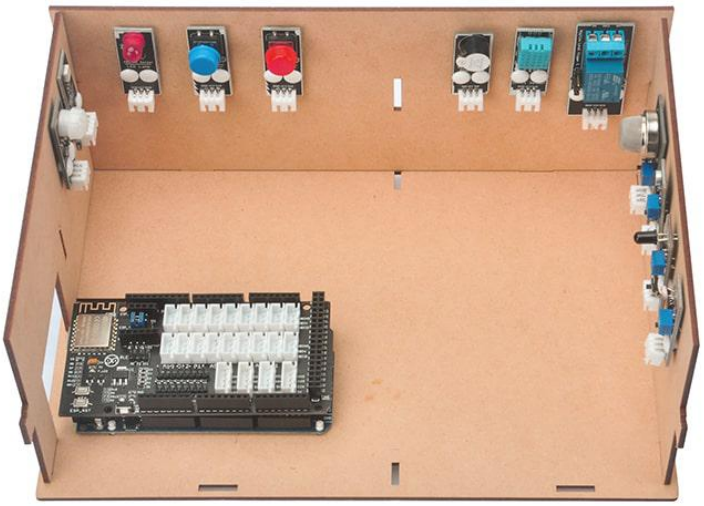
Step1: Insert the Back Board into Floor Board and fasten it with rubber rings (see picture).



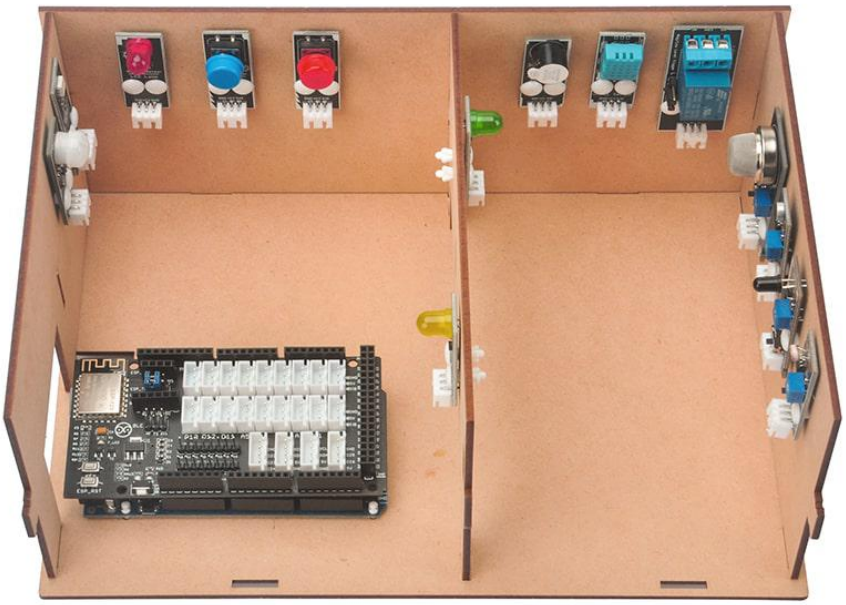
Step2: Insert the Left Board into Floor Board and fasten it with rubber rings.



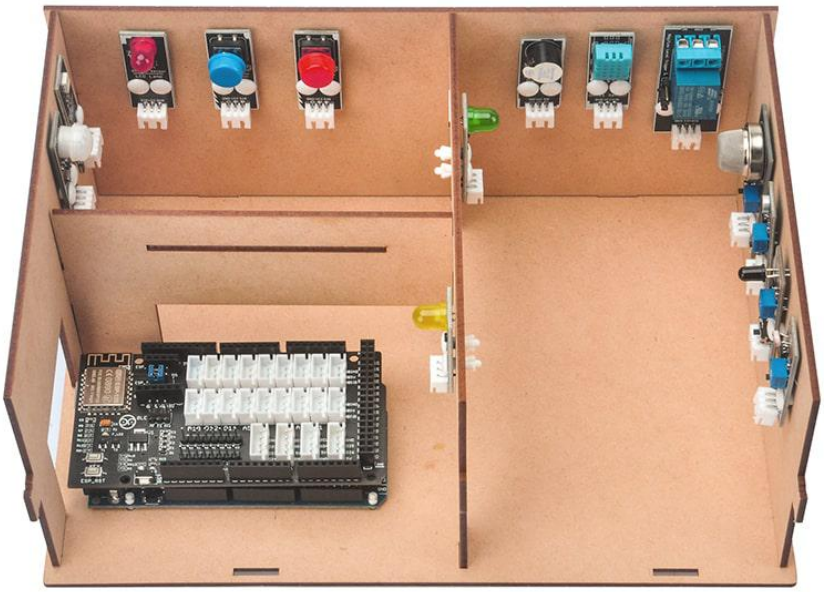
Step3: Insert the Right Board into Floor Board and fasten it with rubber rings.



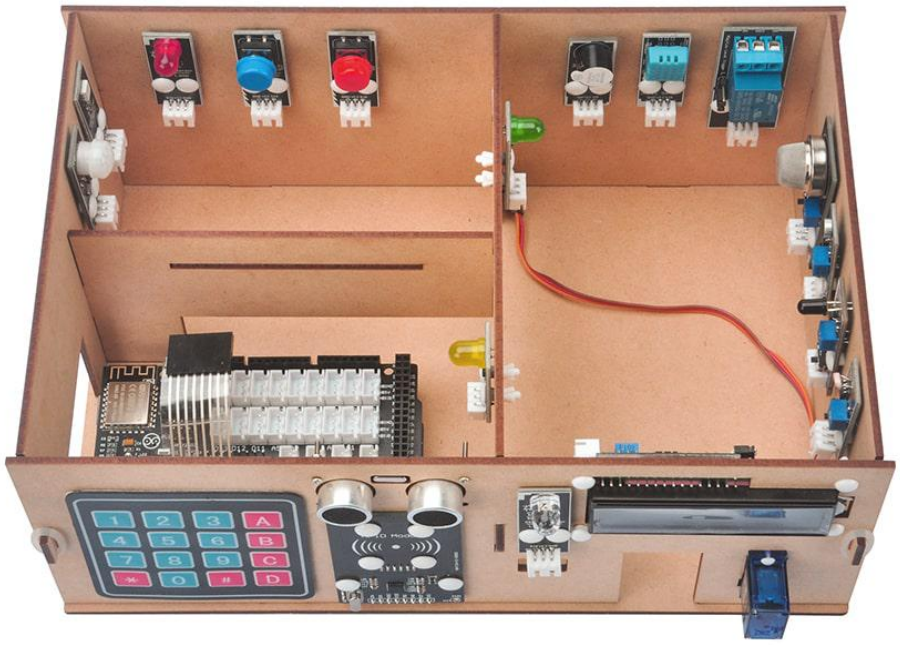
Step4: Insert the Partition Board into middle of Floor Board.



Step5: Insert the L-Partition Board between Left Board and Partition Board.



Step6: Insert the Front Board into Floor Board and fasten it with rubber rings.



The model installation is completed, the wire connection and projects please view the subsequent lessons of OSOYOO Smart Home IoT Learning Kit with MEGA2560.

Lesson 3: Hello World

OBJECTIVE

In order to connect our Things to Internet, we need select some Internet communication protocol so that different internet device can talk with each other. Some commonly used IoT protocols are HTTP, MQTT etc.

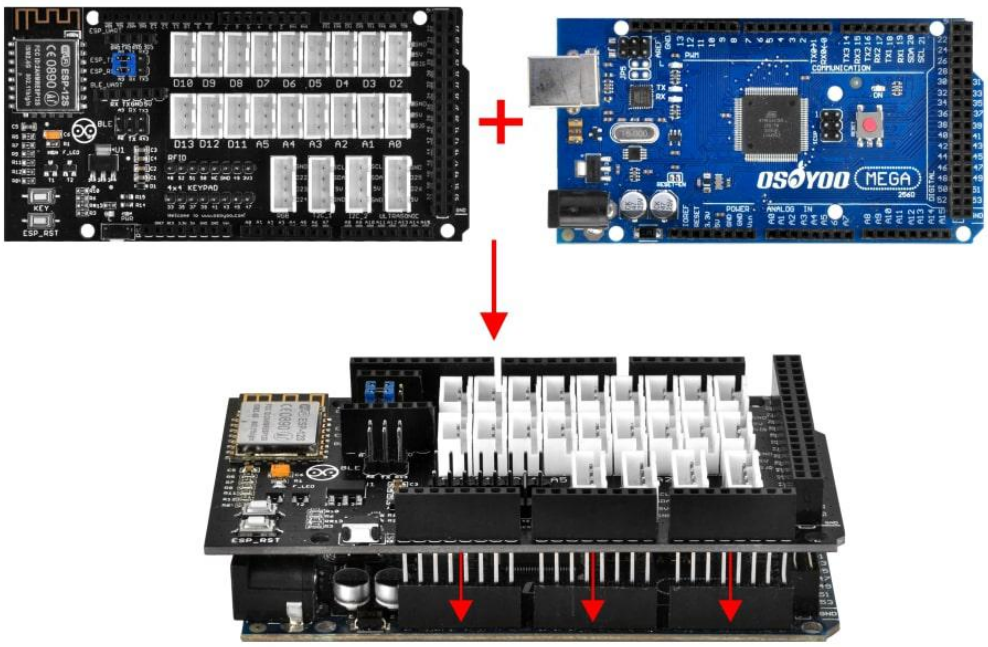
In this lesson, we will learn how to use HTTP protocol and how to make simple HTTP web server with Osoyoo MEGA-IoT shield and MEGA2560 micro-controller and show a “Hello World!” web page to remote browser . The web page also shows the input voltage of A0 pin which is detected by Arduino analogRead() functions.

PARTS & DEVICES

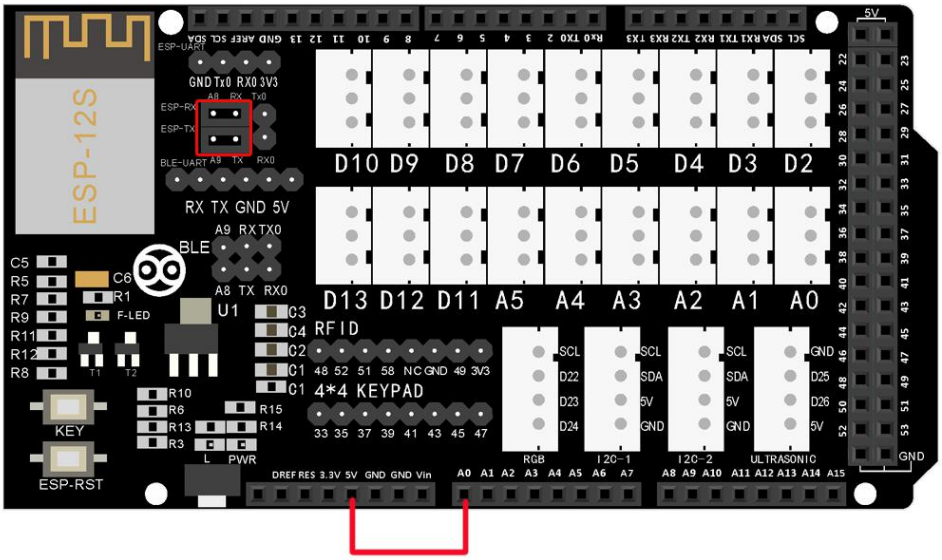
- OSOYOO MEGA 2560 board x 1
- OSOYOO MEGA-IoT extension board x 1
- USB Cable x 1
- Male to Male jumper wire x 1

HOW TO MAKE

1) . Please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



2) . Connect A0 to 5V by Male to Male jumper wire. (Jumper Cap should connect ESP8266 RX with A8, TX with A9).



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Software Installation

Open-source Arduino Software(IDE)		Download Arduino IDE here: https://www.arduino.cc/en/Main/Software?setlang=en
7 zip is a free zip utility that un-zips zip files		Download 7zip here for free https://www.7-zip.org/

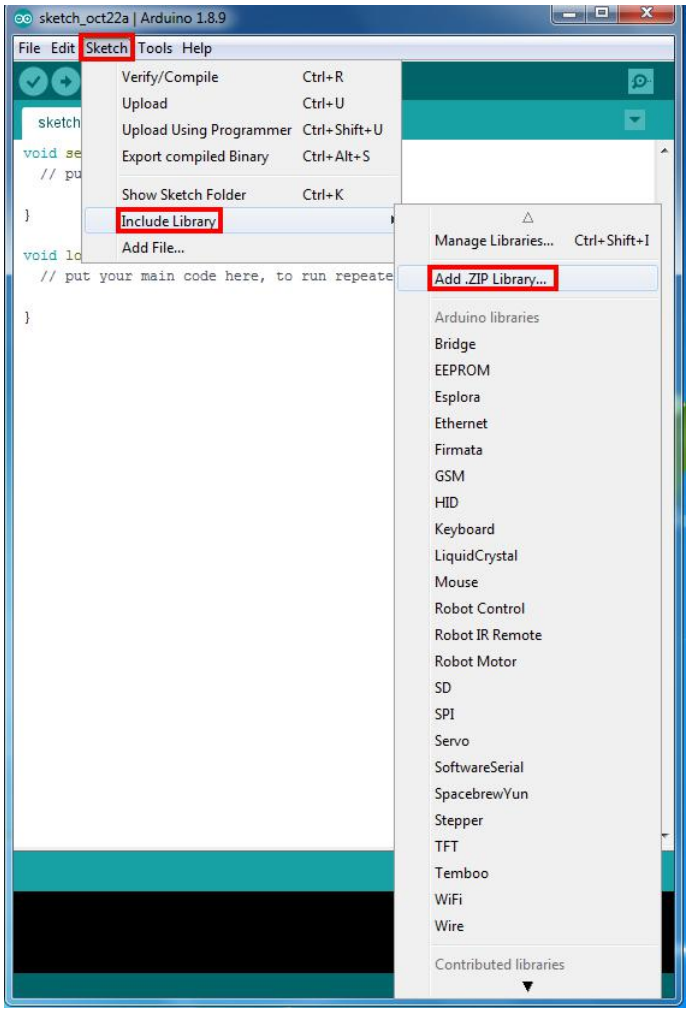
Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software.

Step 2 OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in

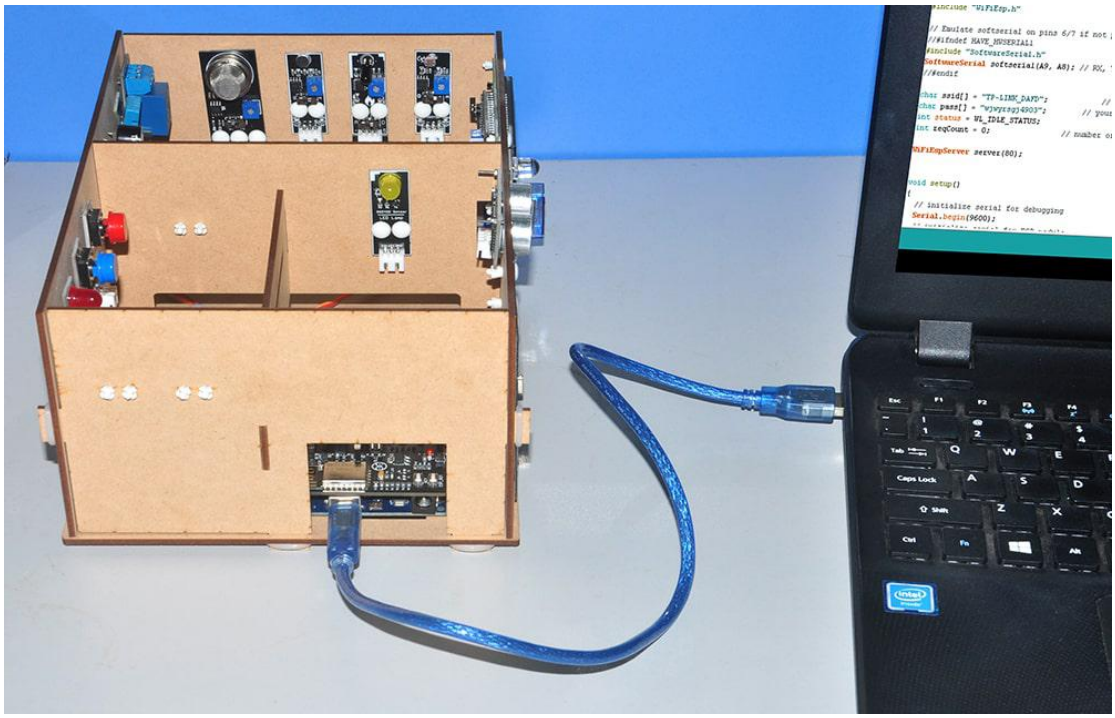
Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in software serial object).we need download WiFiEsp-master library from following link firstly: http://osoyoo.com/driver/WiFiEsp-master.zip

Step3 Open Arduino IDE ->Sketch ->Include Library ->Add ,Zip library to load above zip files into Arduino IDE.

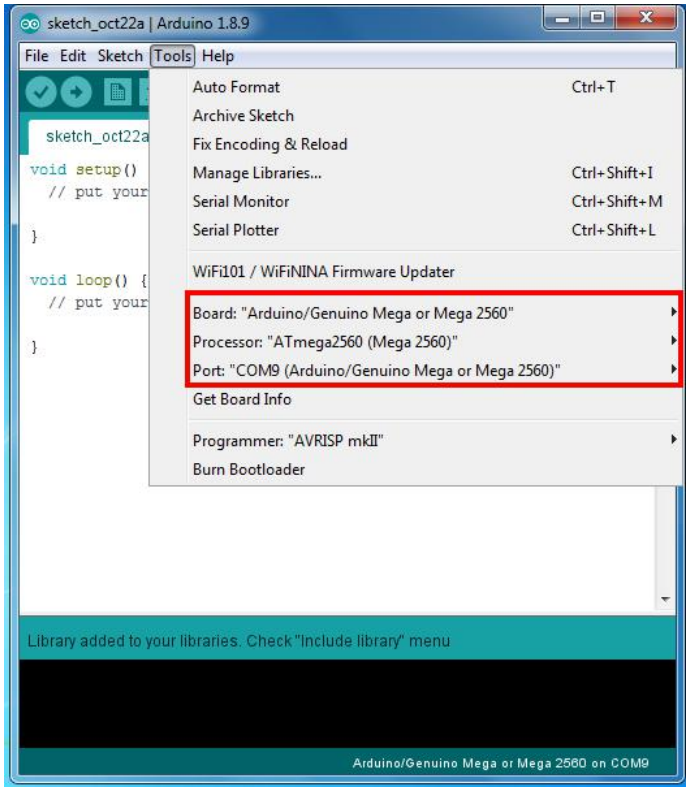


Step 4 After installing above library, please download the main code from following link.unzip the download zip file lesson3.zip, you will see a folder called smarthome-lesson3.
http://osoyoo.com/driver/smarthome/smarthome-lesson3.zip

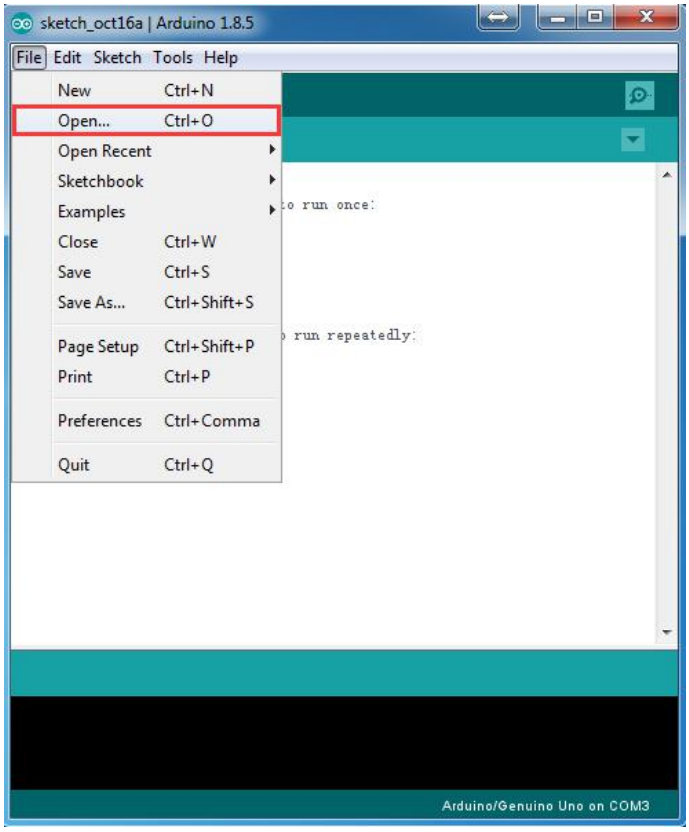
Step 5 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 6 Open the Arduino IDE and choose corresponding board type and port type for you project.



Step 7 Arduino IDE: Click file -> click Open -> choose code “smarthome-lesson3”, load up the sketch onto your Arduino.

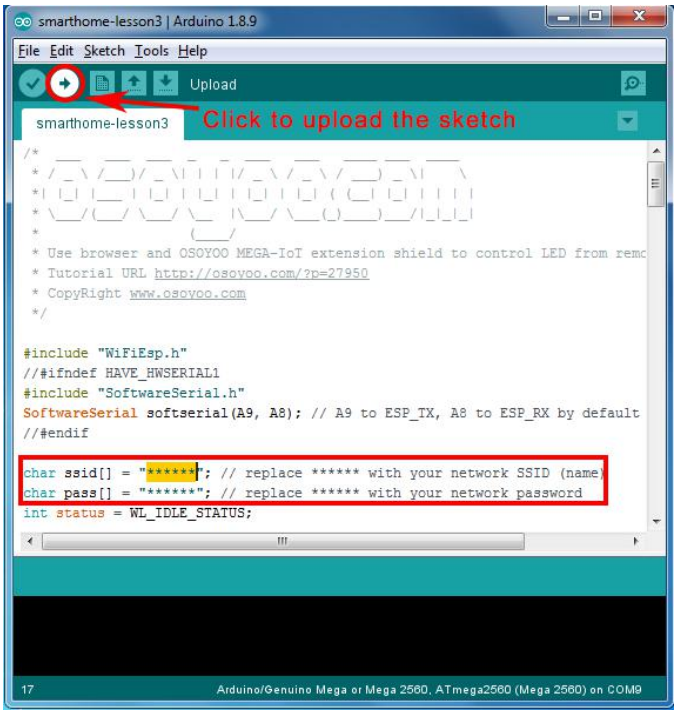


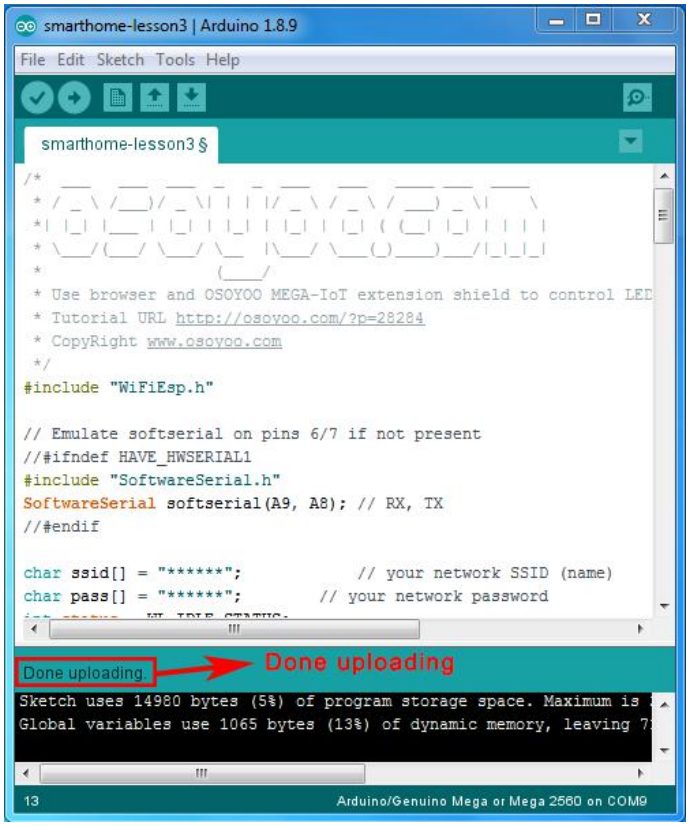
Note: In the sketch, find following lines:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

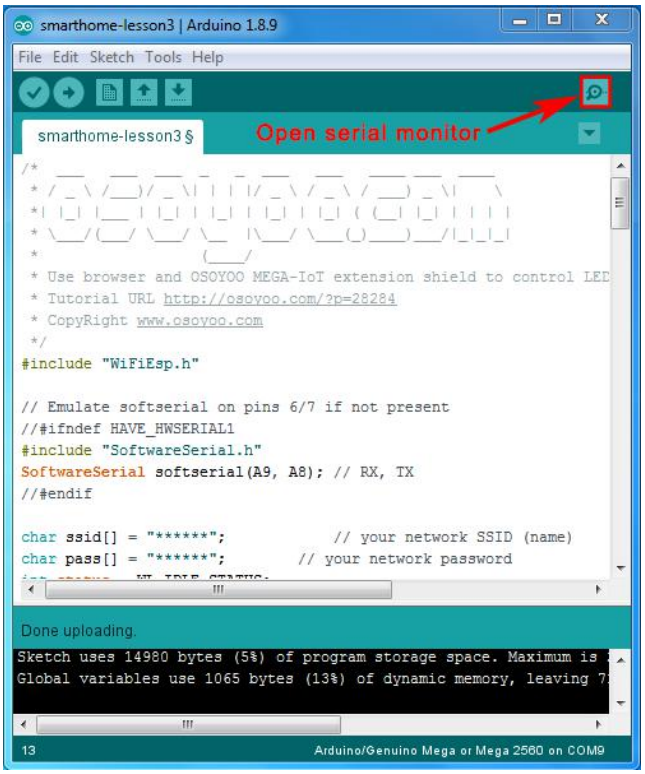
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

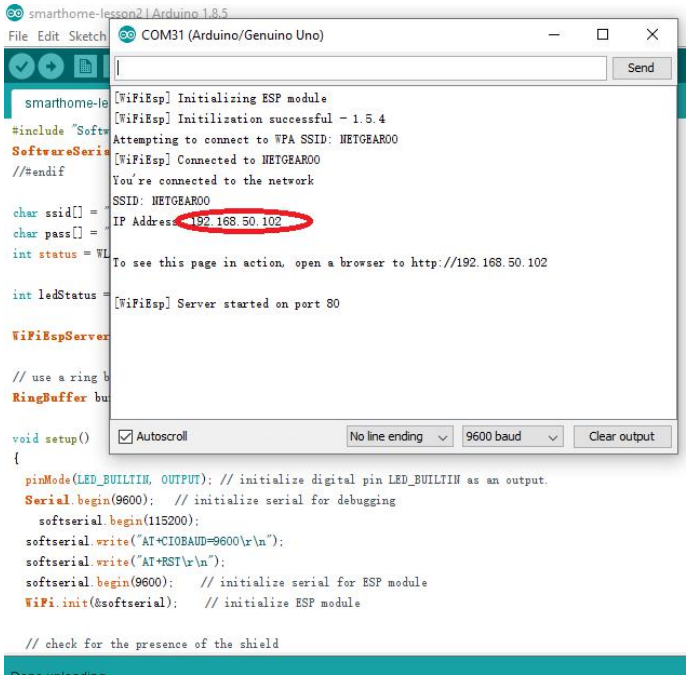




HOW TO PLAY

After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:

Above result also shows the A0 pin input voltage through analogRead(0) function in line 94. analogRead() can read the input 0-5V voltage and return a value between 0 to 1023 standing for the voltage. We have connected A0 to 5V, so above Analog input A0: shows 1023.

Lesson 4: Remote Control LED

OBJECTIVE

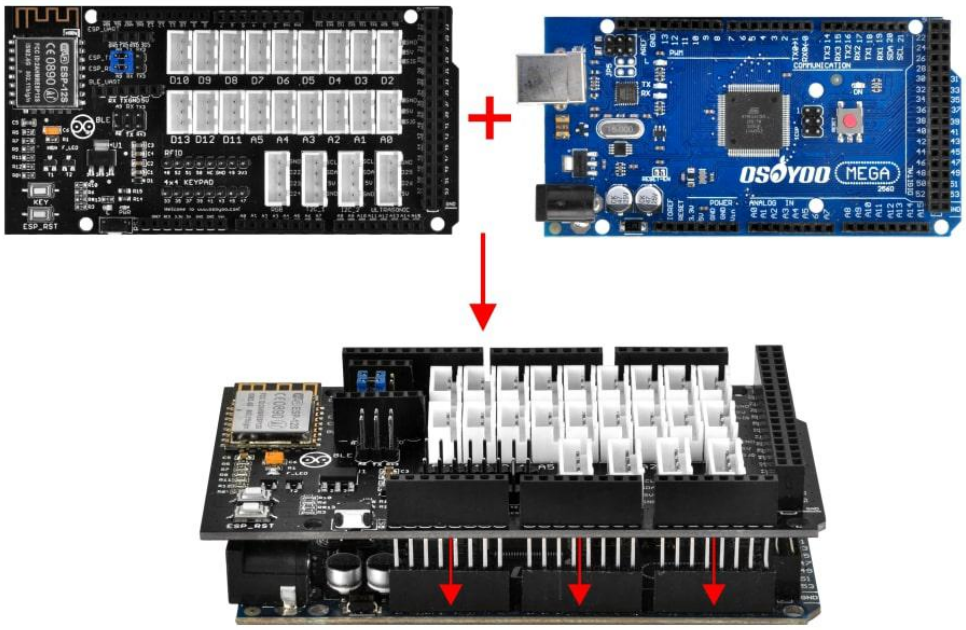
In this lesson, we will show you how to make simple Internet of Things (IoT) project – to turn on/off an LED from a remote browser .
We will use OSOYOO Mega-IoT Shield to connect LED and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server and control the LED connected to D13 pin of MEGA2560.

PARTS & DEVICES

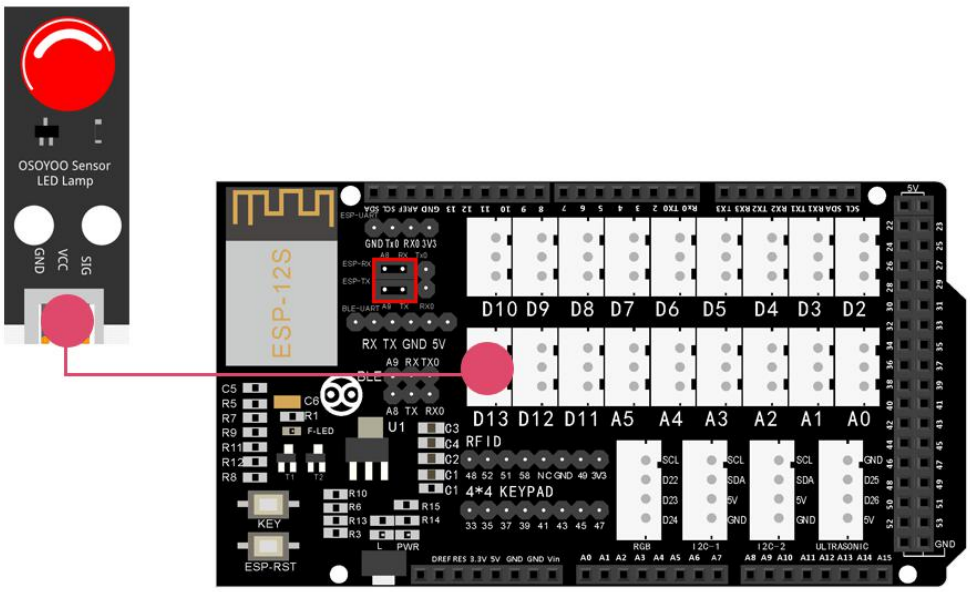
- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- LED PnP Module x 1
- OSOYOO 3-Pin PnP Cable x 1
- USB Cable x 1
- PC x 1

HOW TO MAKE

First, please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the LED module to the D13 port of the OSOYOO MEGA-IoT Extension Board with a 3-pin PnP cable as below (Jumper Cap should connect ESP8266 RX with A8, TX with A9):



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step)

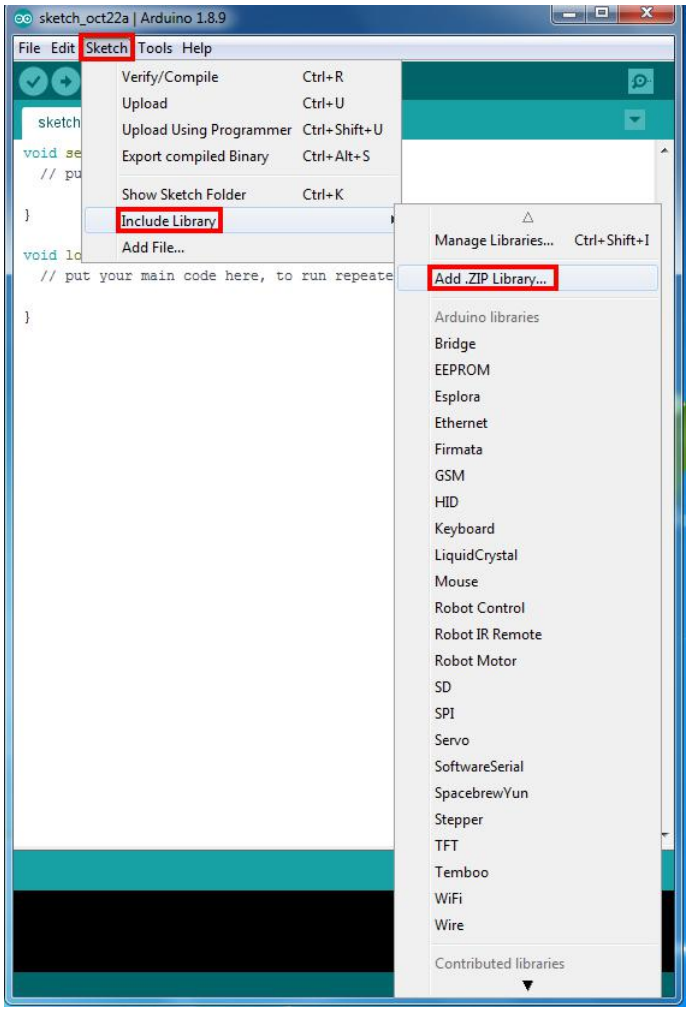
Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

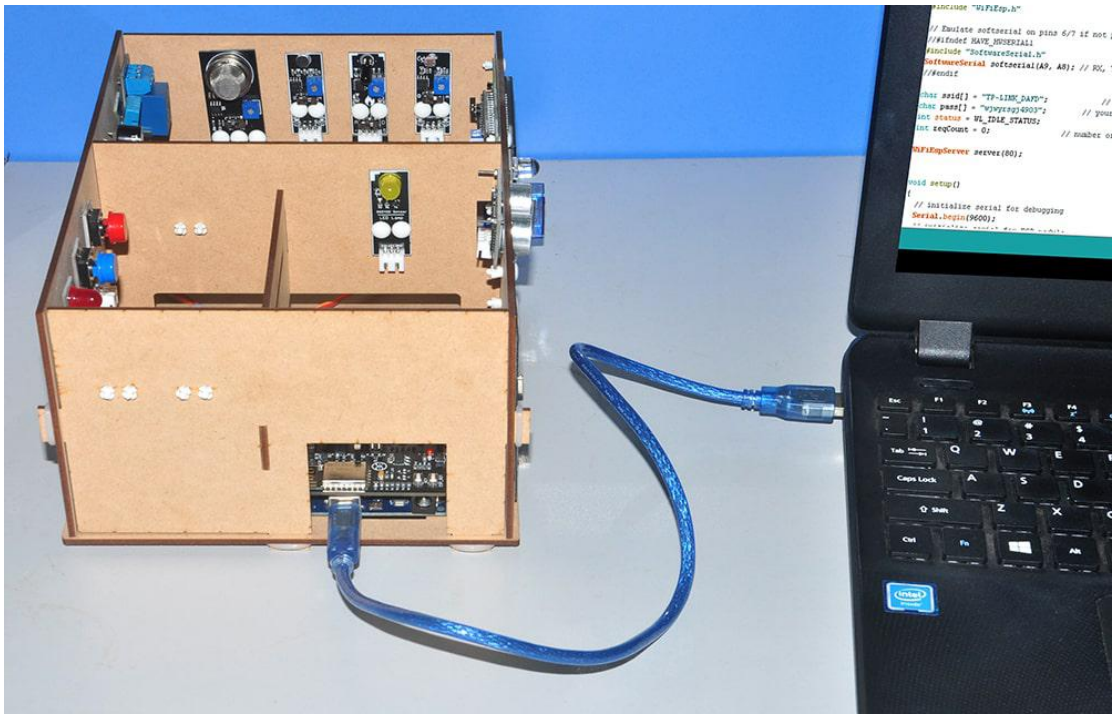
To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.

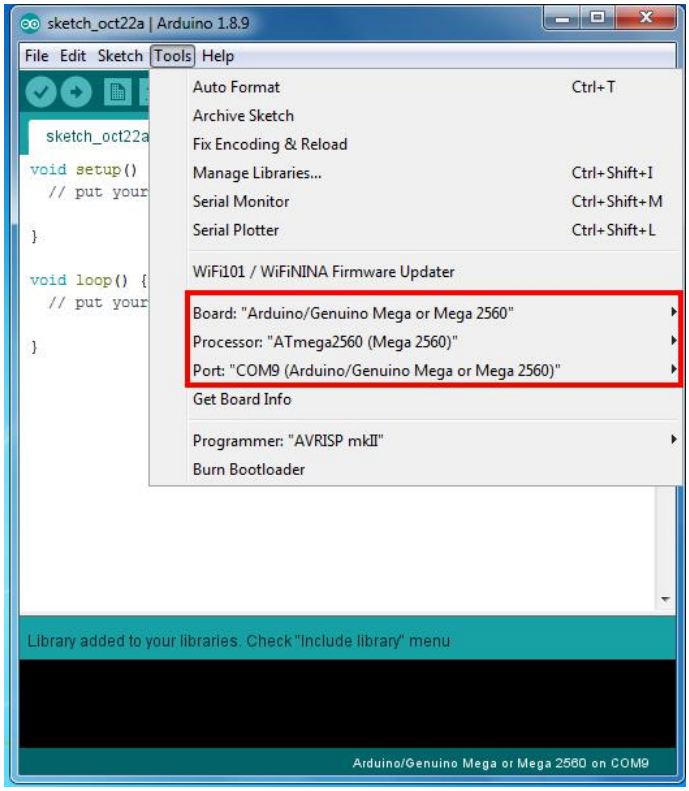


Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson4”:
http://osoyoo.com/driver/smarthome/smarthome-lesson4.zip

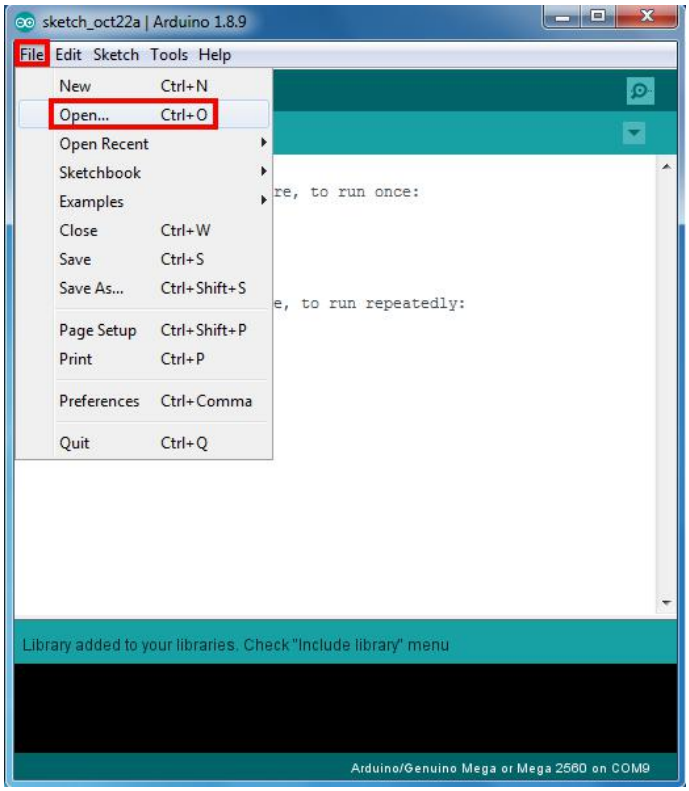
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Arduino IDE: Choose corresponding board type and port type for you project .



Step 6 Arduino IDE: Click file – Open, then choose code “smarthome-lesson4.ino” in the folder, load up the sketch onto your Arduino.

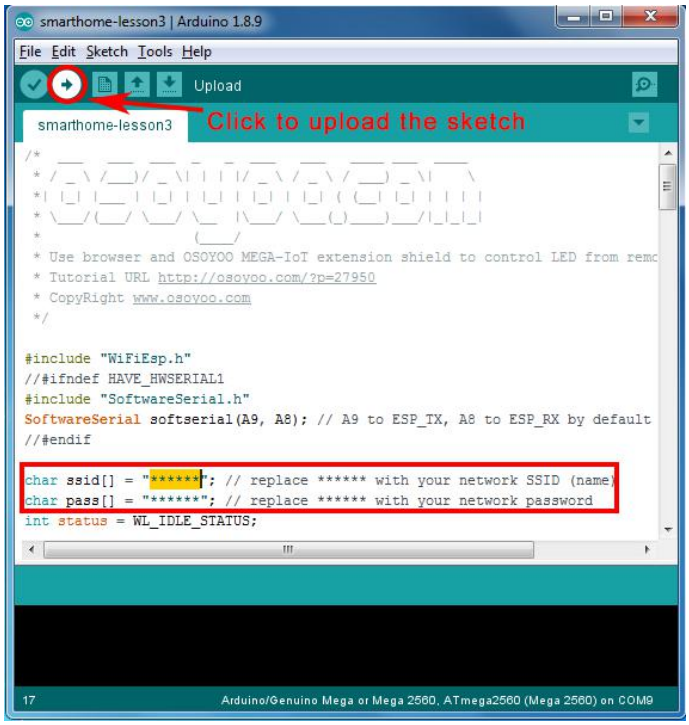


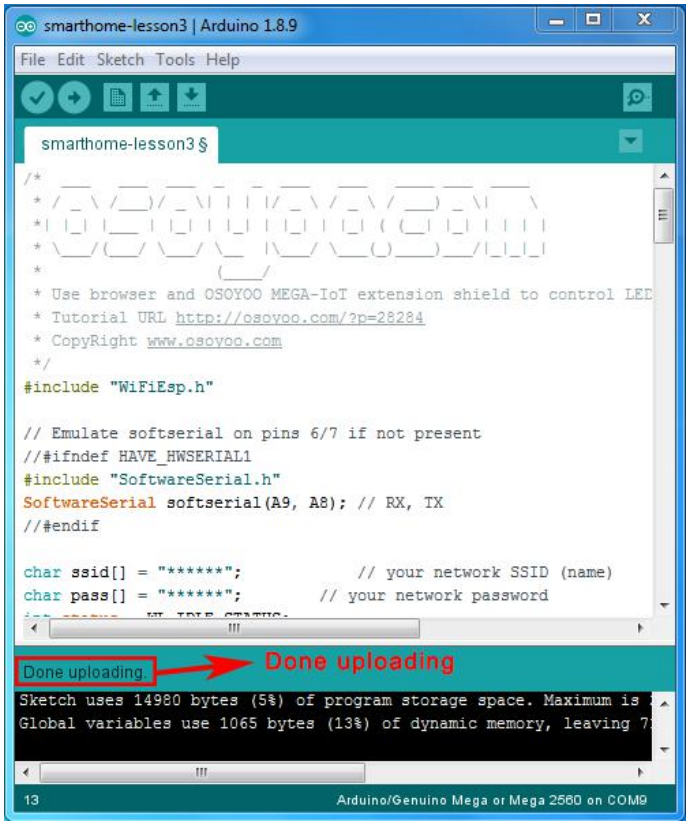
Note: In the sketch, find line 24，25 as following:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

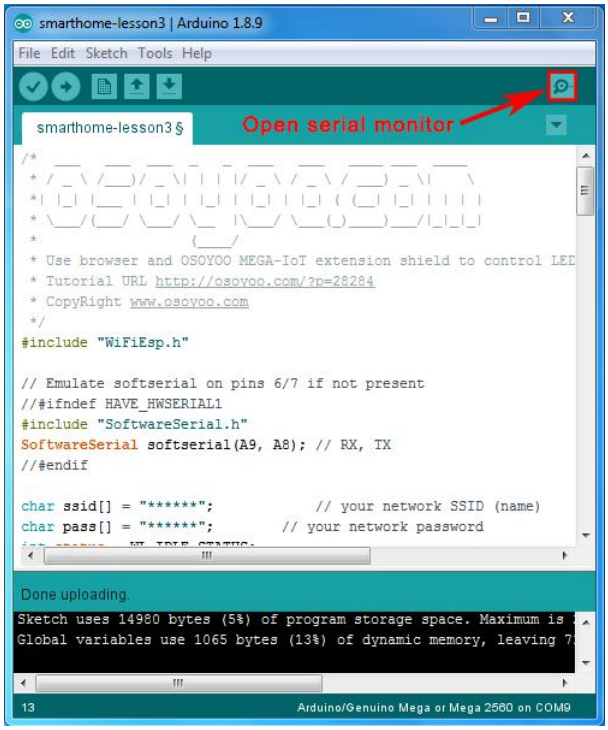
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

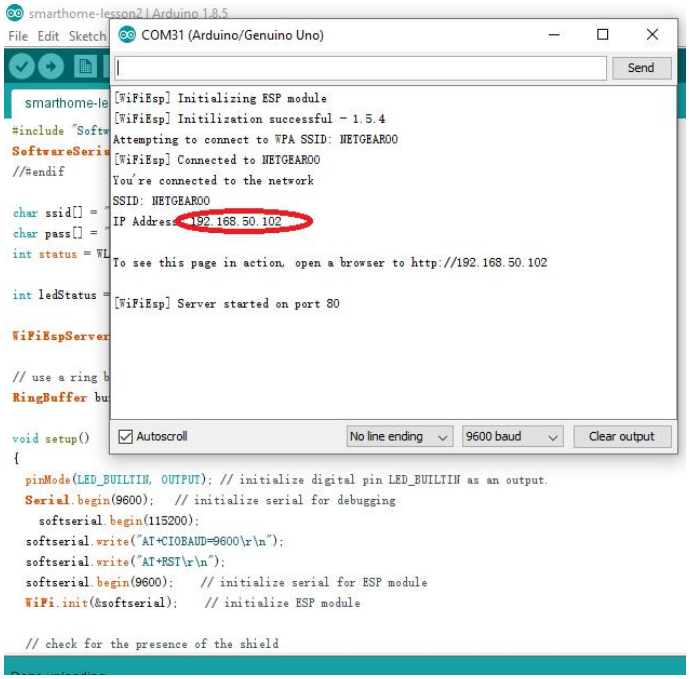




HOW TO PLAY

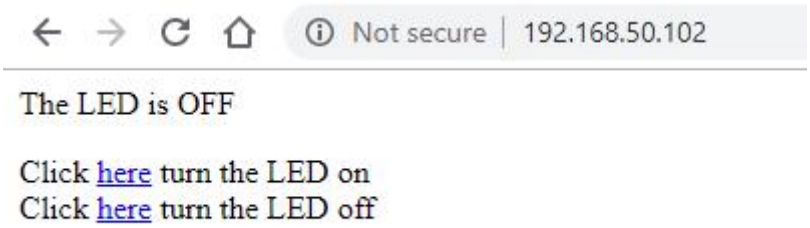
After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Click the two links as showed in above picture, you will turn on/off the LED module which is connected to your MEGA2560 through the IoT Shield.

Lesson 5: RGB Module

OBJECTIVE

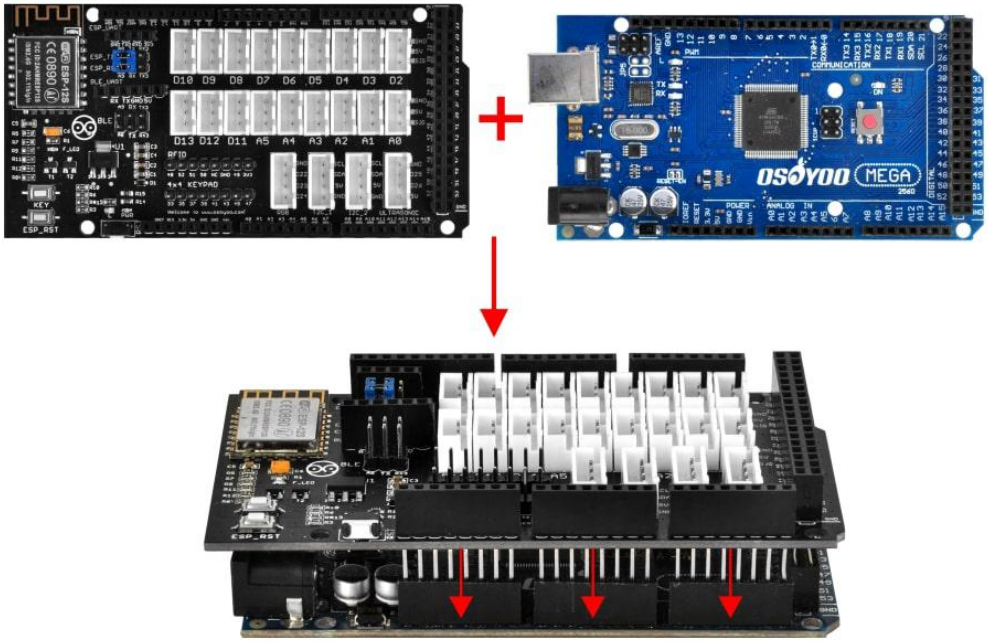
In this lesson, we will show you how to control the RGB LED from a remote browser .
We will use Osoyoo Mega-IoT Shield to connect the RGB and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server and control the RGB connected to the RGB interface of this shield.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT extension board x 1
- USB Cable x 1
- RGB PnP module x 1
- 4-pin PnP cable x 1

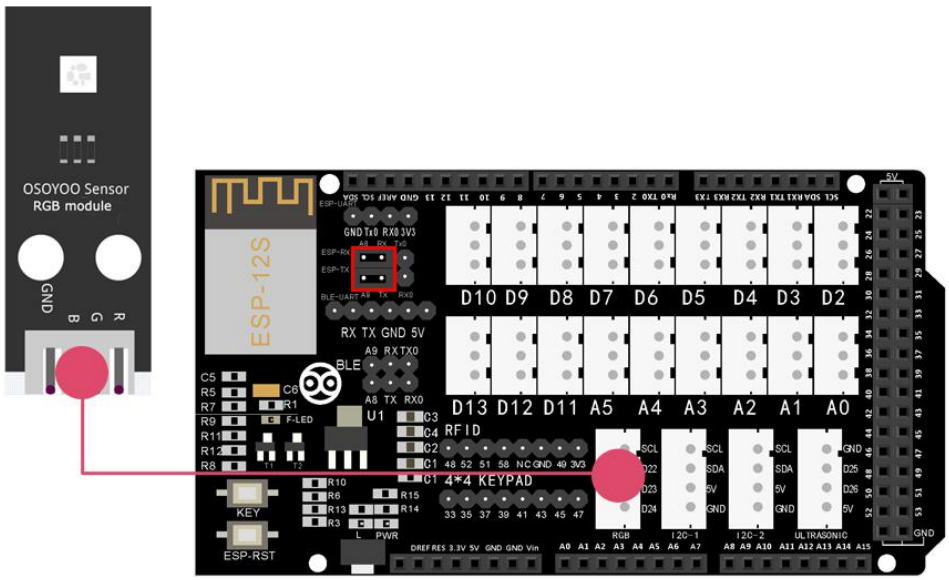
HOW TO MAKE

First, please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the RGB module to the RGB port of the OSOYOO MEGA-IoT Extension Board with a 4-pin PnP cable as below (Jumper Cap should connect ESP8266 RX with A8,

TX with A9):



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

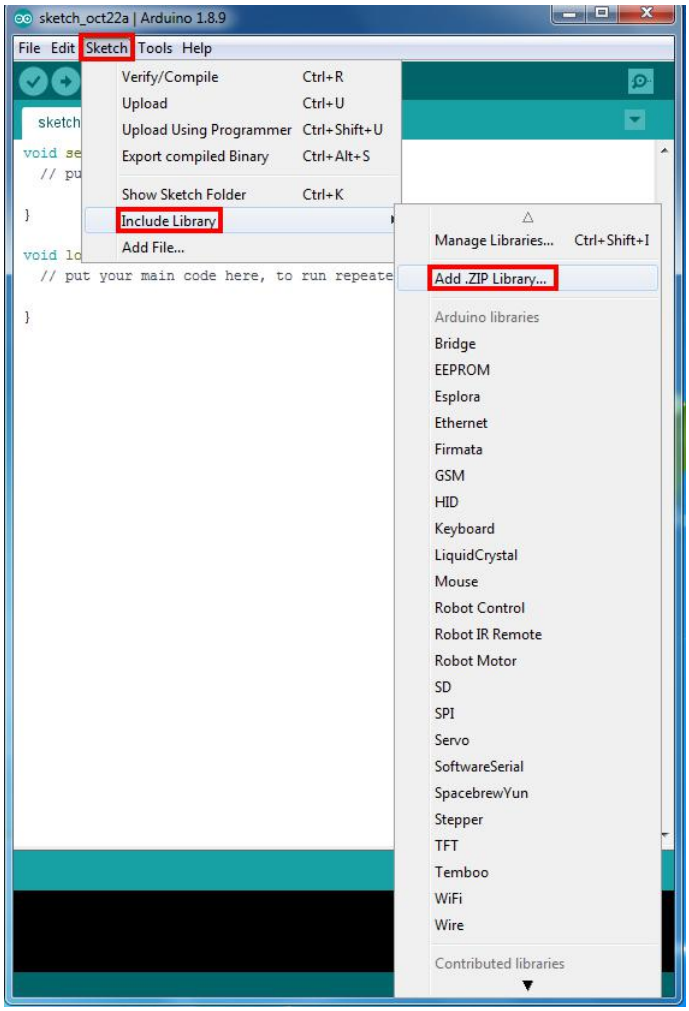
Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

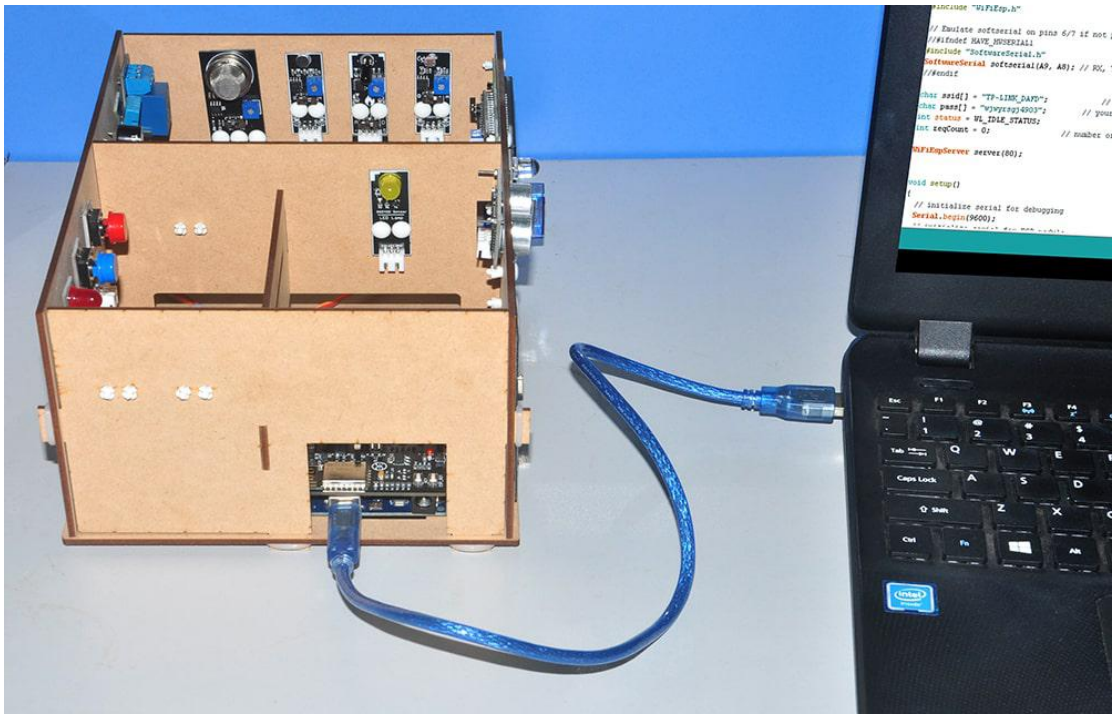
Open Arduino IDE ->Sketch ->Include Library ->Add ,Zip library to load above zip files into Arduino IDE.



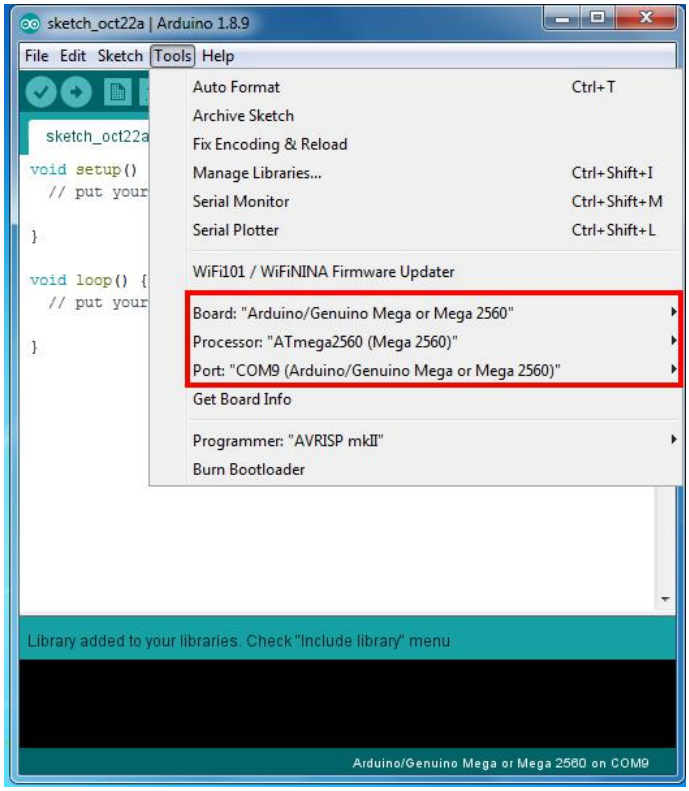
Step 3 After installing above library, please download the main code from following link.unzip the download zip file lesson5.zip, you will see a folder called smarthome-lesson5.

http://osoyoo.com/driver/smarthome/5/smarthome_lesson5.zip

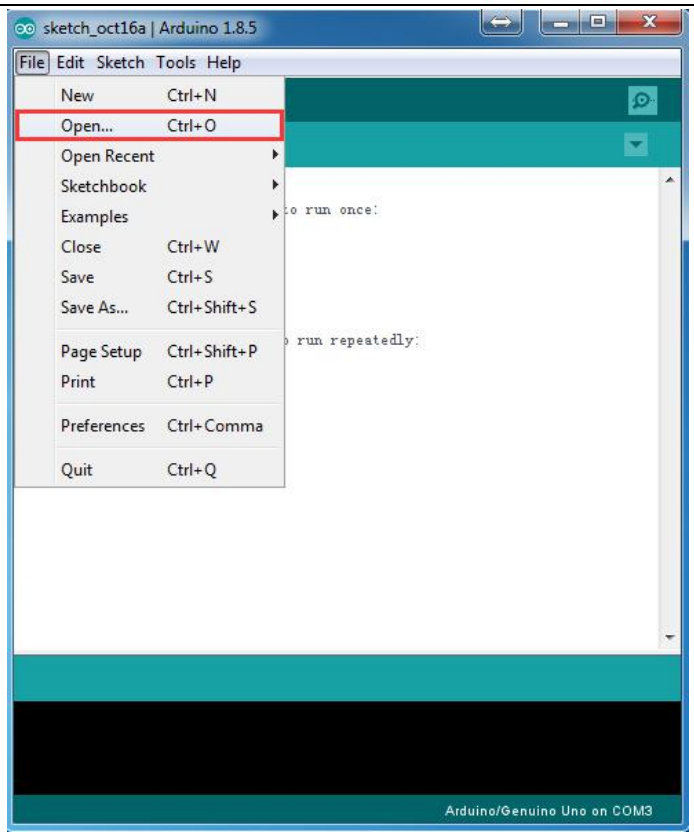
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Open the Arduino IDE and choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file -> click Open -> choose code “smarthome-lesson5”, load up the sketch onto your Arduino.

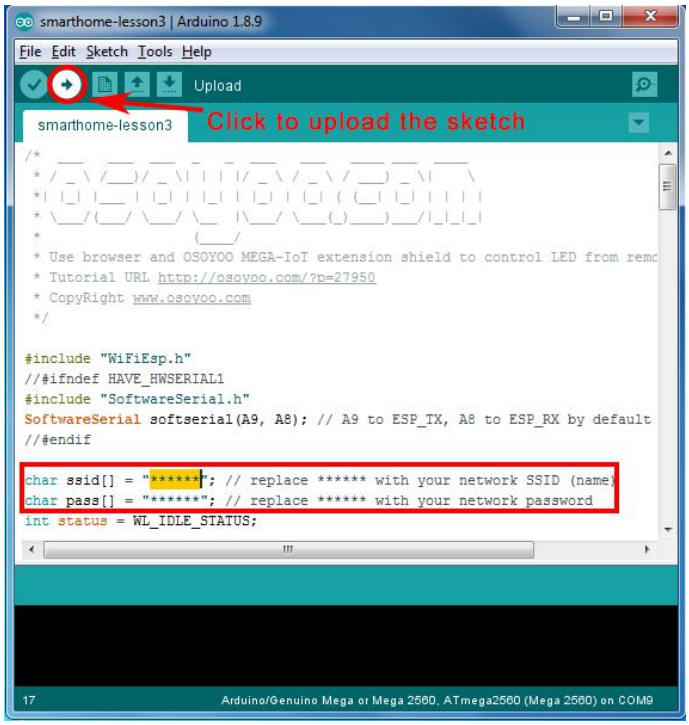


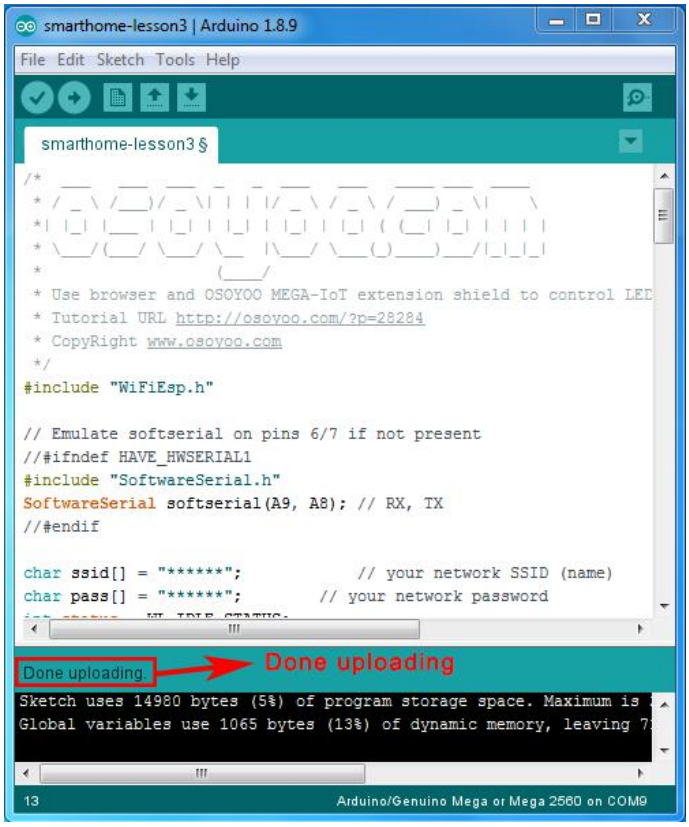
Note: In the sketch, find following lines:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

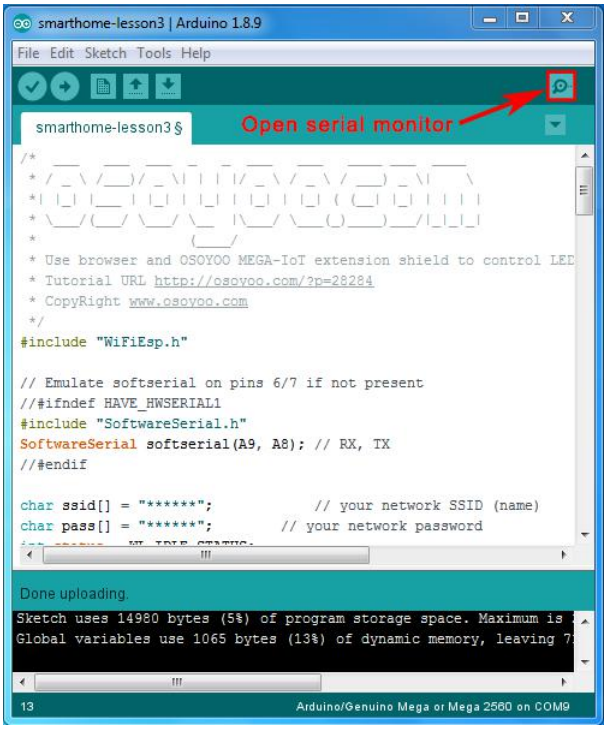
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

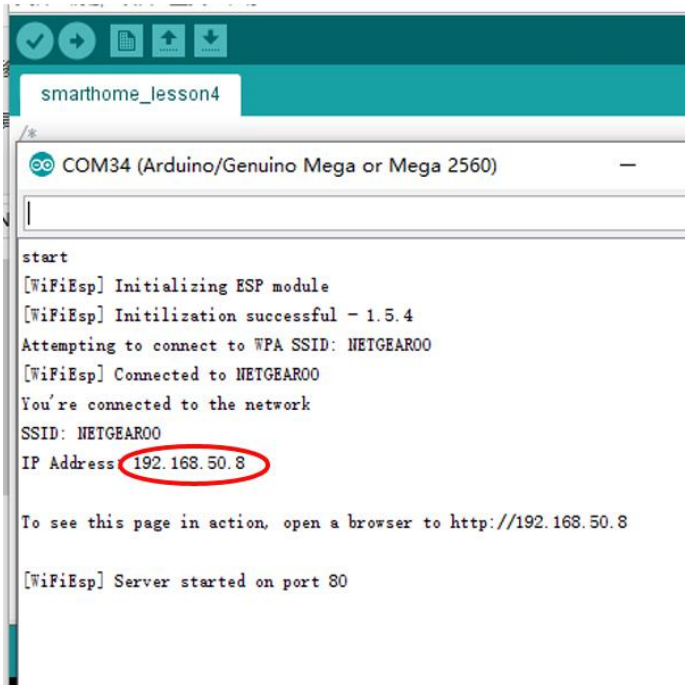




HOW TO PLAY

After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:

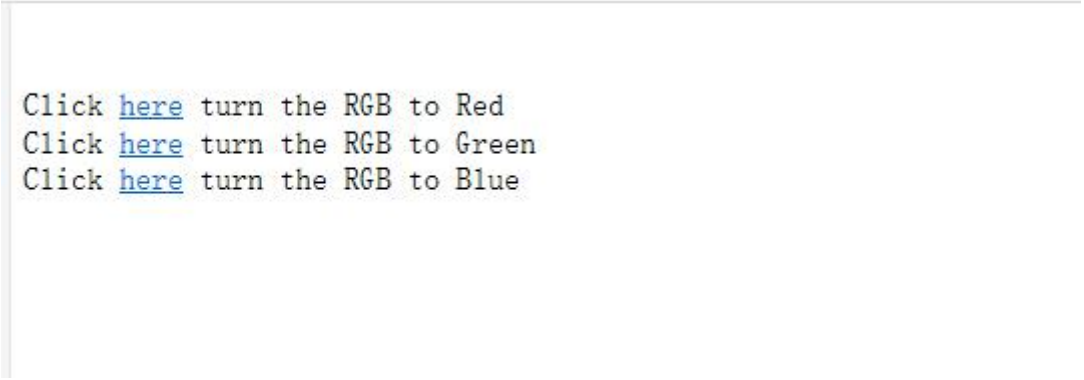




From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.8).

Then use your browser to visit the website http://mega2560-ip-address (in above case,

http://192.168.50.8), you will see following result:



Click the three links as showed in above picture, you will switch the color of RGB module which is connected to your MEGA2560 through the IoT Shield.

Lesson 6: Active Buzzer

OBJECTIVE

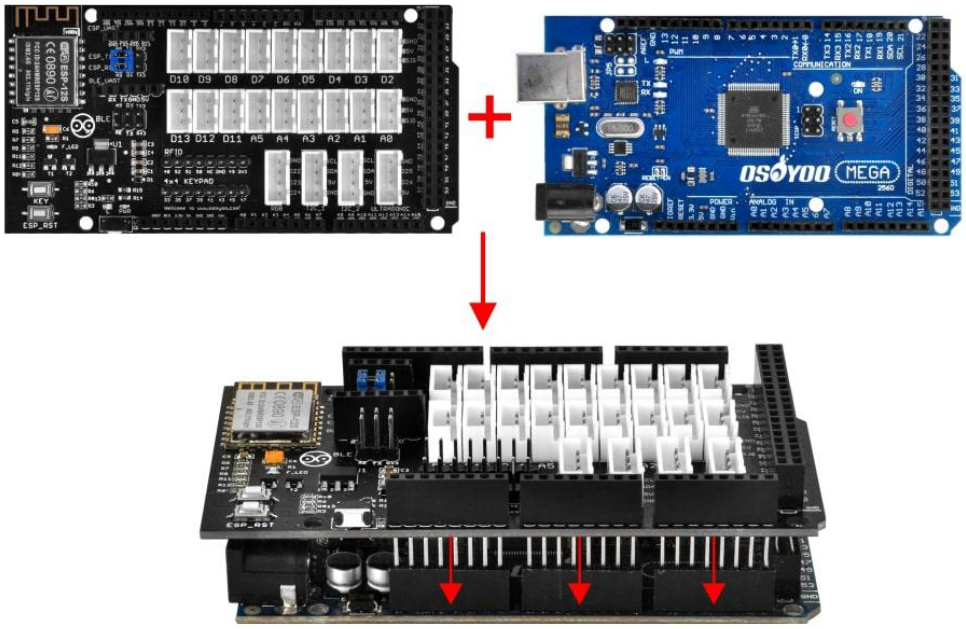
In this lesson, we will show you how to control an active buzzer from a remote browser . We will use Osoyoo Mega-IoT Shield to connect the active buzzer and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server and control the active connected to the buzzer connected to D5 pin of MEGA2560.

PARTS & DEVICES

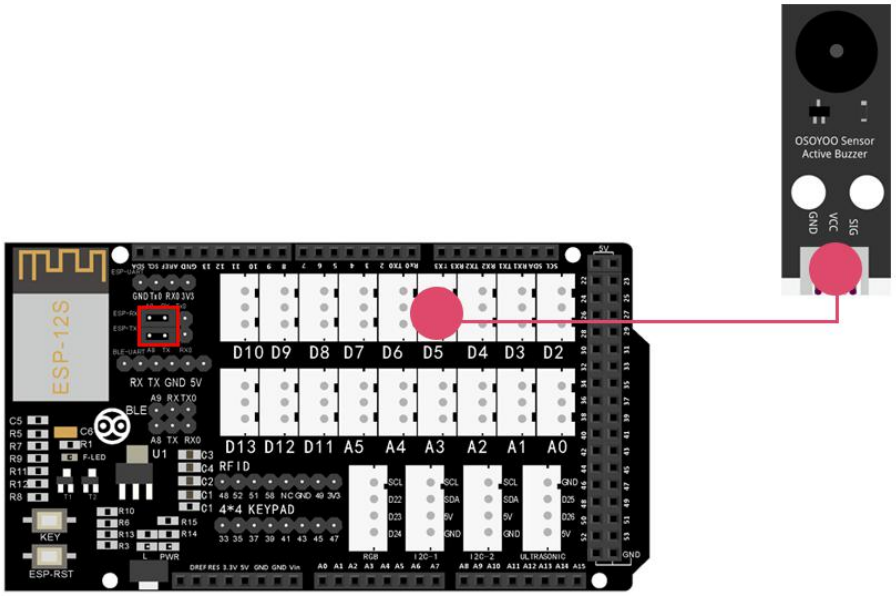
- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- Active Buzzer PnP module
- OSOYOO 3-Pin PnP Cable x 1
- USB Cable x 1
- PC x 1

HOW TO MAKE

First, please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the buzzer module to the D5 port of the OSOYOO MEGA-IoT Extension Board with a 3-pin PnP cable as below (Jumper Cap should connect ESP8266 RX with A8, TX with A9):



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step)

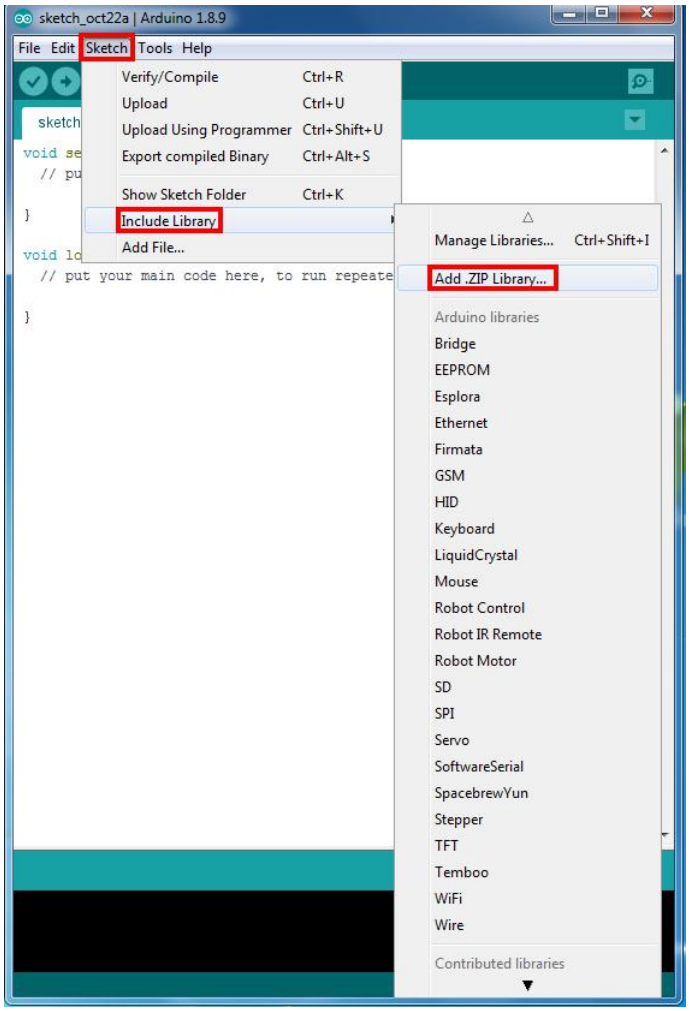
Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

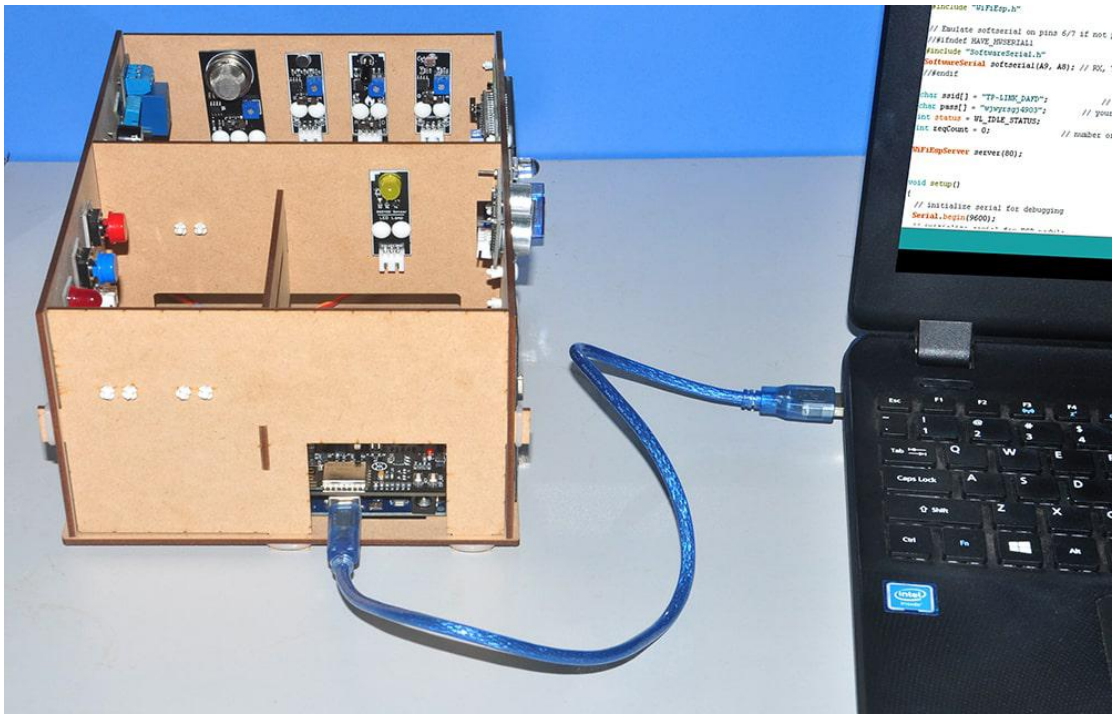
To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.

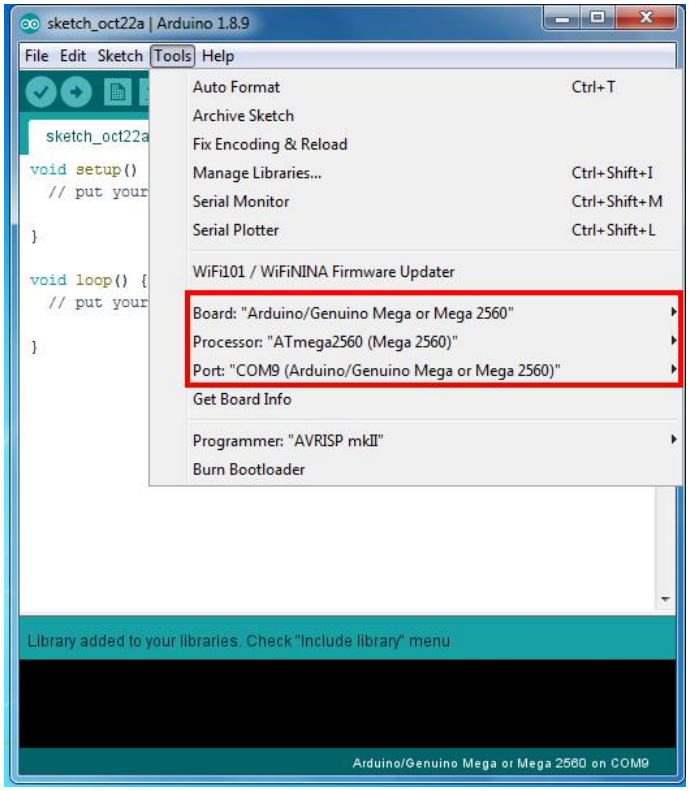


Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson6”:
http://osoyoo.com/driver/smarthome/6/smarthome_lesson6.zip

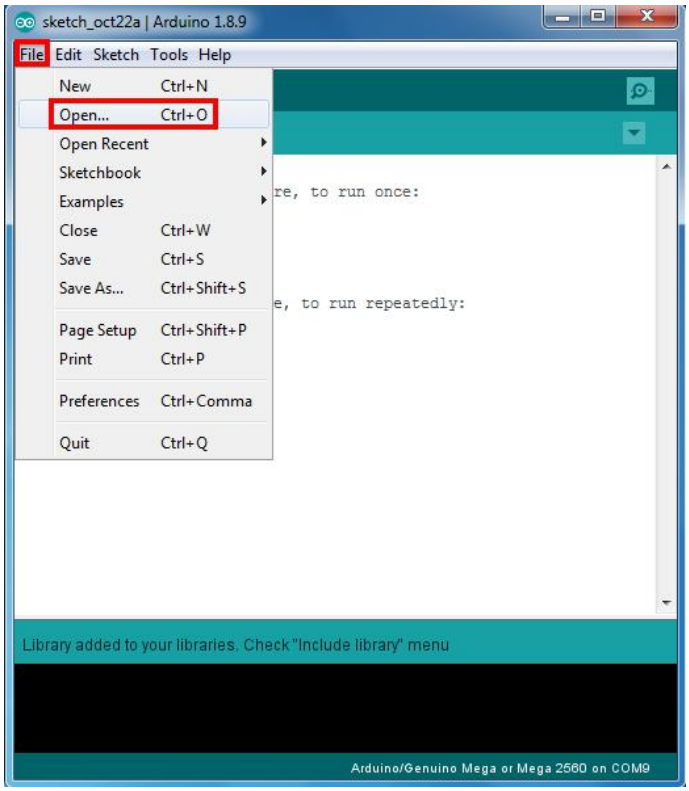
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Arduino IDE: Choose corresponding board type and port type for you project .



Step 6 Arduino IDE: Click file – Open, then choose code “smarthome-lesson6.ino” in the folder, load up the sketch onto your Arduino.

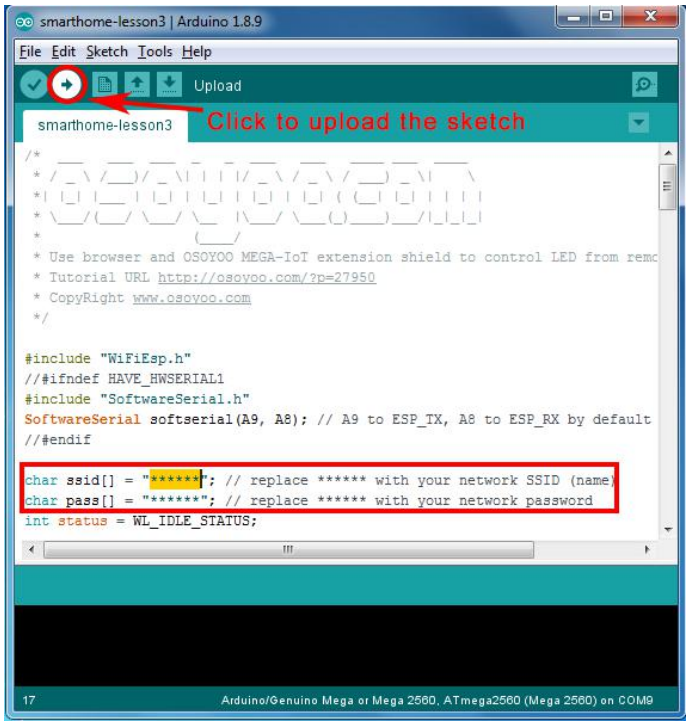


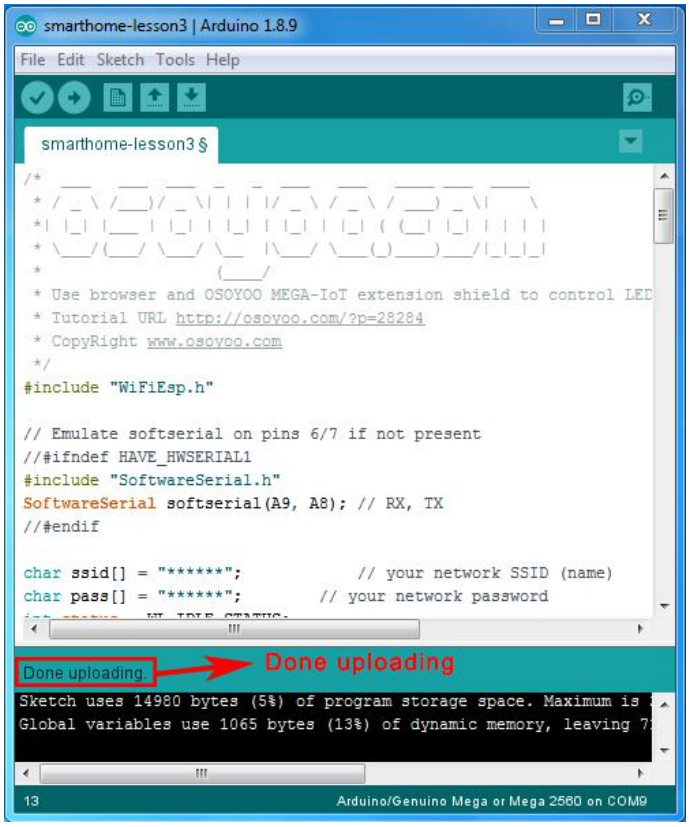
Note: In the sketch, find the lines as following:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

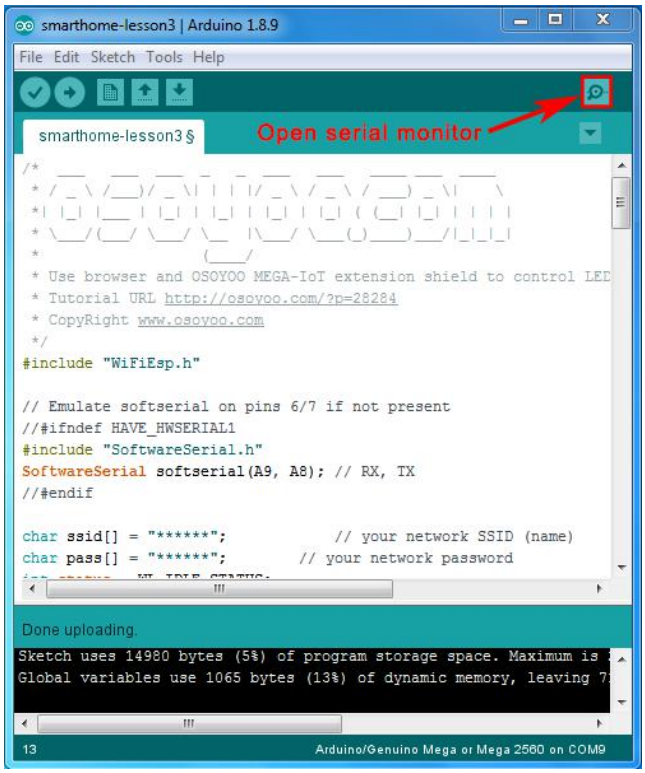
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

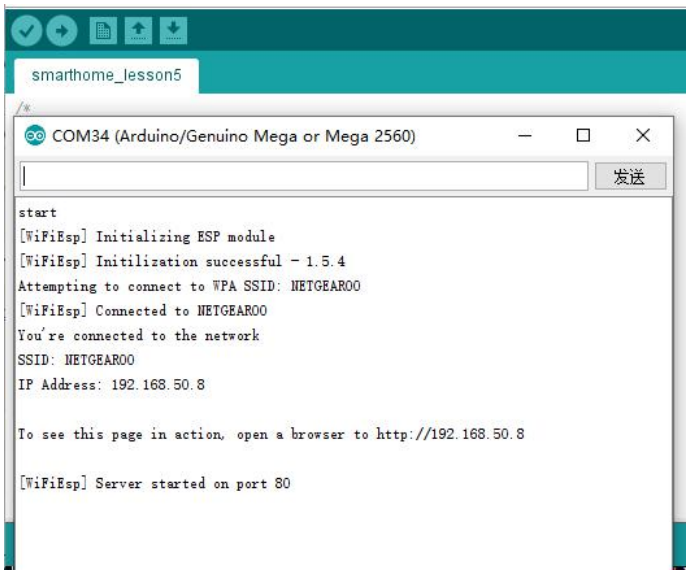




HOW TO PLAY

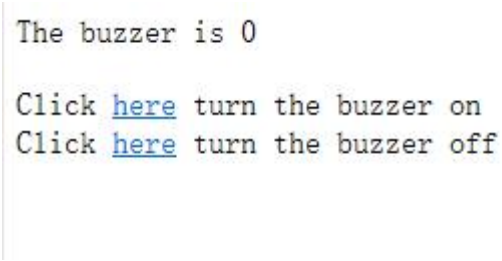
After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.8).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.8), you will see following result:



Click the two links as showed in above picture, you will turn on/off the active buzzer module which is connected to your MEGA2560 through the IoT Shield.

Lesson 7: DHT11 Sensor

OBJECTIVE

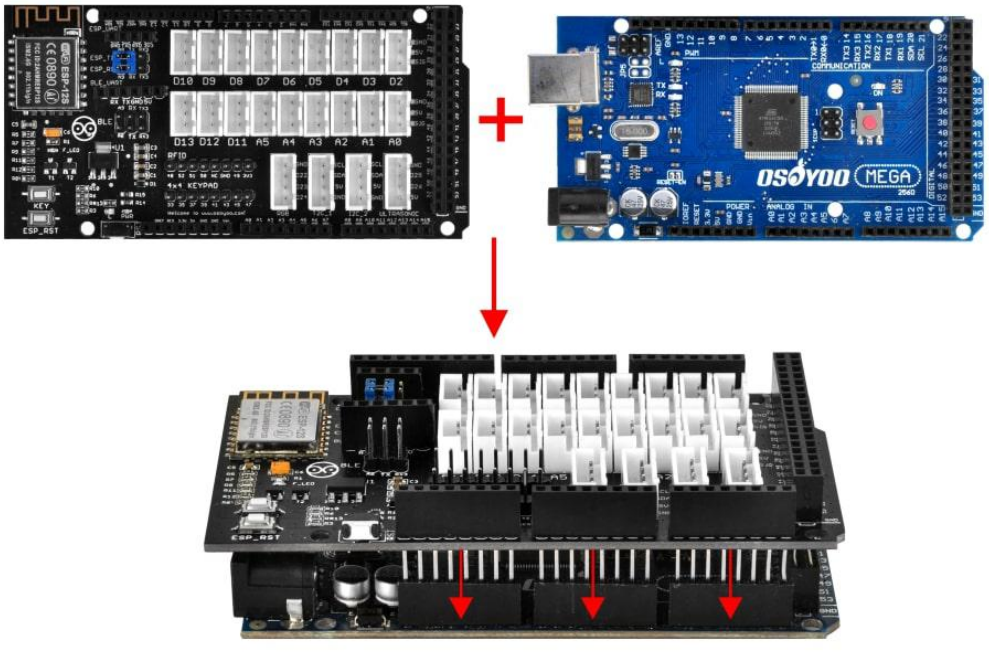
In this lesson, we will show you how to get DHT11 data remotely, this example shows how value can be pushed from Arduino to a remote browser.
We will use Osoyoo Mega-IoT Shield to connect DHT11 sensor and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server and get the data of DHT11 connected to D2 pin of MEGA2560.

PARTS & DEVICES

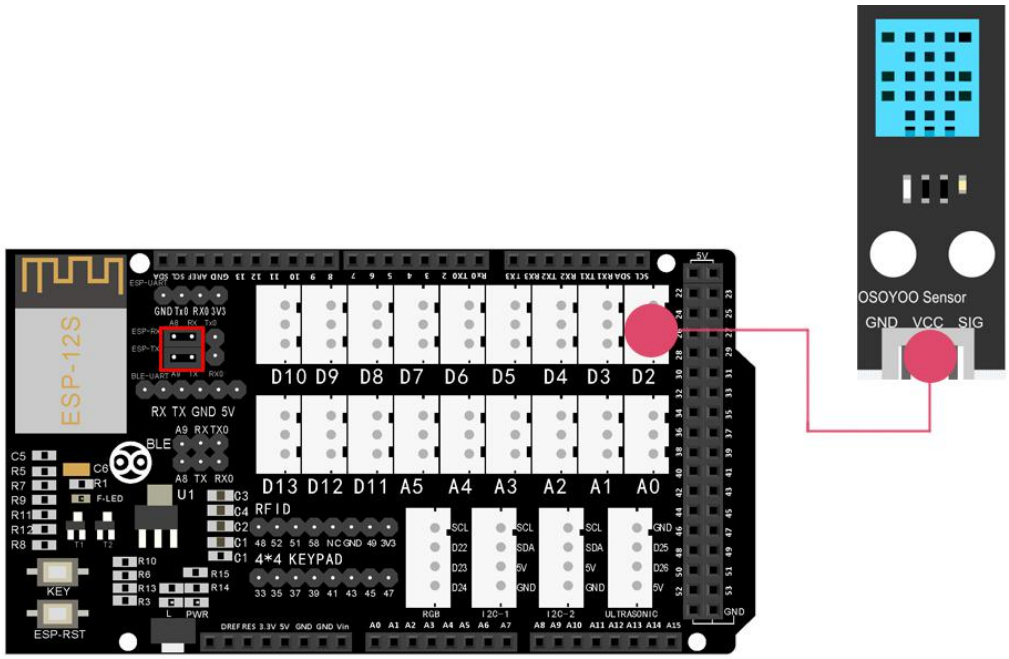
- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT extension board x 1
- USB Cable x 1
- DHT11 PnP module x 1
- 3-pin PnP cable x 1

HOW TO MAKE

First please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the DH11 Temp & Hum Sensor to the D2 port of the OSOYOO MEGA-IoT Extension Board with a 3-pin PnP cable as below： (Jumper Cap should connect ESP8266 RX with A8, TX with A9):



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step)

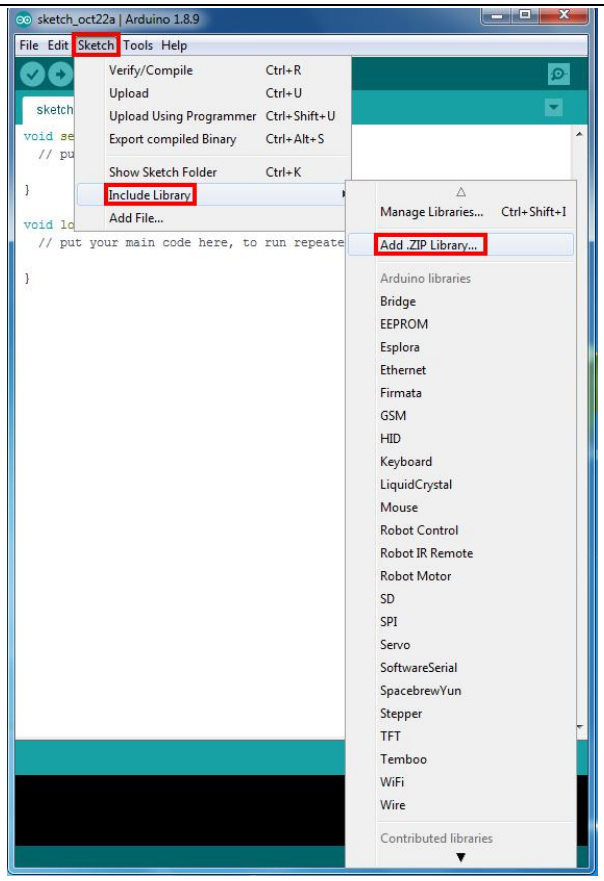
Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en , then install the software.

Step2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

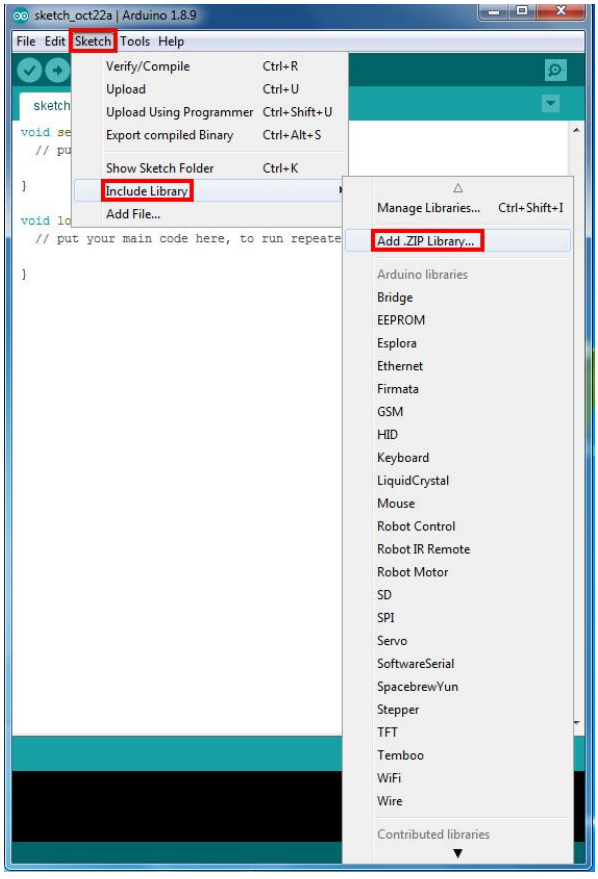
OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

You need go to Arduino IDE ->Sketch ->Include Library ->Add ,Zip library to load above zip files into Arduino IDE.

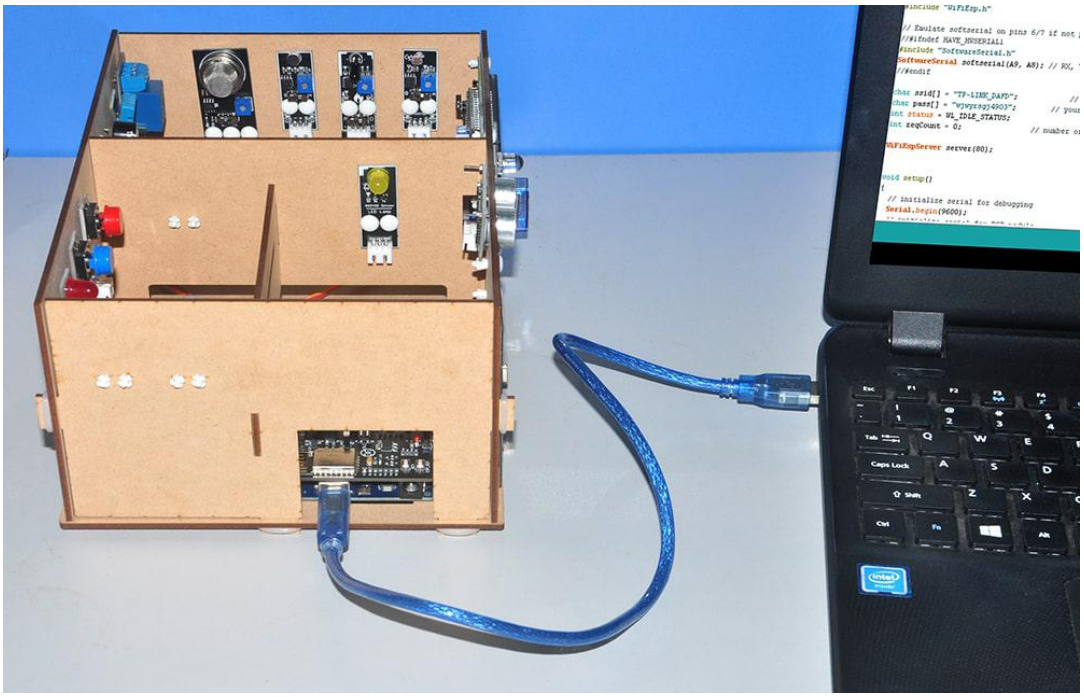


To use the DHT11 sensor here, you also need to install the DHT11 library as above operations.

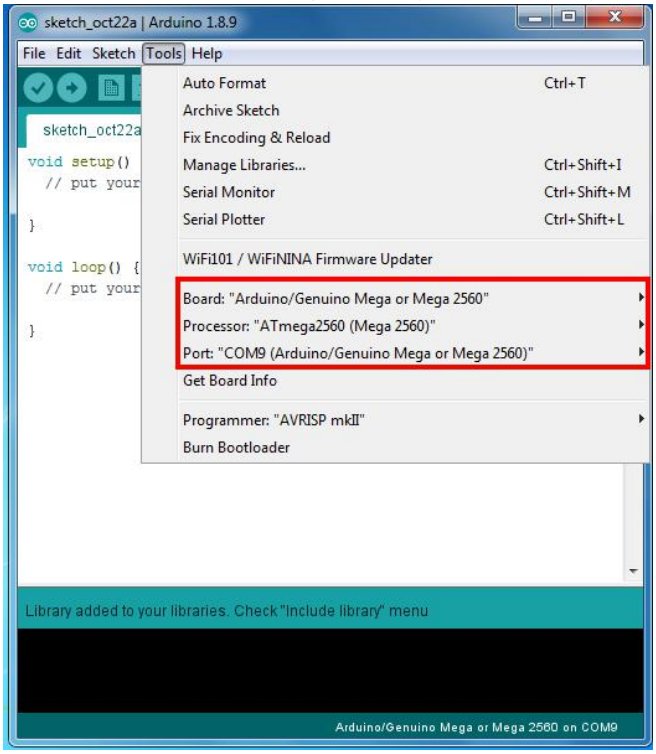


Step 3 After installing above libraries, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson7”:
http://osoyoo.com/driver/smarthome/7/smarthome_lesson7.zip

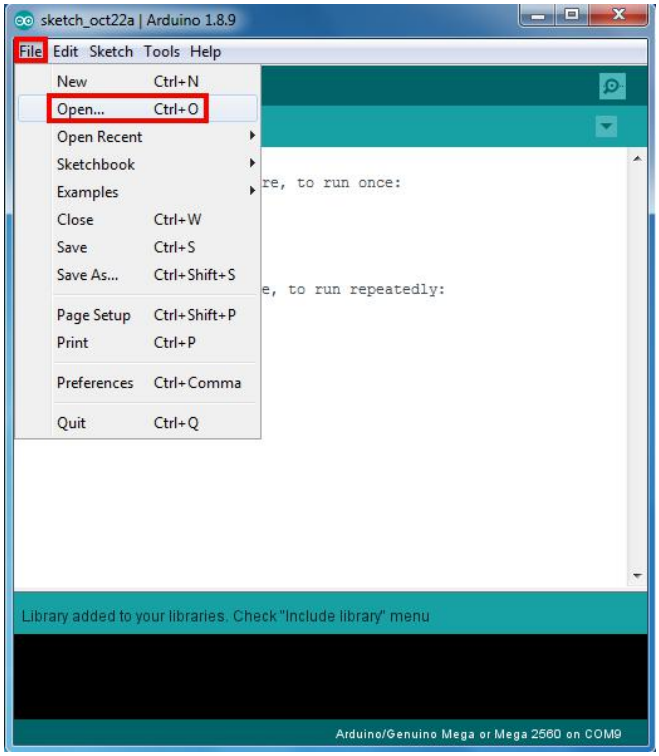
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Arduino IDE: Choose corresponding board type and port type for you project .



Step 6 Arduino IDE: Click file – Open, then choose code “smarthome-lesson7.ino” in the folder, load up the sketch onto your Arduino.

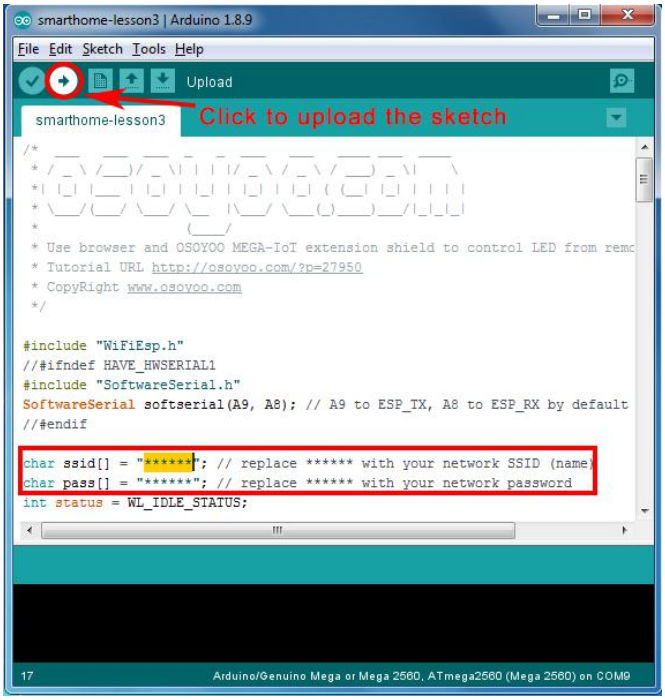


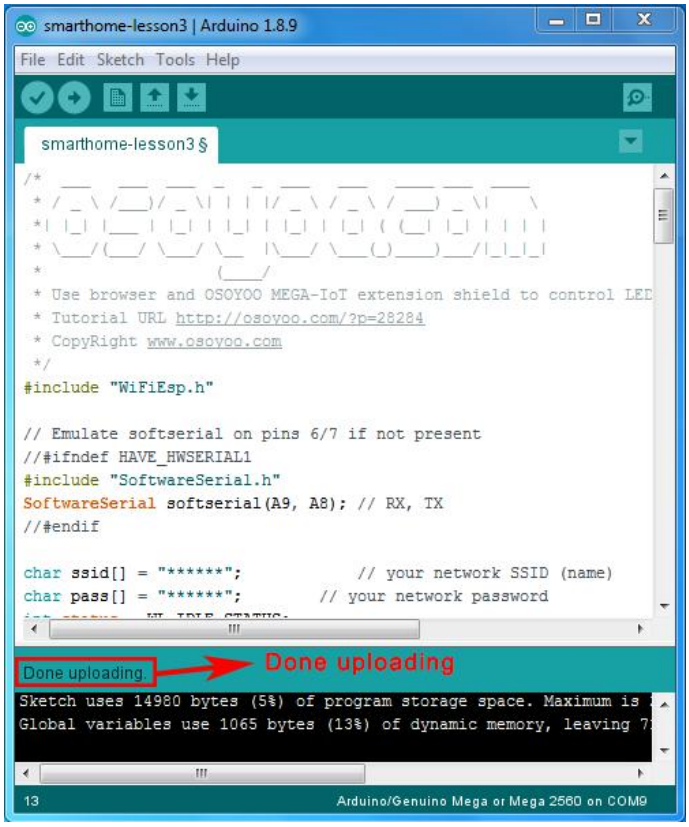
Note: In the sketch, find line 24，25 as following:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

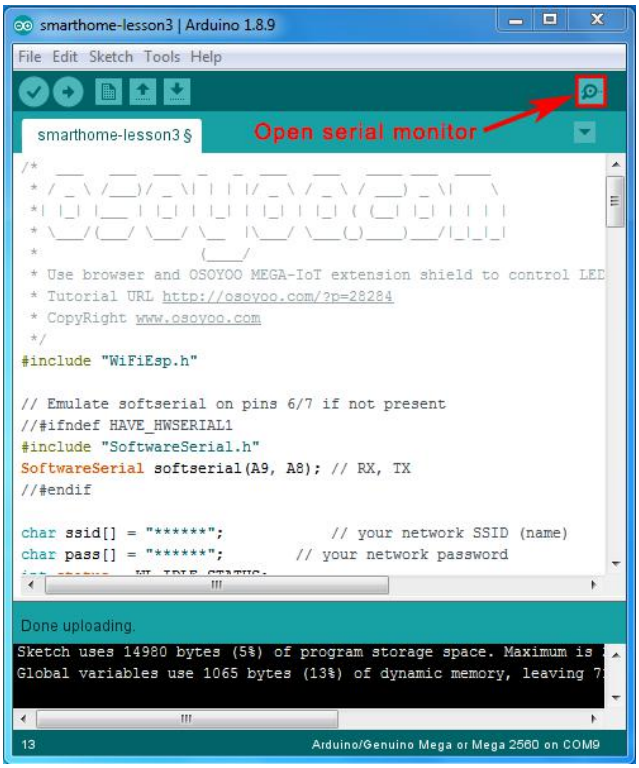
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

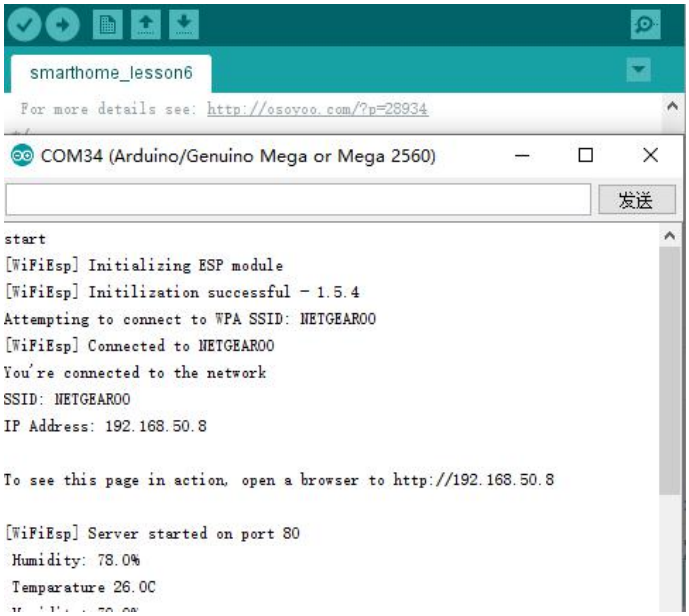




HOW TO PLAY

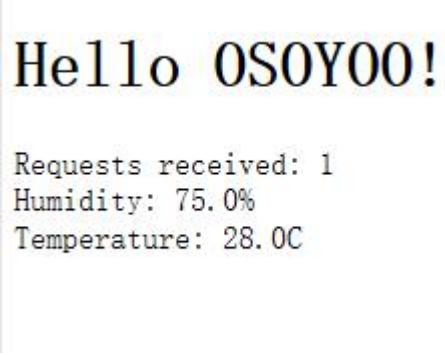
After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:



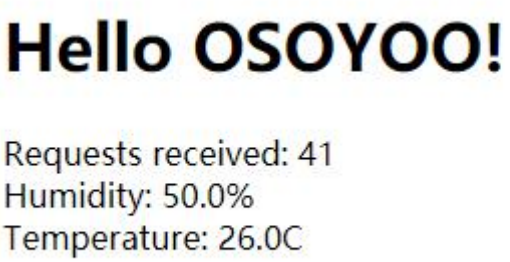


From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.8).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.8), you will see following result:



From here, you can see a simple web server that shows the temperature and humidity data of the DHT11 sensor. The web page will be automatically refreshed each 20 seconds. Wait a minute, you may see the following data on the web page：



Lesson 8: Switching Door

OBJECTIVE

In previous lessons, we have showed how to use web browser to access Arduino Board through Internet. In these examples, we used a protocol called HTTP. Arduino works as a HTTP server(web server) and response to request from browser(client) .

In this lesson, we will teach you to use a very simple and power protocol called UDP which is commonly used for Email service and control signal. We will use a cell phone APP to send angle control signal to remote Arduino and make the servo to make a rotate at a specific angle.

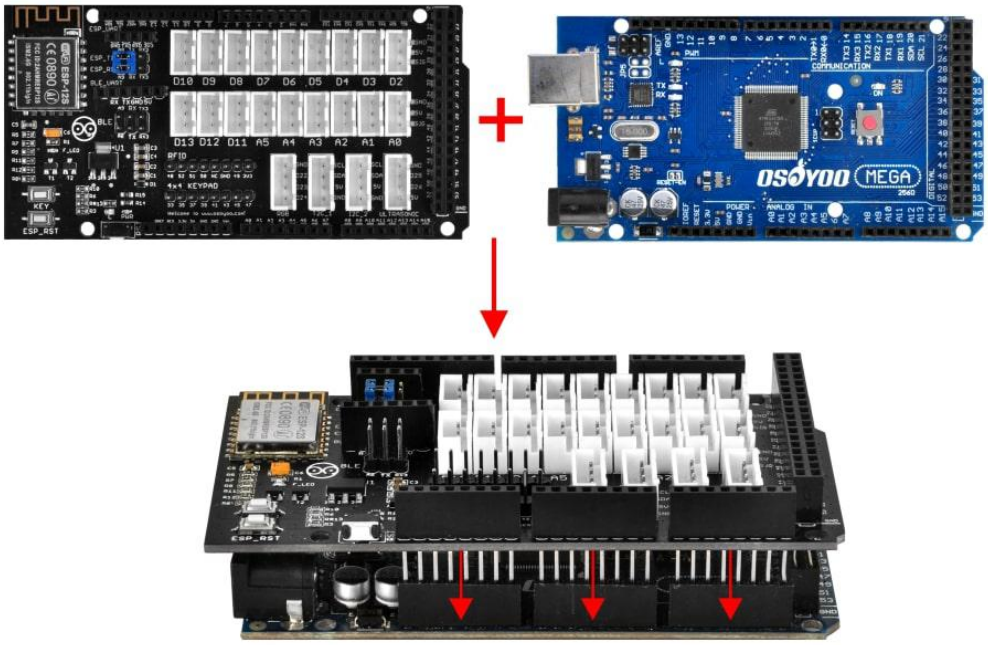
We will also show you how to use a Keypad to control the servo locally.

PARTS & DEVICES

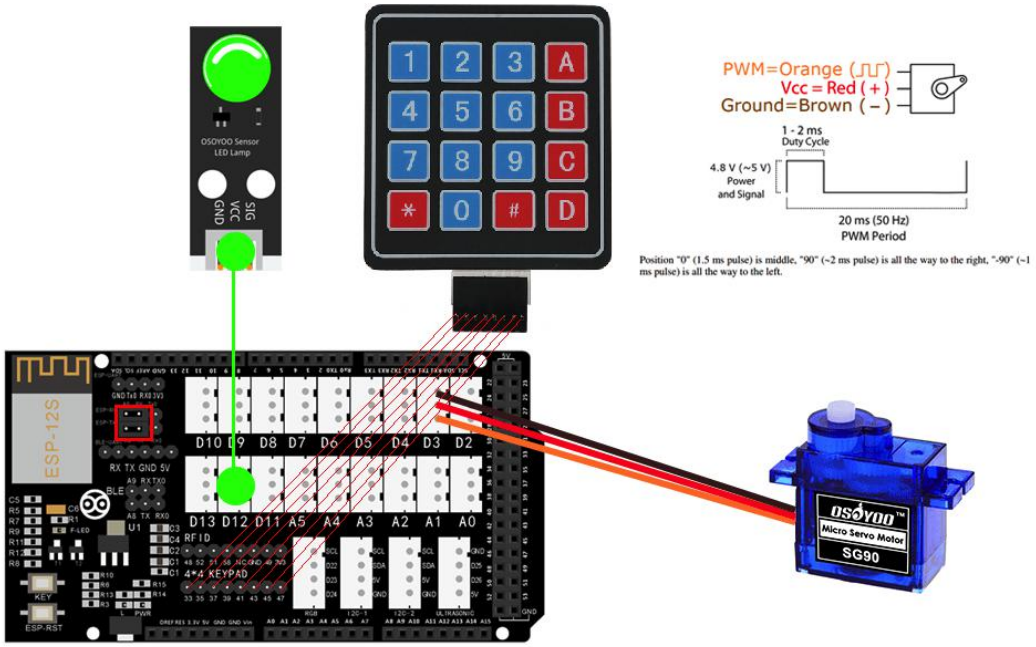
- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- LED PnP Module x 1
- Servo x 1
- OSOYOO 3-Pin PnP Cable x 1
- USB Cable x 1
- PC x 1

HOW TO MAKE

First, please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the LED module to the D12 port of the OSOYOO MEGA-IoT Extension Board with 3-pin PnP cable, connect servo motor to the D3 port as below (Jumper Cap should connect ESP8266 RX with A8, TX with A9):

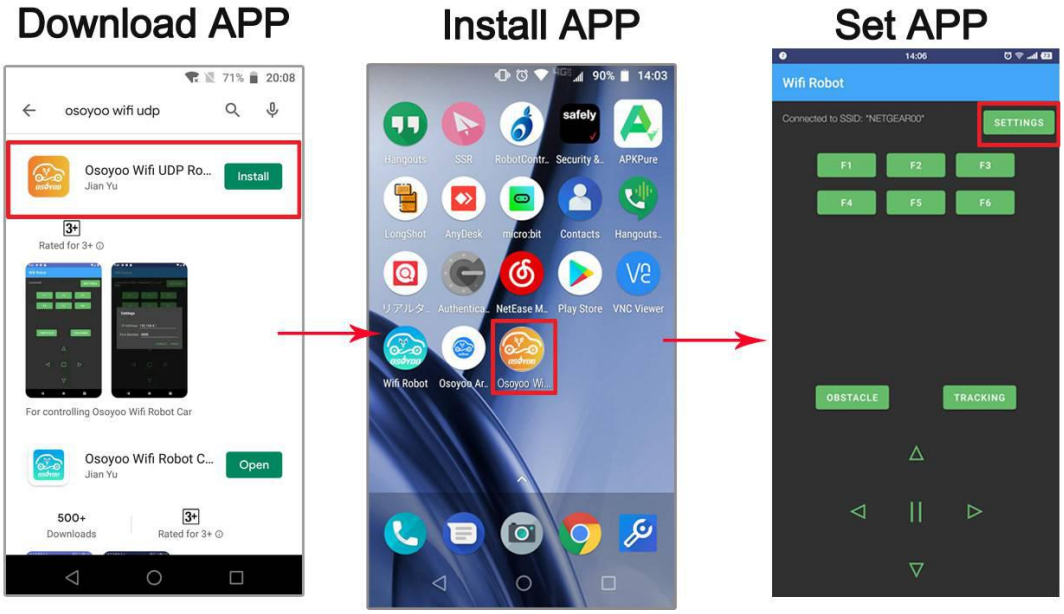


HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Download OSOYOO Wifi UDP Robot Car control APP

In Google Play or Apple Store, please search key words “OSOYOO Wifi UDP Robot Car”, you will find an orange icon APP as following:



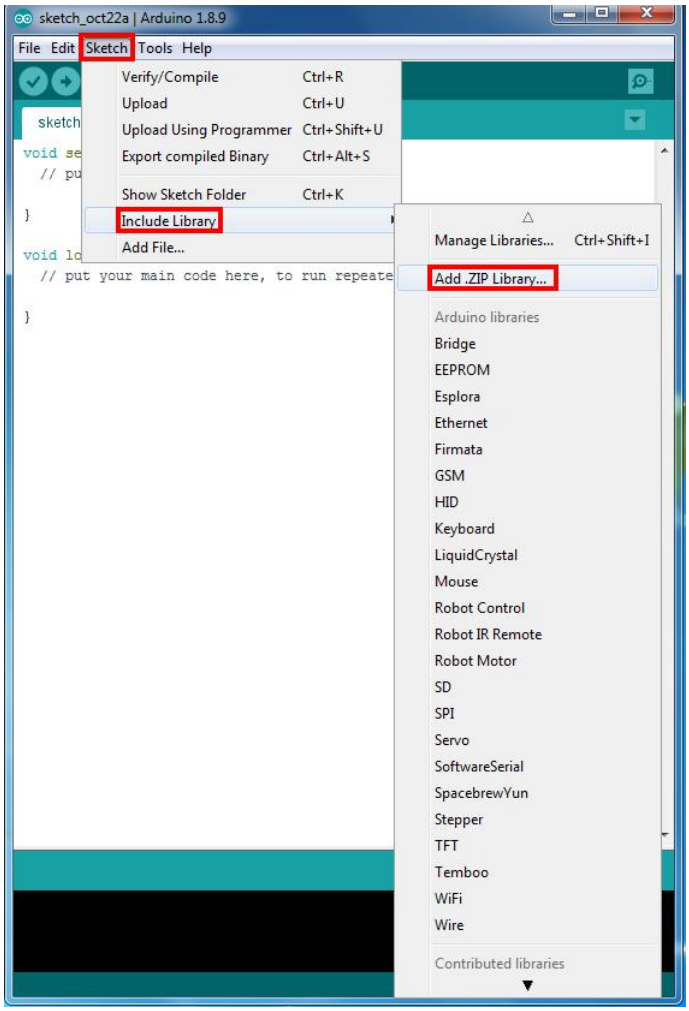
Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

In order to use the keypad, you also need download and install a keypad library from:
https://osoyoo.com/driver/smarthome/Keypad.zip

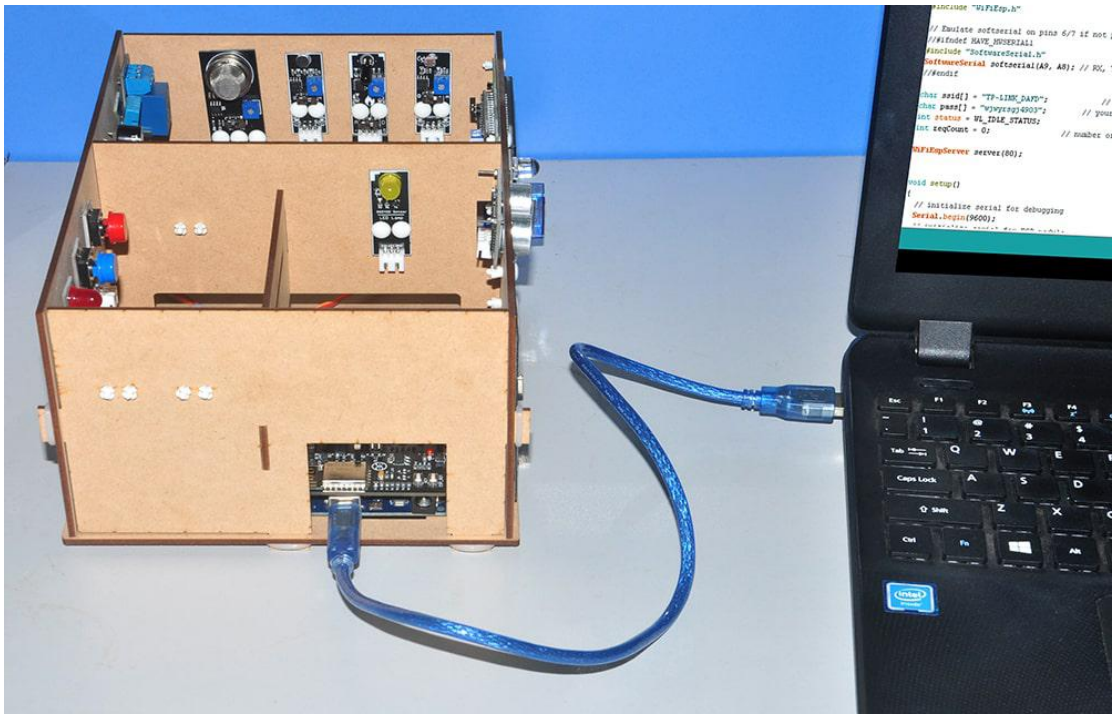
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



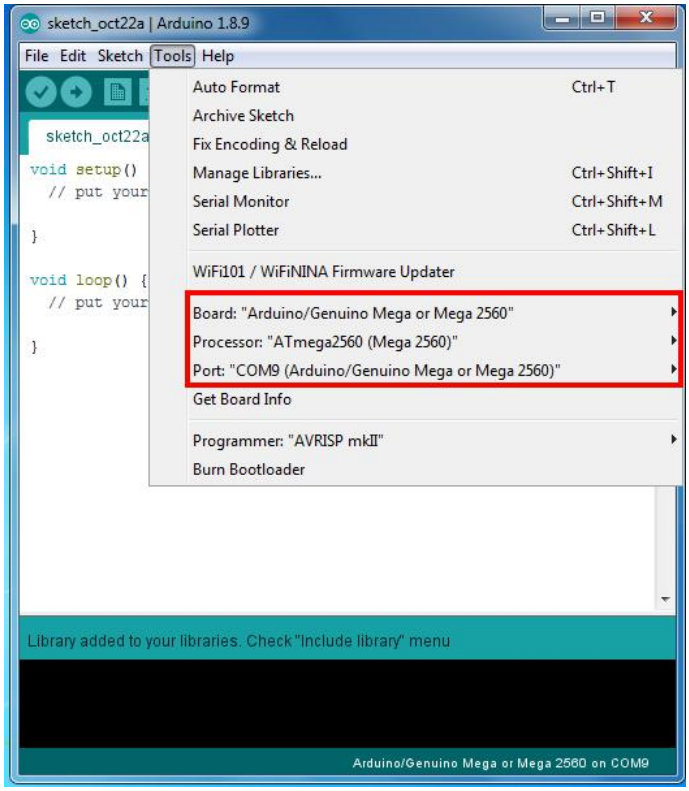
Step 3 To use the Servo in Arduino IDE, we need download Servo.h library from this link and save it as above operations.

Step 4 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson8B”:
https://osoyoo.com/driver/smarthome/smarthome_lesson8B.zip

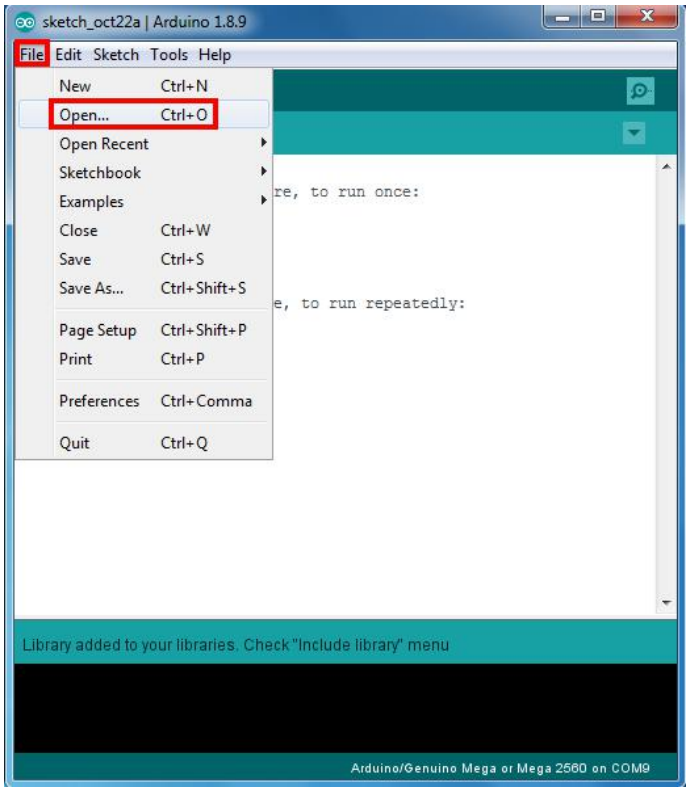
Step 5 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 6 Arduino IDE: Choose corresponding board type and port type for you project .



Step 7 Arduino IDE: Click file – Open, then choose code “smarthome-lesson8.ino” in the folder, load up the sketch onto your Arduino.

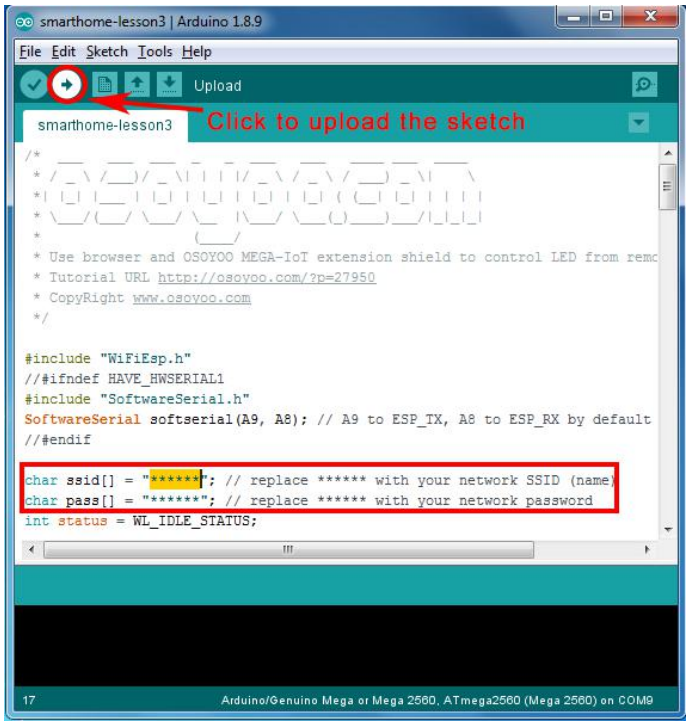


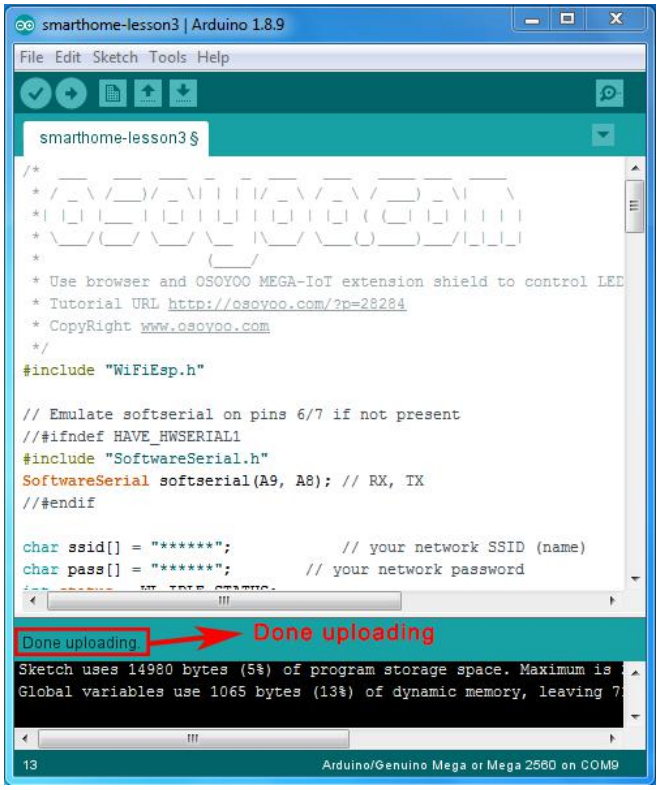
Note: In the sketch, find line following lines:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

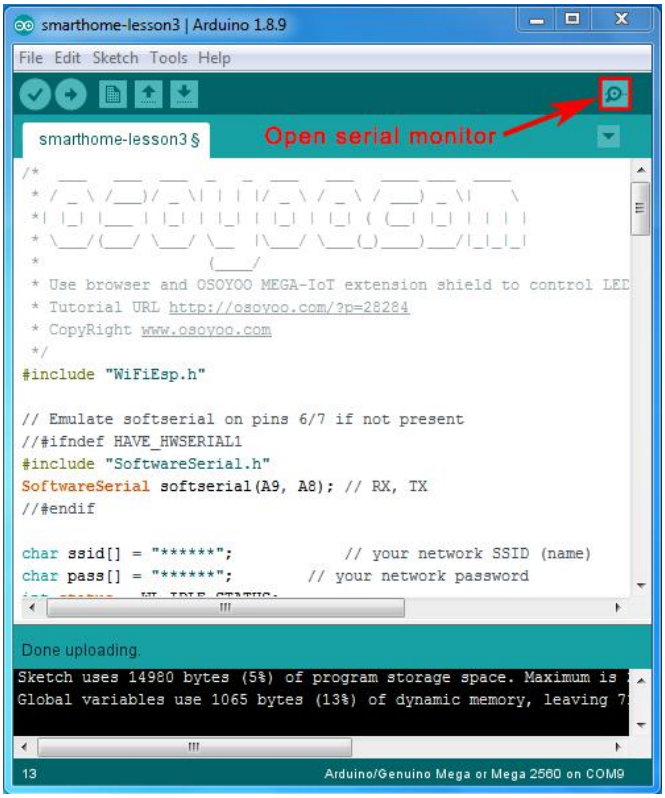
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.



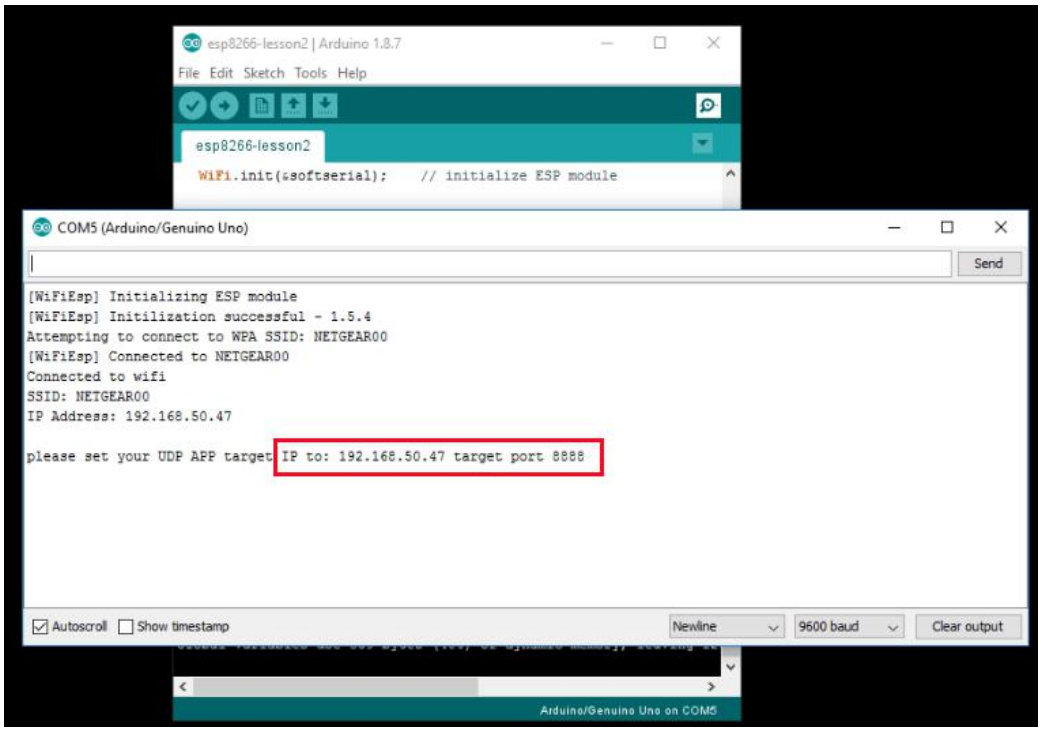


HOW TO PLAY

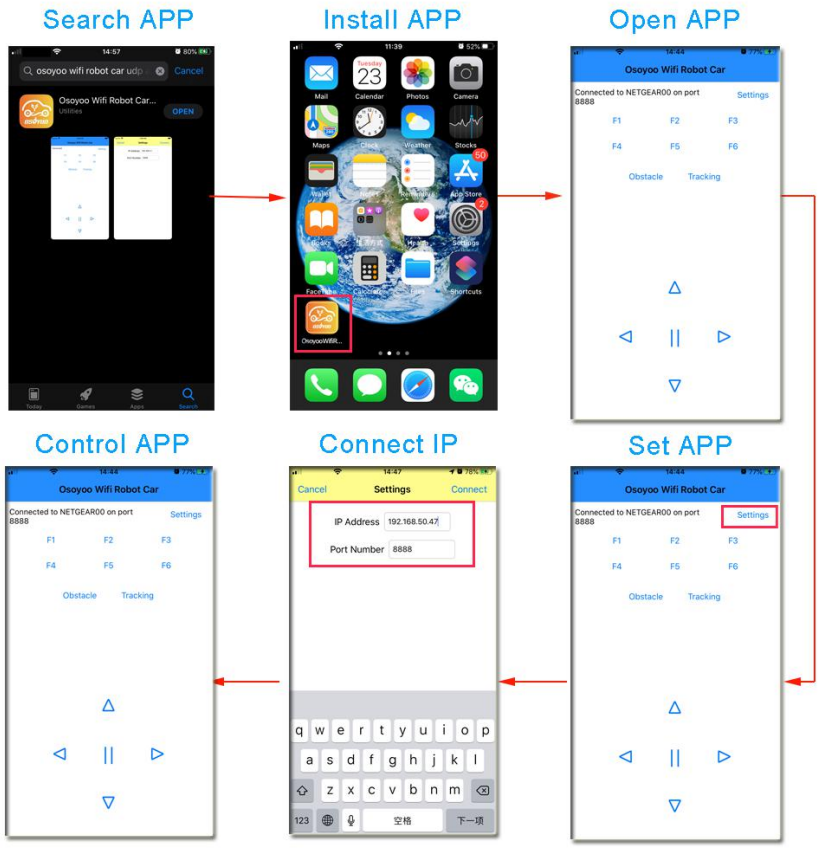
After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:



You will Arduino's IP address and Port Number as following:



From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.47) and default port number is 8888, you need write the IP address into your APP Setting as following:



Click the two links as showed in above picture, you will control the servo which is connected to your MEGA2560 through the IoT Shield.

Now in your APP,
when you click ◄ button, the servo will point zero degree, Green LED is OFF.
Serial Monitor will show Close THE DOOR!

when you click ▲ button, the servo will point 90 degree, Green LED is OFF.
Serial Monitor will show Half Close THE DOOR!

when you click ► button, the servo will point 180 degree, Green LED is ON.
Serial Monitor will show OPEN THE DOOR!

You can also use Keypad to control the servo.
when you click * Button, the servo will point zero degree, Green LED is OFF.
Serial Monitor will show Close THE DOOR!

when you click 0 button, the servo will point 90 degree, Green LED is OFF.
Serial Monitor will show Half Close THE DOOR!

when you click # button, the servo will point 180 degree, Green LED is ON.
Serial Monitor will show OPEN THE DOOR!

Lesson 9: Gas Detection

OBJECTIVE

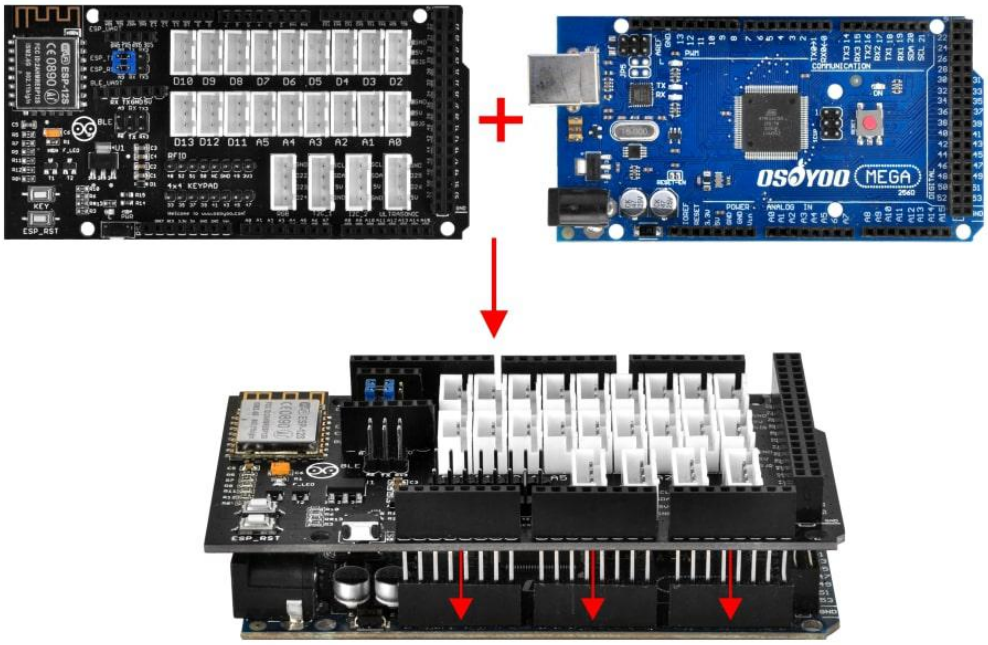
In this lesson, we will show you how to make use Internet to monitor remote Smoke Sensor status.
We will use Osoyoo Mega-IoT Shield to connect Fire Sensor, LEDs and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server to shows fire sensor real time status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT extension board x 1
- USB Cable x 1
- Red LED PnP module x 1
- Green LED PnP module x 1
- Gas Sensor PnP module x 1
- 3-pin PnP cable x 3

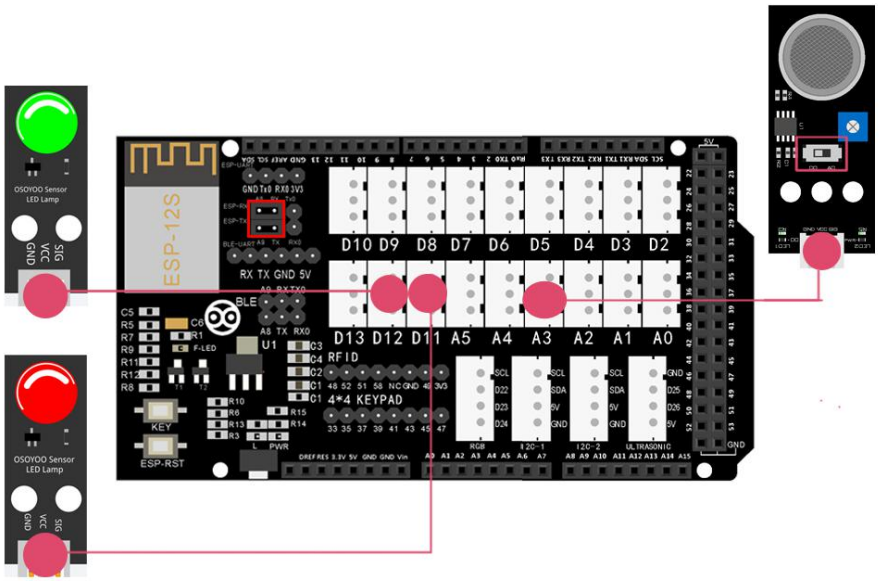
HOW TO MAKE

First please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules to the OSOYOO MEGA-IoT Extension Board with 3-pin PnP cables as below. (Jumper Cap should connect ESP8266 RX with A8, TX with A9)

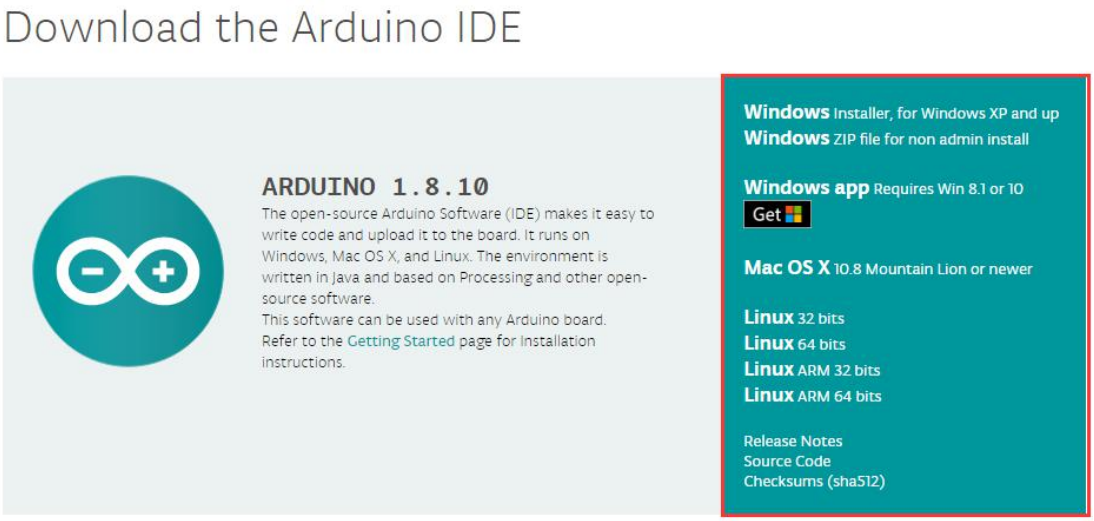
Green LED module—D12
Red LED module—-D11
Gas Detection module—A3 (Make sure the Gas Detection module's switch is put on D (NOT A) on the left side)



Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step)

Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en , then install the software.

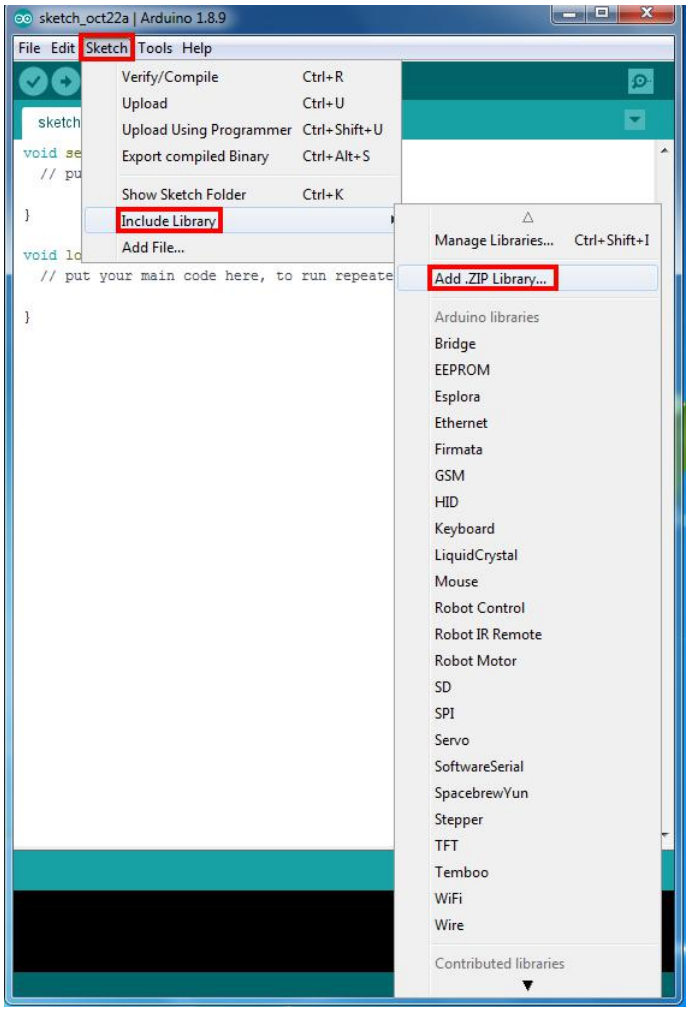


Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step)

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

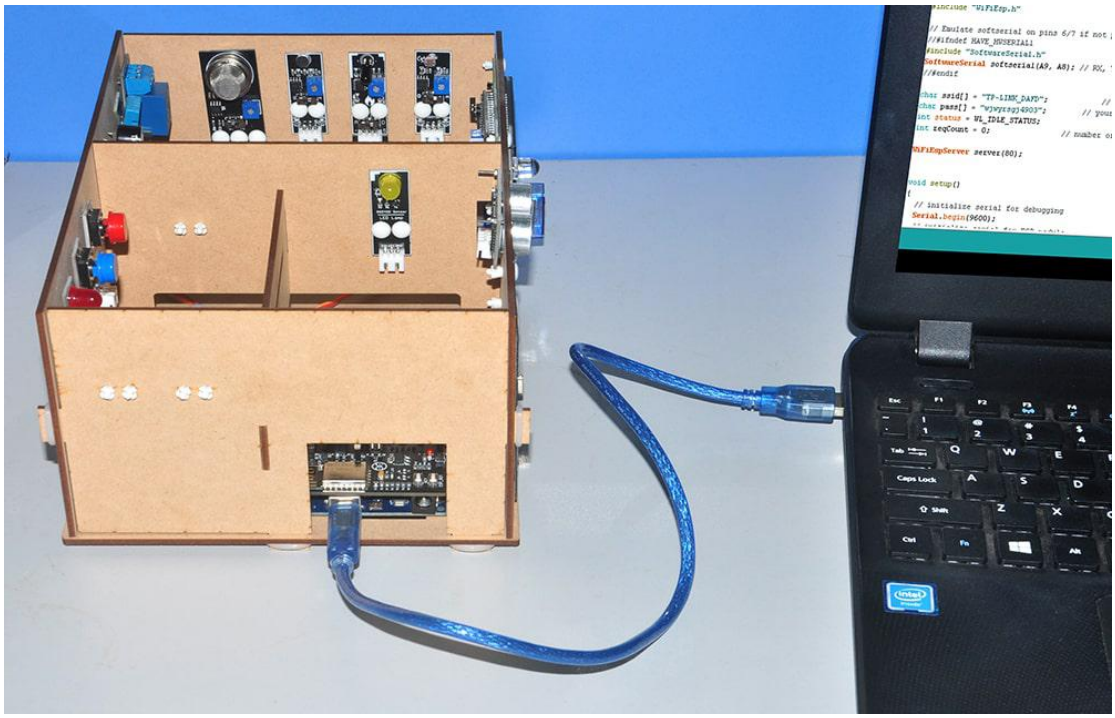
To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:
http://osoyoo.com/driver/WiFiEsp-master.zip

You need go to Arduino IDE ->Sketch ->Include Library ->Add ,Zip library to load above zip files into Arduino IDE.

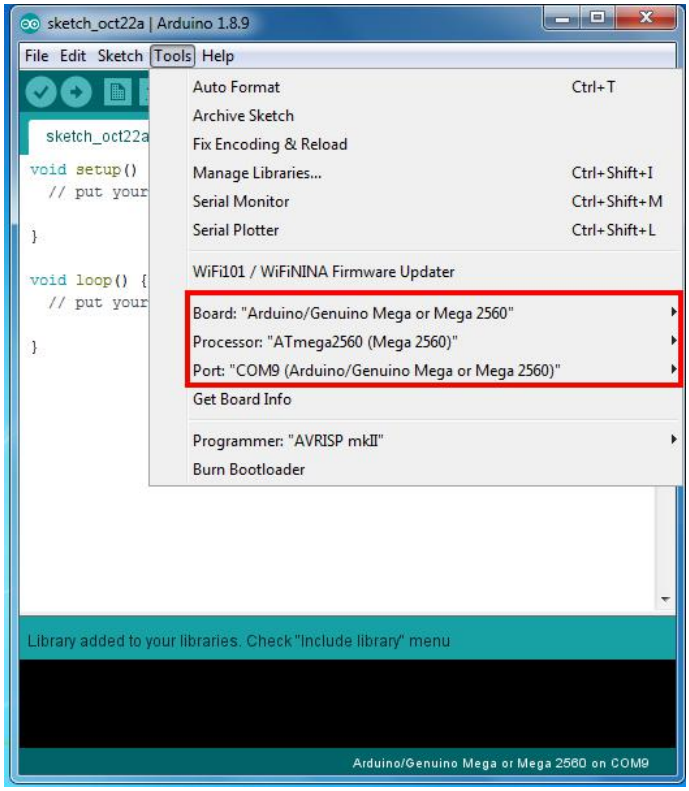


Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson9”:
http://osoyoo.com/driver/smarthome/smarthome-lesson9.zip

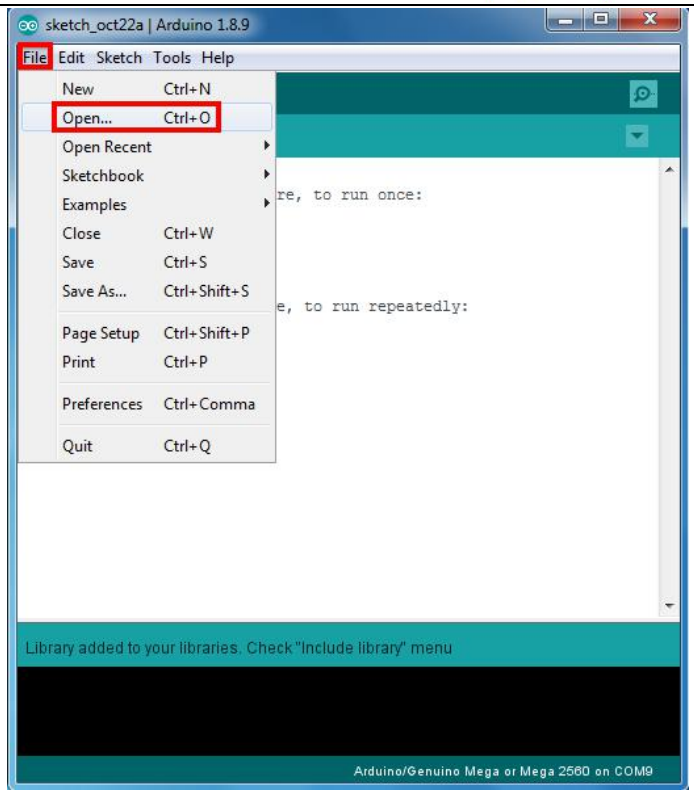
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Arduino IDE: Choose corresponding board type and port type for you project .



Step 6 Arduino IDE: Click file – Open, then choose code “smarthome-lesson9.ino” in the folder, load up the sketch onto your Arduino.

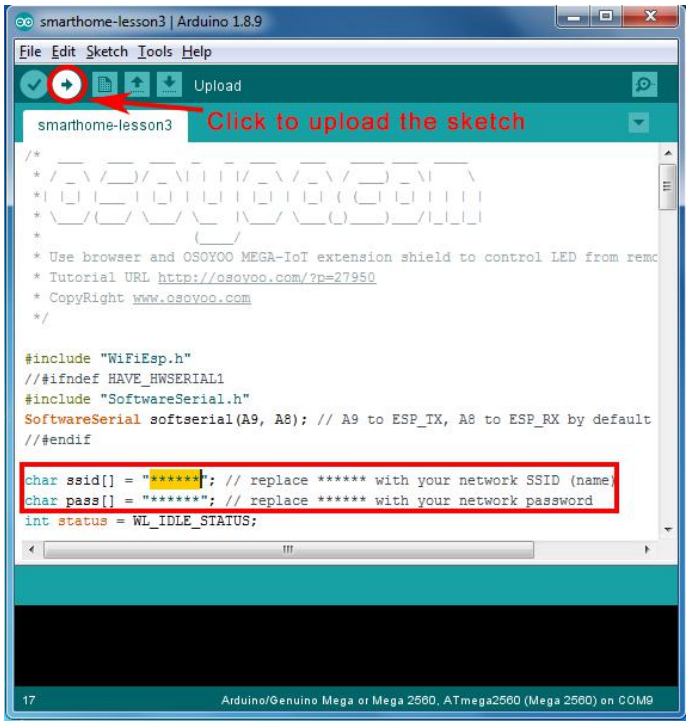


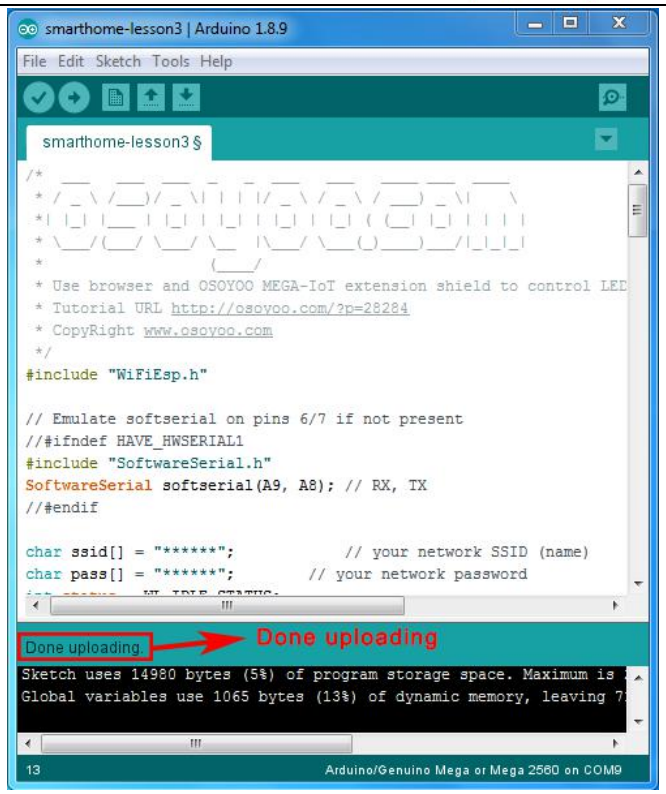
Note: In the sketch, find line 24，25 as following:

char ssid[] = "******"; // your network SSID (name)

char pass[] = "******"; // your network password

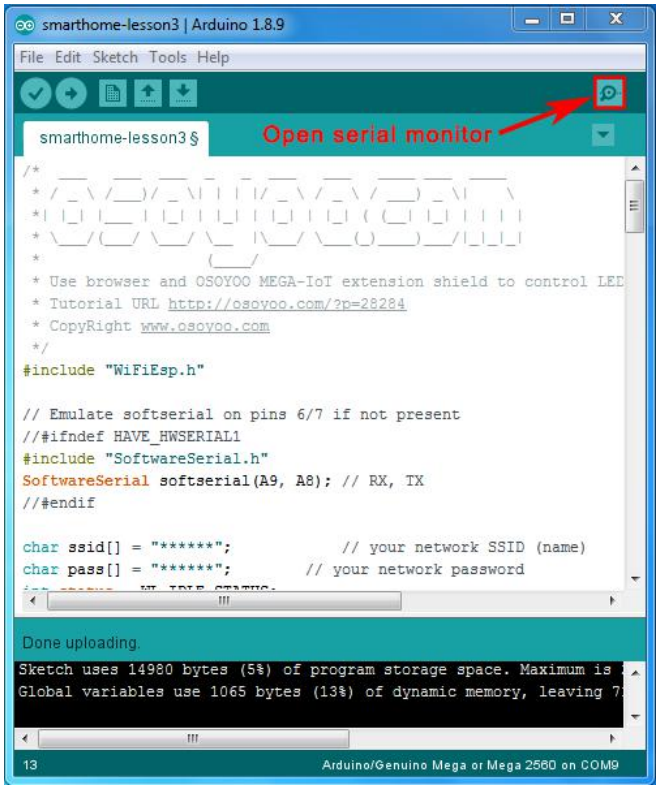
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

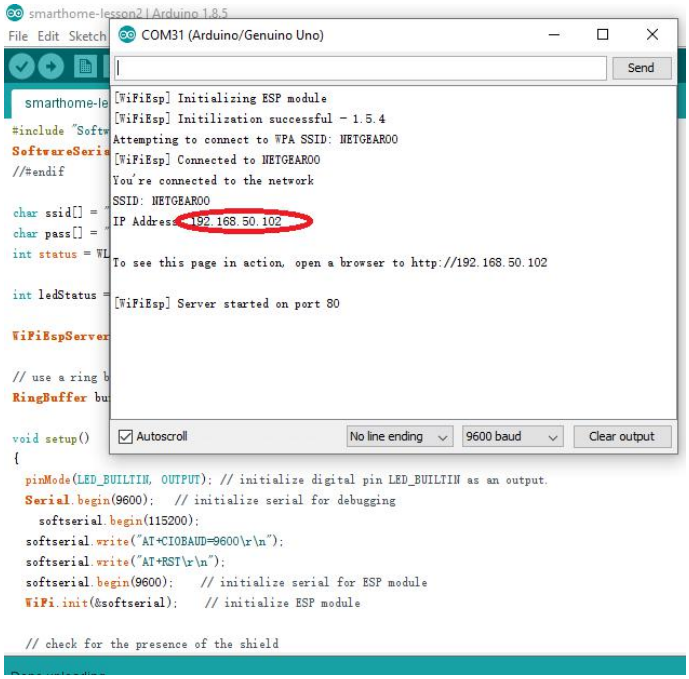




HOW TO PLAY

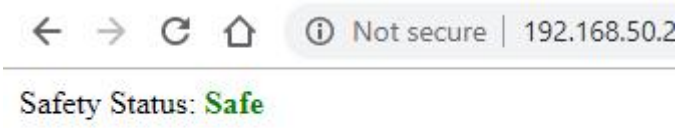
After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





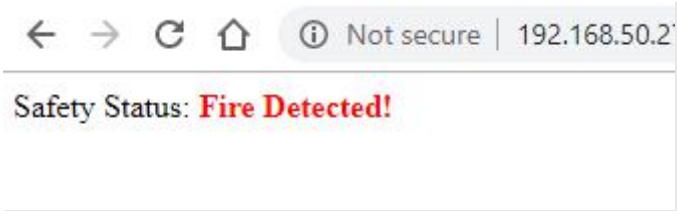
From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Above result means there is no Smoke signal is detected. The Red LED on the D13 pin of MEGA-IoT shield is off and Green LED is ON which shows the same result.

Now let's use a gas lighter to leak some gas to fire sensor, the gas will trig fire signal to Arduino. You will see the Green LED on IoT shield will be off and Red LED will turn ON. Now check the web browser , after about 2 to 5 seconds, the browser will show following result.



Lesson10: Flame Detection

OBJECTIVE

In this lesson, we will show you how to make use Internet to monitor remote Fire Sensor status.

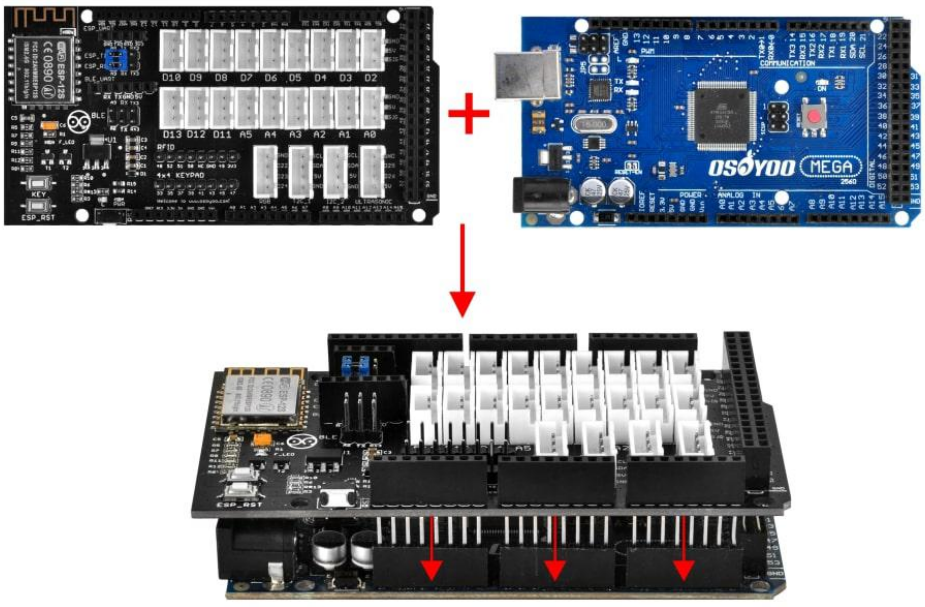
We will use Osoyoo Mega-IoT Shield to connect Fire Sensor, LEDs and MEGA2560 MCU board.Arduino MEGA2560 board can work as a web server. Remote browser can access this web server to shows fire sensor real time status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- Red LED PnP Module x 1
- Green LED PnP Module x 1
- Flame Detection PnP Module x 1
- Buzzer Module x 1
- OSOYOO 3-Pin PnP Cable x 4
- USB Cable x 1PC x 1

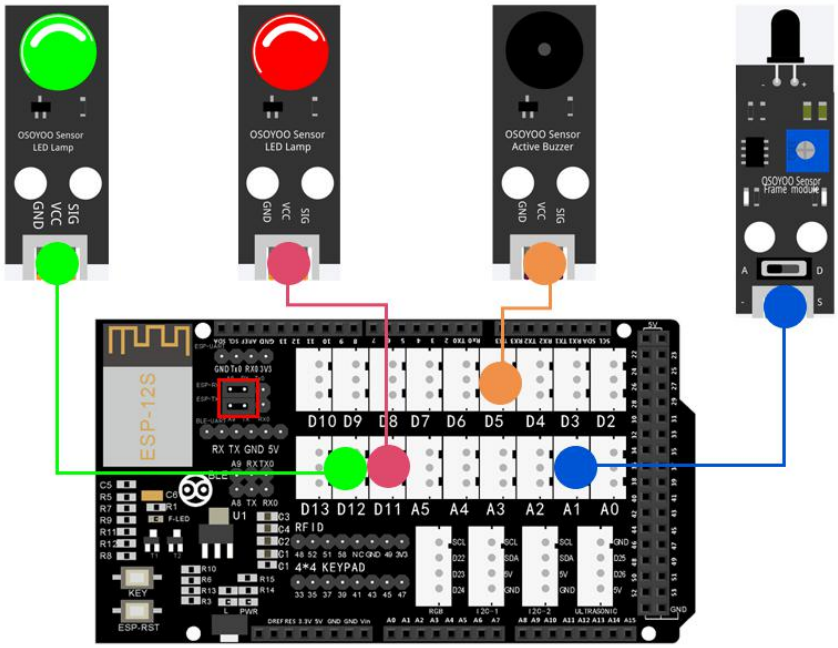
HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with four 3-pin PnP cables as below(Jumper Cap should connect ESP8266 RX with A8, TX with A9):

Green LED Module - D12
Red LED Module - D11
Buzzer Module - D5
Flame Detection Sensor - A1



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

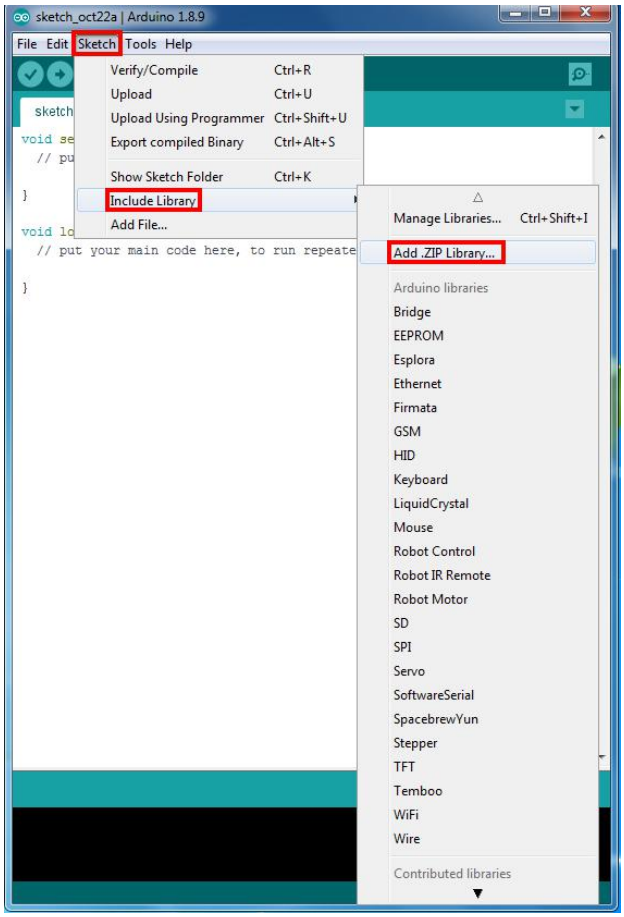
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

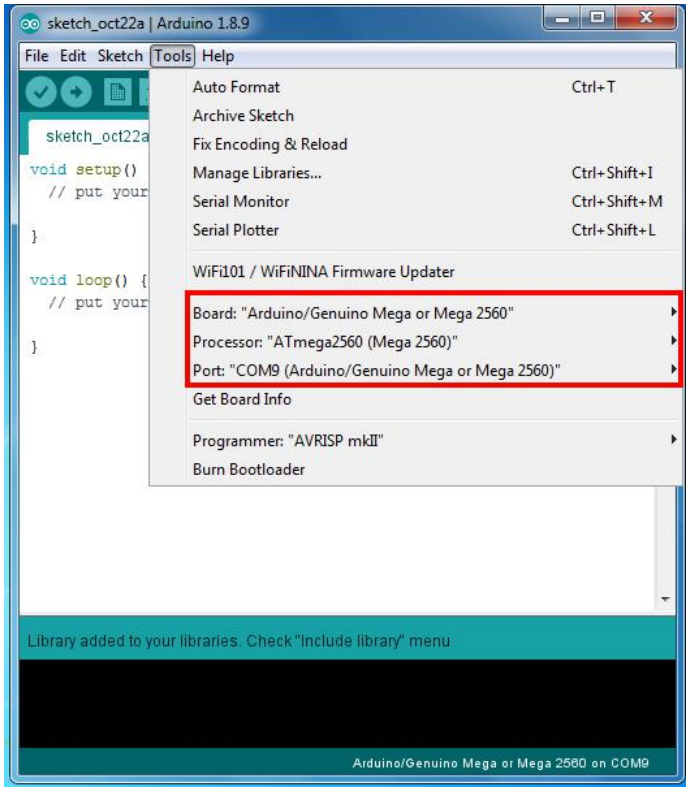
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



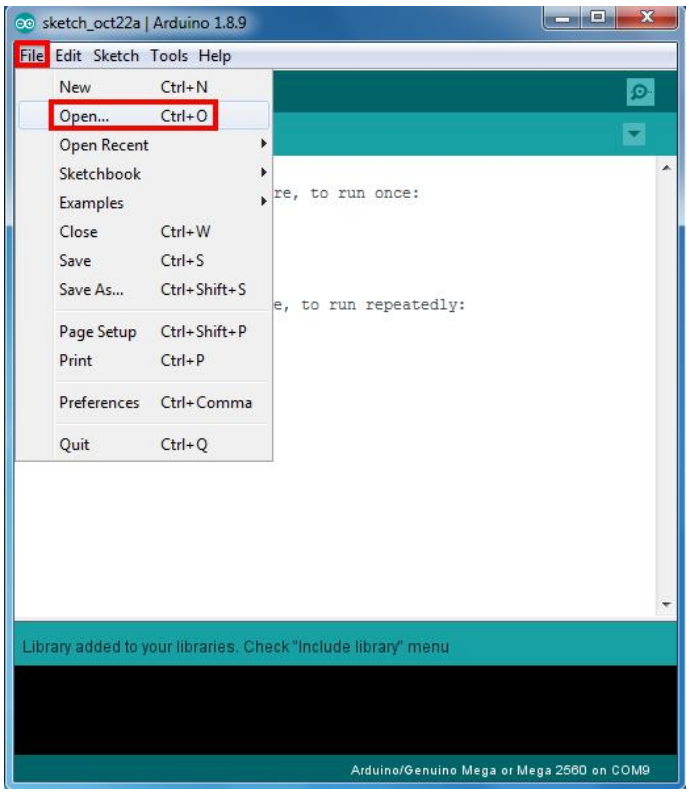
Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson10”:
http://osoyoo.com/driver/smarthome/smarthome-lesson10.zip

Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE:Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file-Open,then choose code “smarthome-lesson10.ino” in the folder, load up the sketch onto your Arduino.

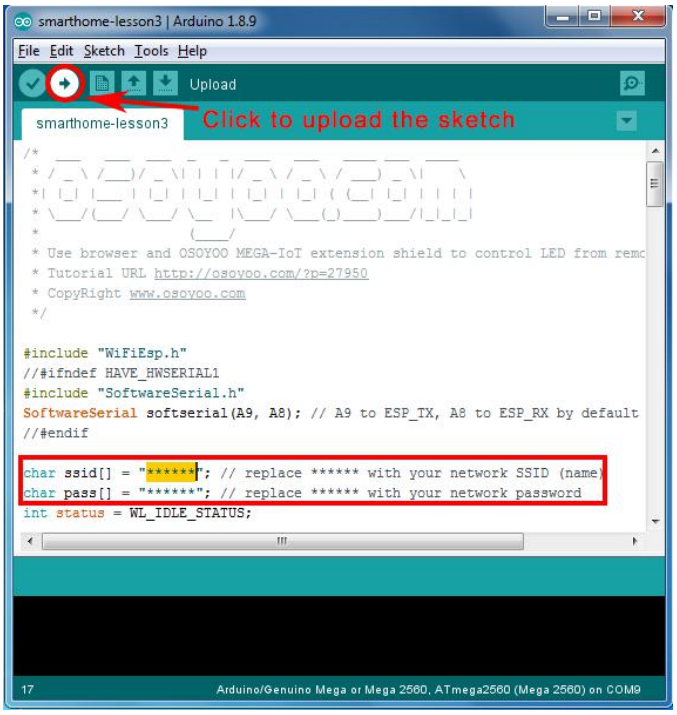


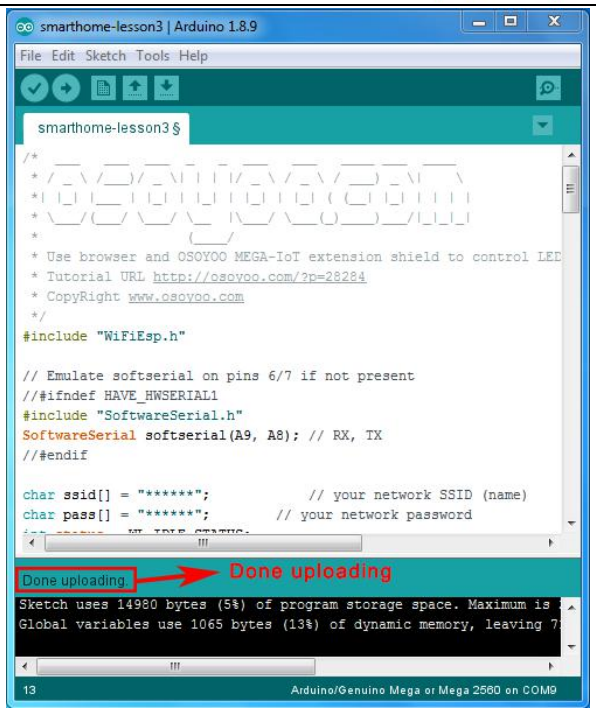
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "*******"; // your network SSID (name)

char pass[ ] = "*******"; // your network password

please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

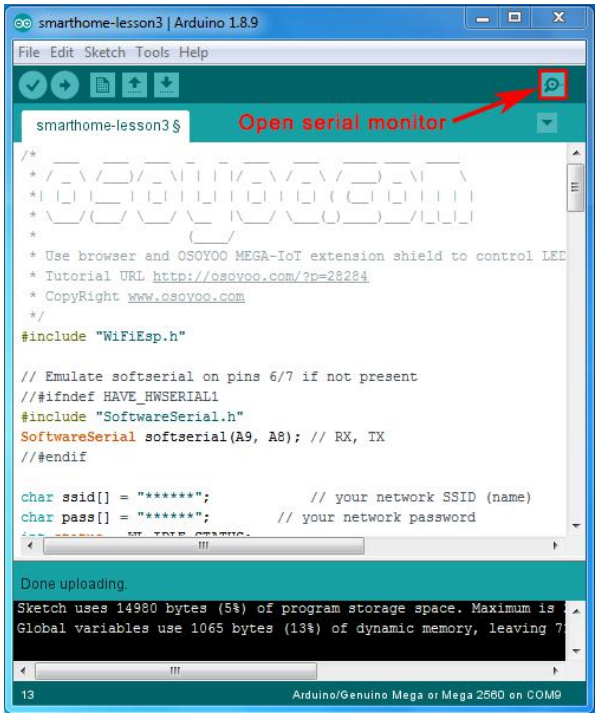


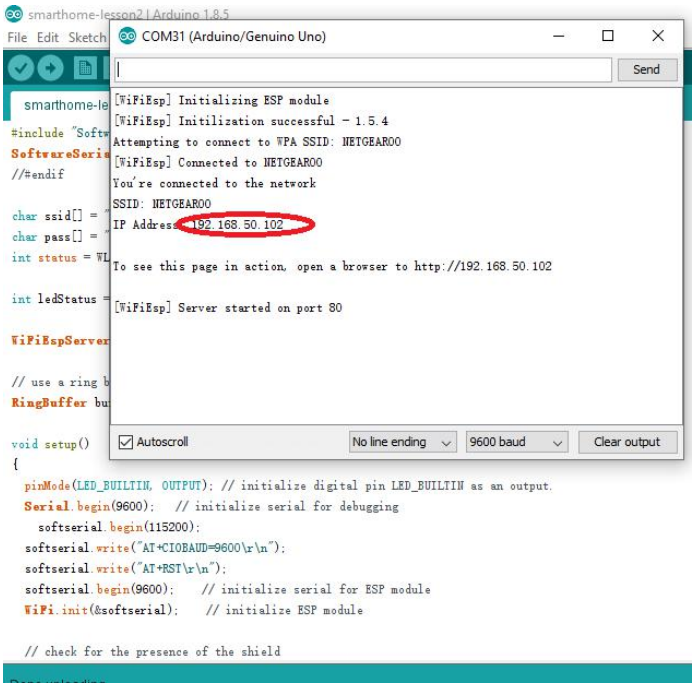


HOW TO PLAY

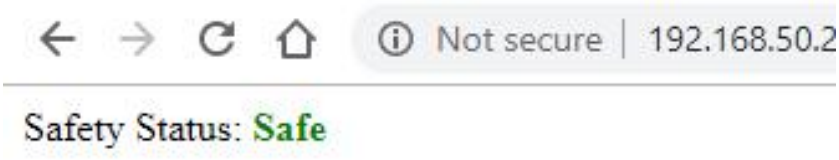
Notice: Please use the Philips Screwdriver to adjust the Flame Detection Module's sensitivity by adjusting the potentiometer, when there's no fire, you should adjust the module to the green light.

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor , you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Above result means there is no Fire signal is detected. The Red LED on the D12 pin of MEGA-IoT shield is off and Green LED is ON which shows the same result.

Now let's use a gas lighter to turn a small flame, the gas flame will trig some IR signal to sensor. You will see the Green LED on IoT shield will be off and Red LED will turn ON, buzzer will alarm.

Now check the web browser , after about 2 to 5 seconds, the browser will show following result:

Lesson11: Sound Sensor

OBJECTIVE

In this lesson, we will show you how to make use Internet to monitor remote sound sensor status.

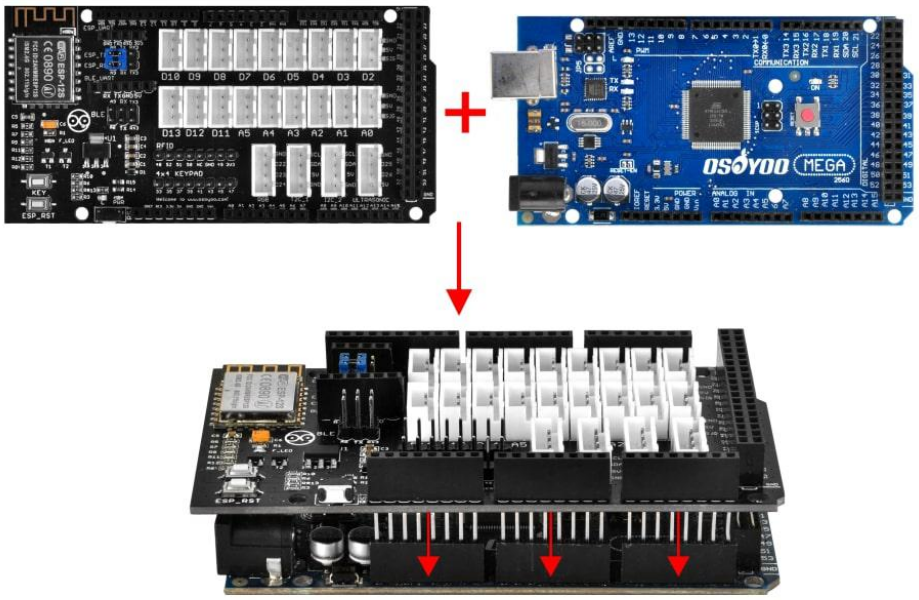
We will use Osoyoo Mega-IoT Shield to connect sound Sensor, LEDs and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server to shows sound sensor real time status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- Red LED PnP module x 1
- Green LED PnP module x 1
- Sound Sensor PnP module x 1
- 3-pin PnP cable x 3

HOW TO MAKE

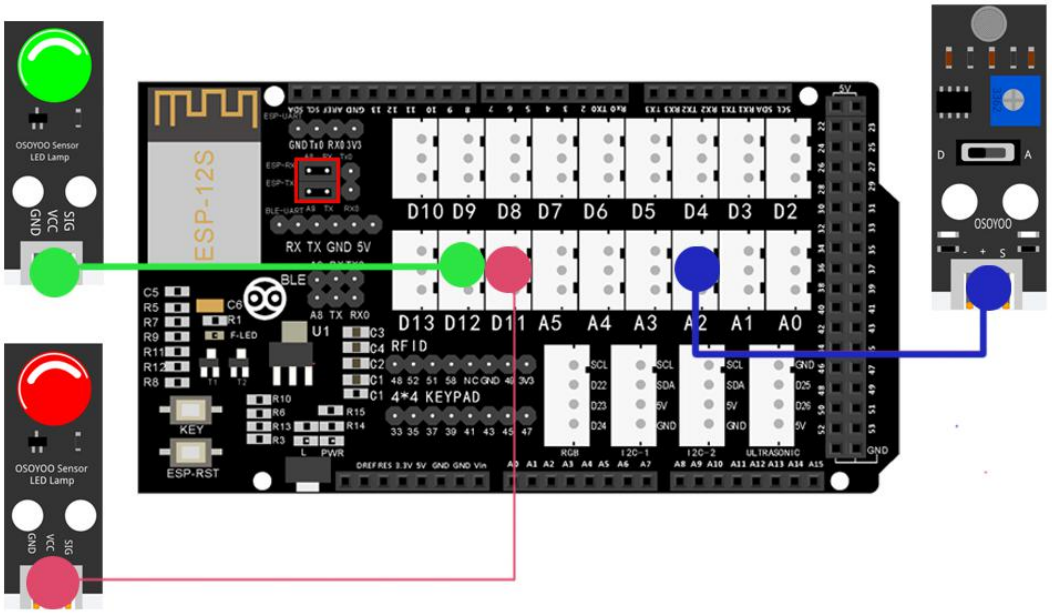
First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with four 3-pin

PnP cables as below:(Jumper Cap should connect ESP8266 RX with A8, TX with A9):

Green LED Module - D12
Red LED Module - D11
Sound Sensor-A2



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

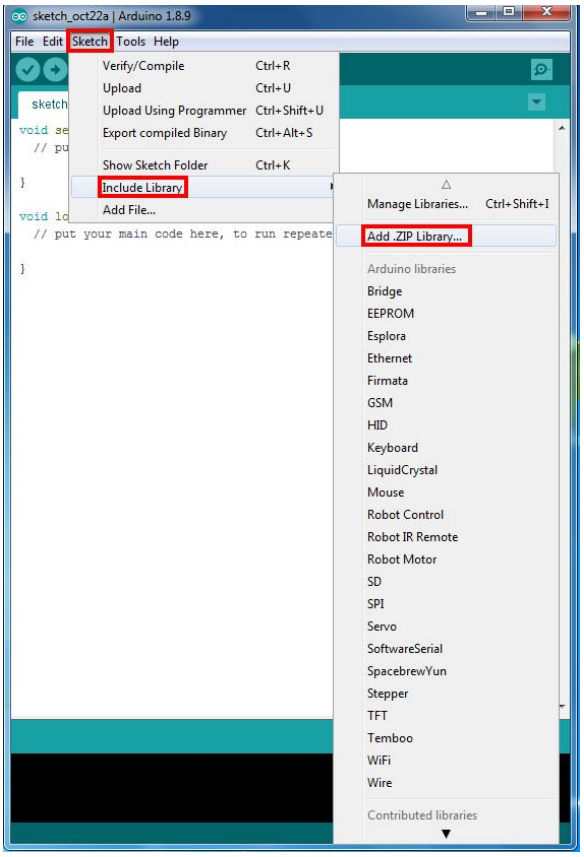
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

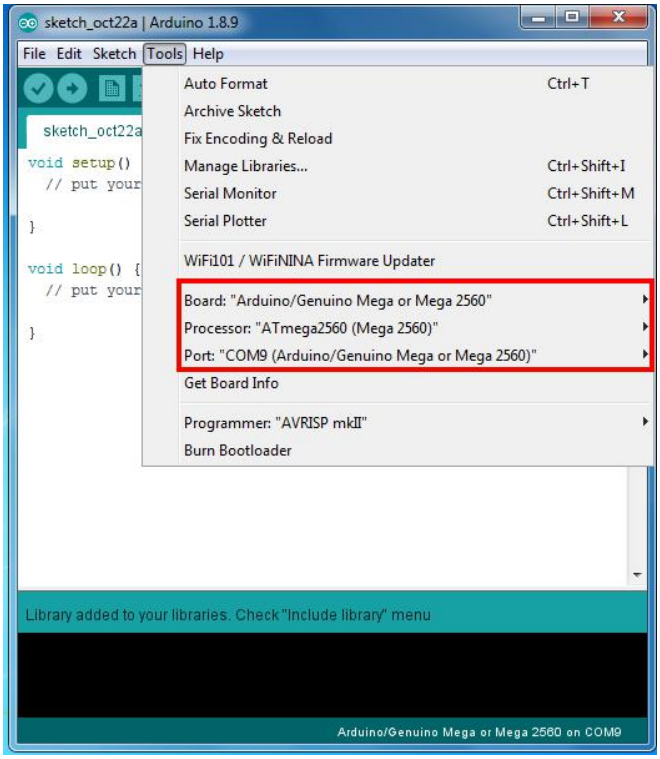
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



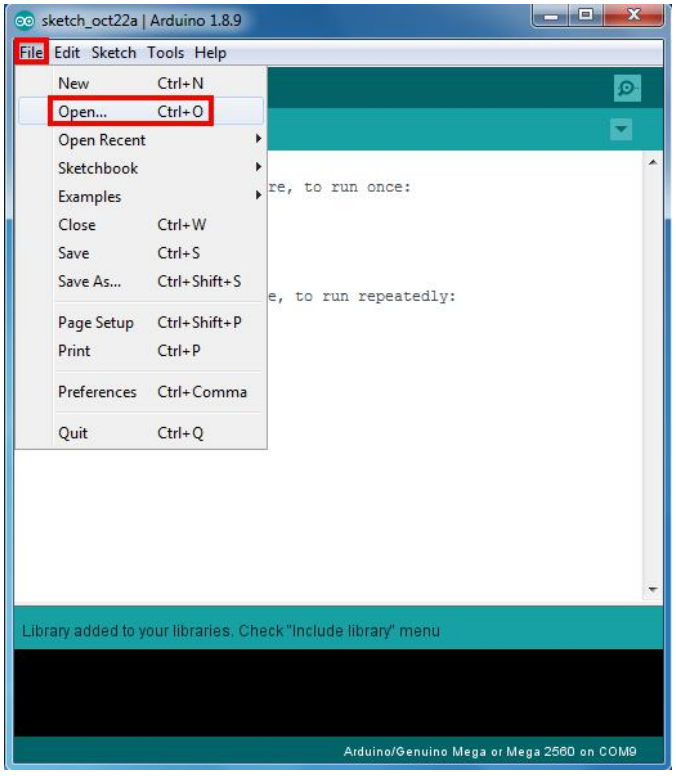
Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson11”:
http://osoyoo.com/driver/smarthome/smarthome-lesson11.zip

Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE:Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file-Open,then choose code “smarthome-lesson11.ino” in the folder, load up the sketch onto your Arduino.

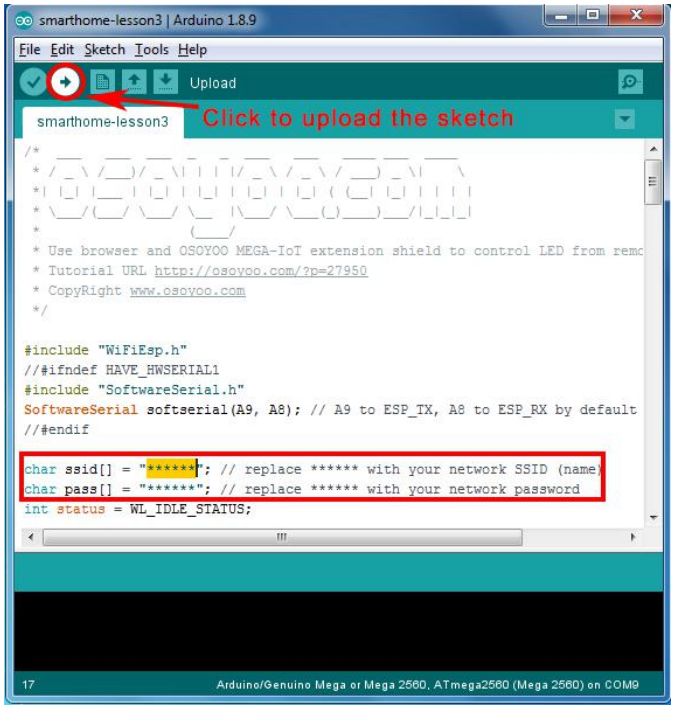


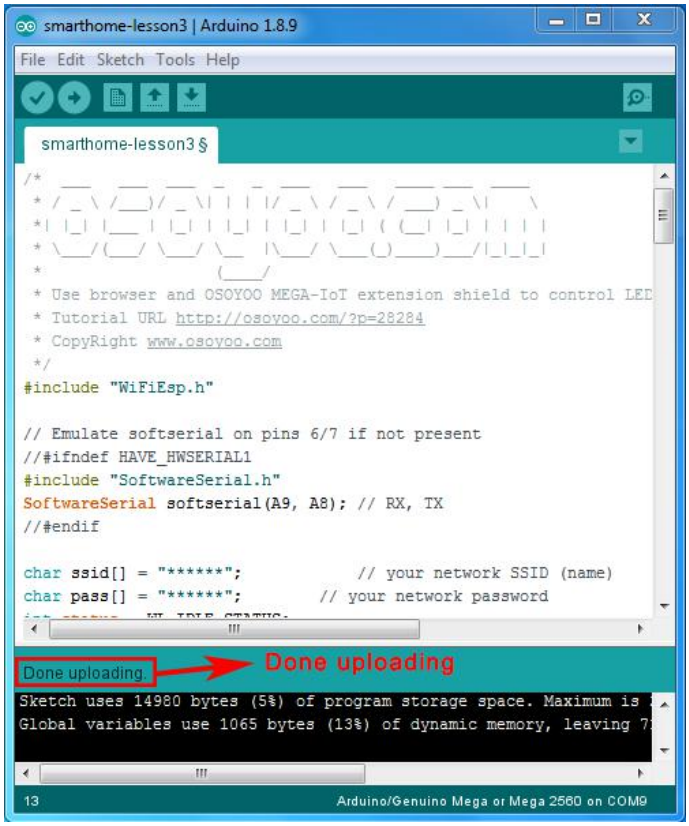
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "*******"; // your network SSID (name)

char pass[ ] = "*******"; // your network password

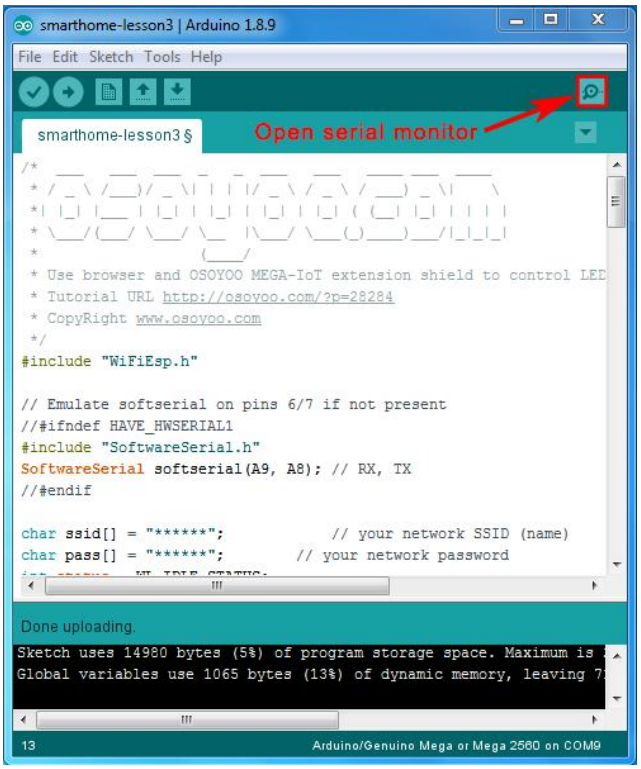
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

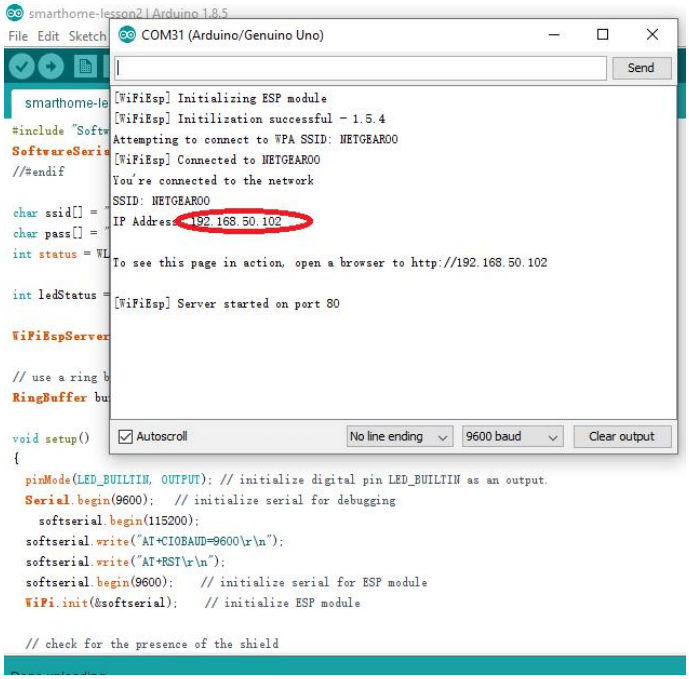




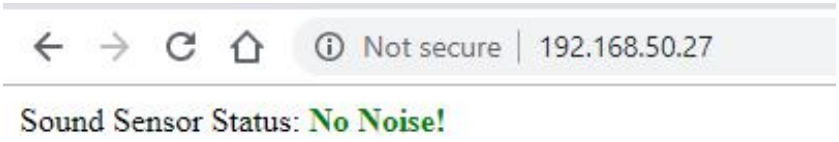
HOW TO PLAY

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor , you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Above result means there is no sound signal is detected. The Red LED on the D11 pin of MEGA-IoT shield is off and Green LED is ON which shows the same result.

Now let's make some noise. We connect a buzzer pin to D5 slot. You will hear very big noise. Put the buzzer close to sound sensor. You will see the Green LED on IoT shield will be off and Red LED will turn ON.
Now check the web browser , after about 2 to 5 seconds, the browser will show following result.

Lesson12: Light Sensor

OBJECTIVE

In this lesson, we will show you how to make use Internet to monitor remote Light Sensor status.

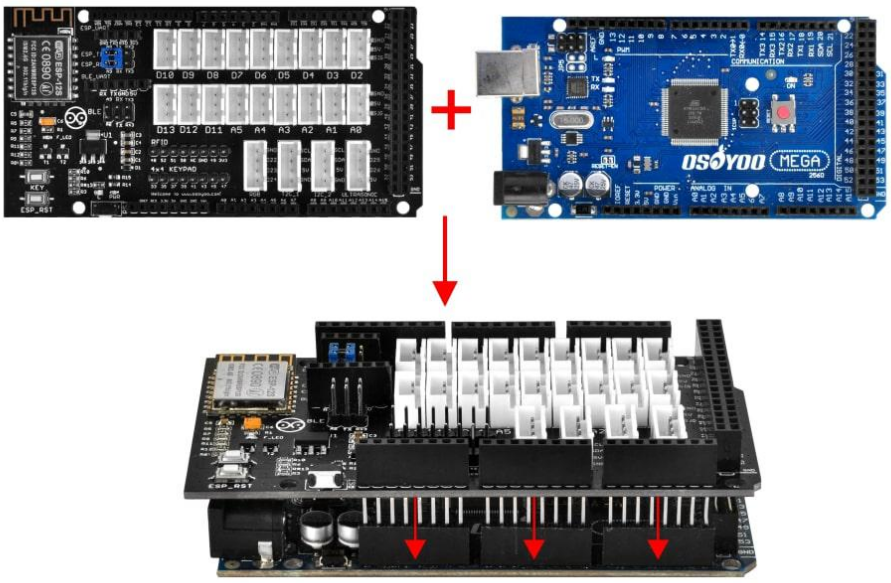
We will use Osoyoo Mega-IoT Shield to connect Light Sensor(photoresistor), LEDs and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server to shows light sensor real time status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- Red LED PnP module x 1
- Green LED PnP module x 1
- Light Sensor PnP module x 1
- Buzzer Module x 1
- 3-pin PnP cable x 4

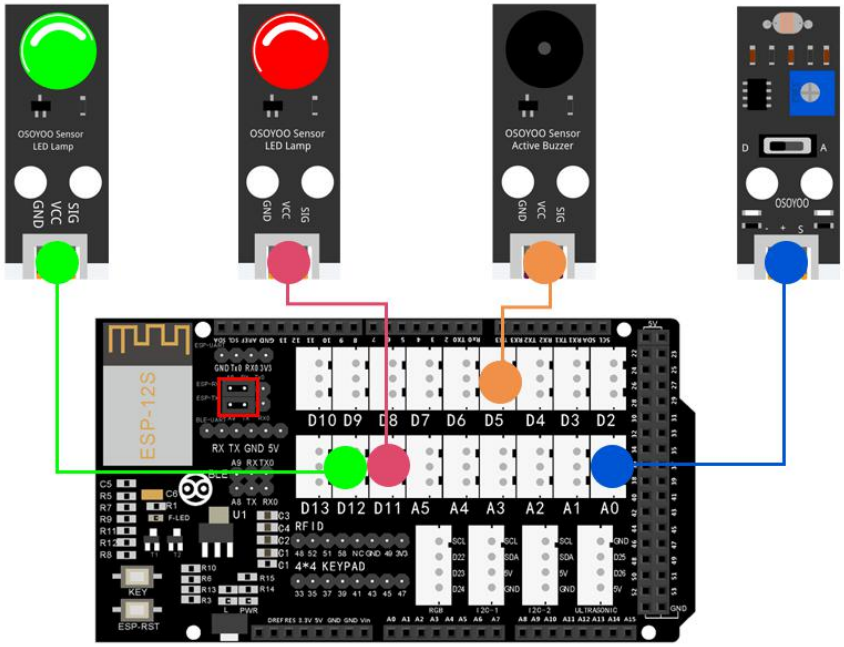
HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with four 3-pin PnP cables as below. Jumper Cap should connect ESP8266 RX with A8, TX with A9)

Green LED Module – D12
Red LED Module – D11
Buzzer Module – D5
Light (Photoresistor) Sensor - A0



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

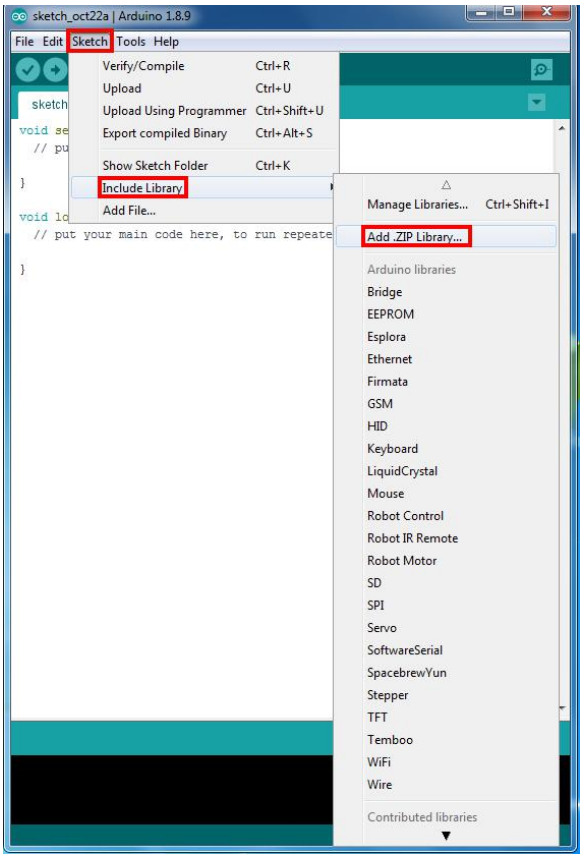
Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as

RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

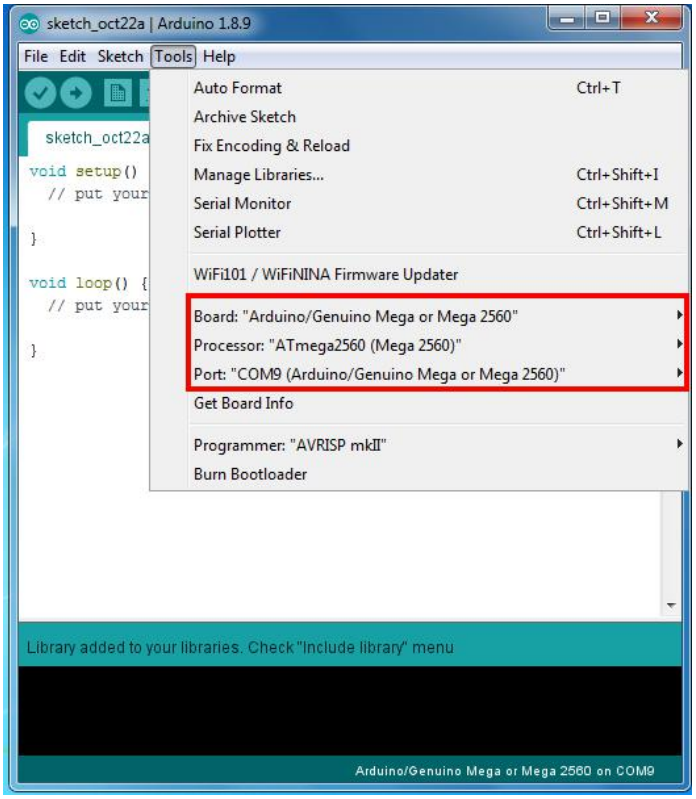
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



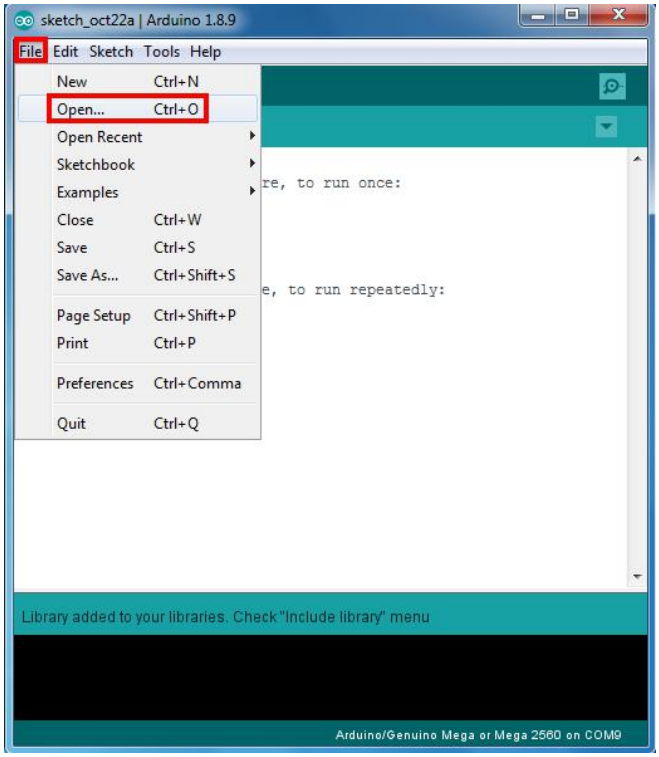
Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson12”:
http://osoyoo.com/driver/smarthome/smarthome-lesson12.zip

Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE:Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click File - Open, then choose code “smarthome-lesson12.ino” in the folder, load up the sketch onto your Arduino.

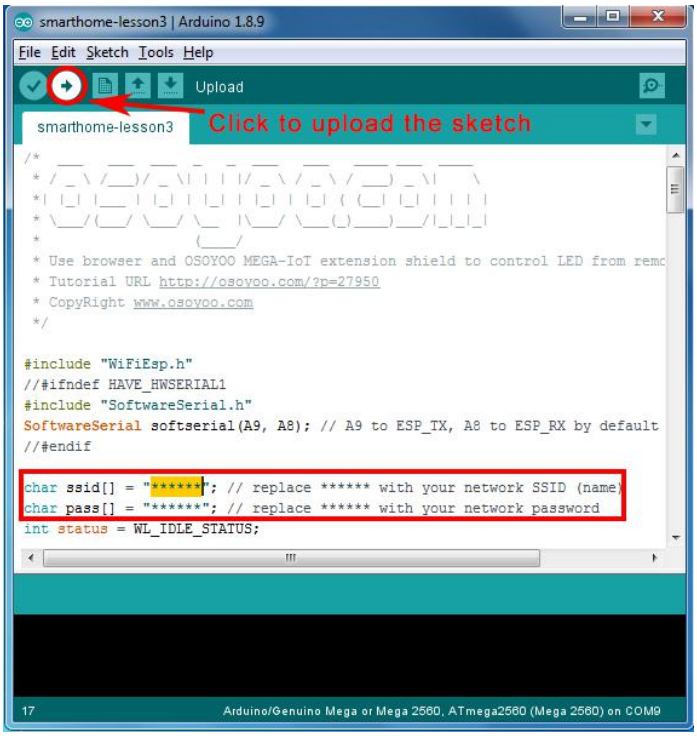


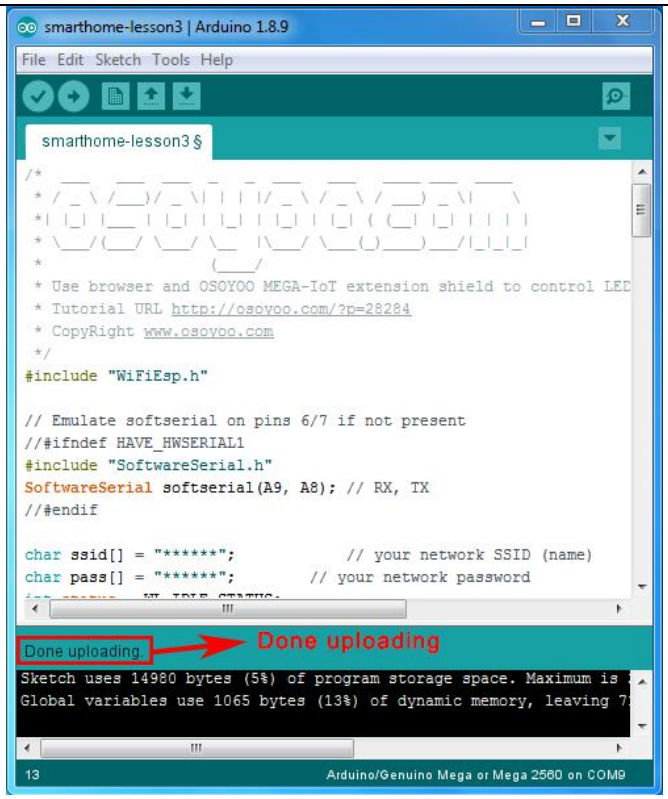
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "******"; // your network SSID (name)

char pass[ ] = "******"; // your network password

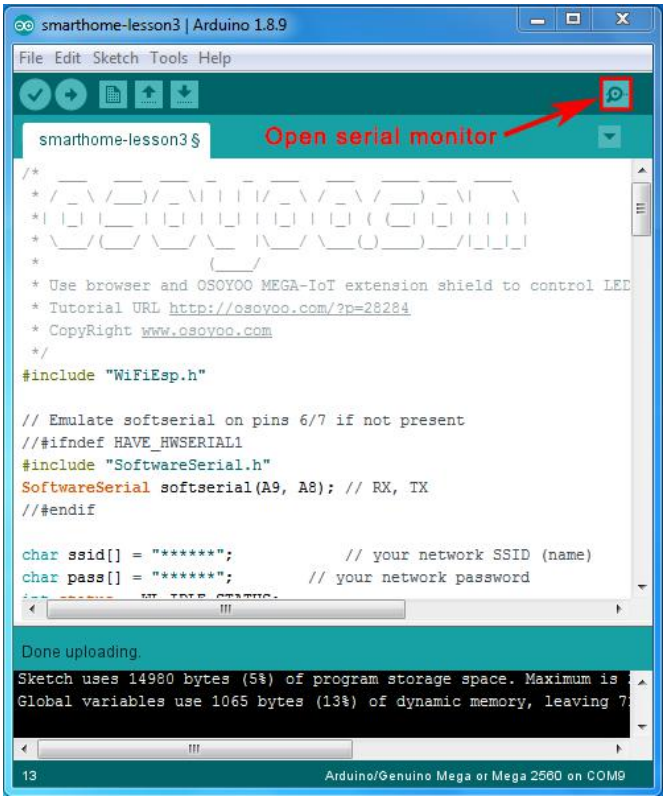
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

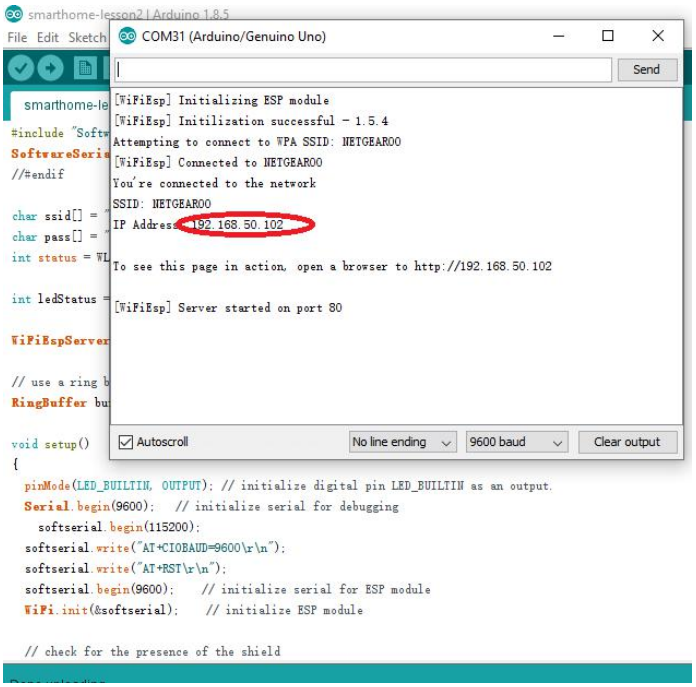




HOW TO PLAY

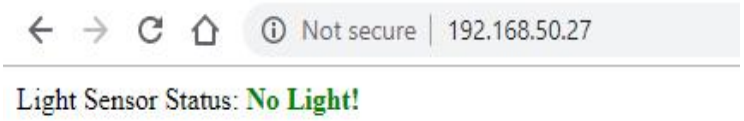
After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor , you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Now use your hand to block all the light over the light sensor, Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Above result means there is no light signal is detected. The Red LED on the D13 pin of MEGA-IoT shield is off and Green LED is ON which shows the same result.

Now expose the light sensor to light source, You will see the Green LED on IoT shield will be off and Red LED will turn ON, buzzer will alarm.

Now check the web browser , after about 2 to 5 seconds, the browser will show following result.

Lesson13: PIR Motion Detection

OBJECTIVE

In this lesson, we will show you how to make use Internet to monitor remote motion sensor status and detect intruder.

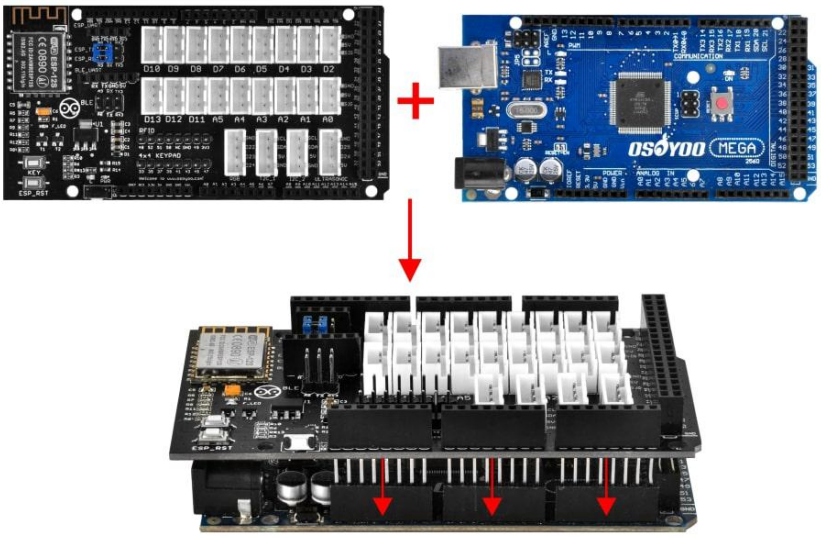
We will use Osoyoo Mega-IoT Shield to connect motion Sensor(photoresistor), LEDs and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server to shows motion sensor real time status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- Red LED PnP module x 1
- Green LED PnP module x 1
- motion Sensor(Photoresistor) PnP module x 1
- Buzzer Module x 1
- 3-pin PnP cable x 4

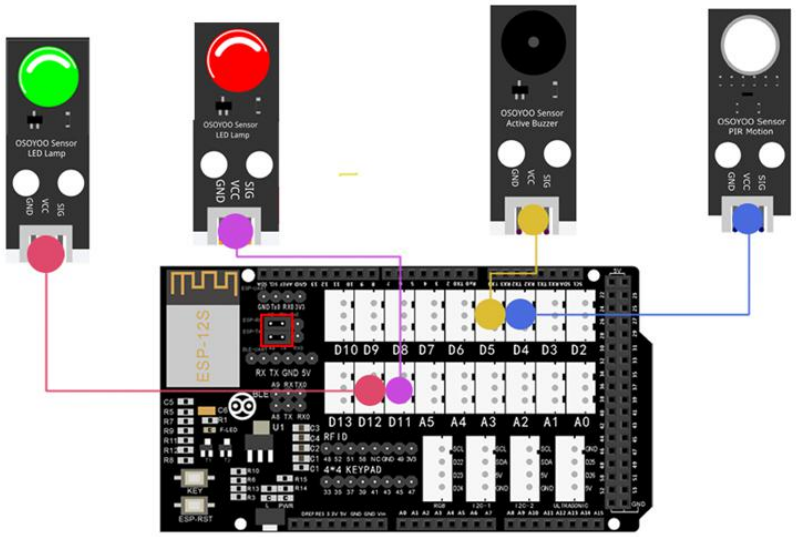
HOW TO MAKE

First, please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with four 3-pin PnP cables as below. (Jumper Cap should connect ESP8266 RX with A8, TX with A9)

Green LED Module - D12
Red LED Module - D11
Buzzer Module - D5
Motion Sensor-D4



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

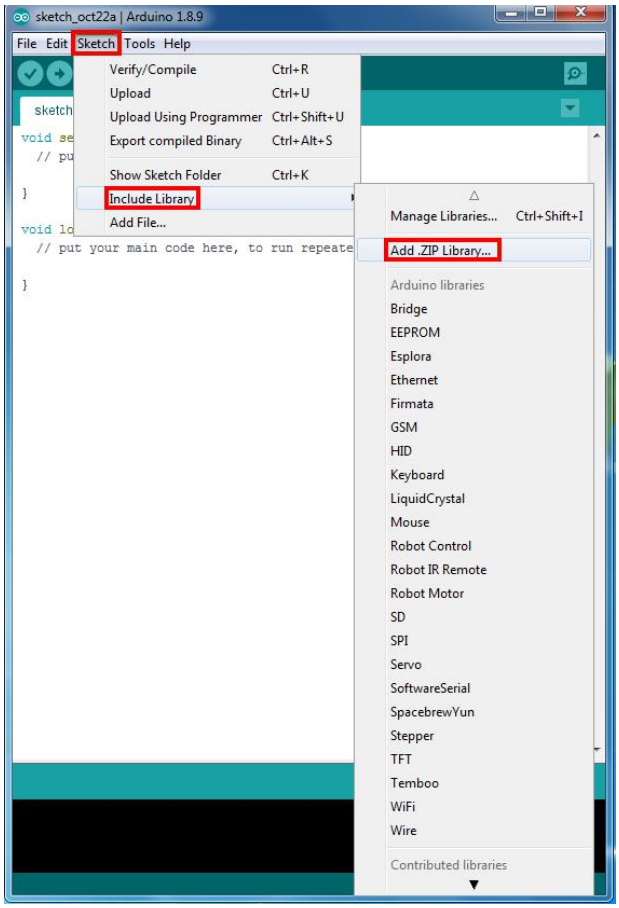
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A9 as TX and A8 as RX in software serial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

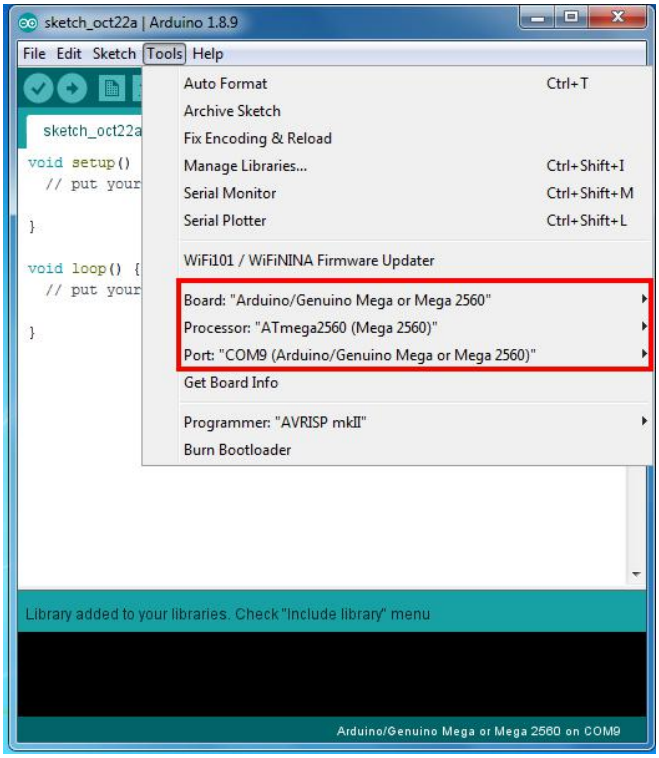
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



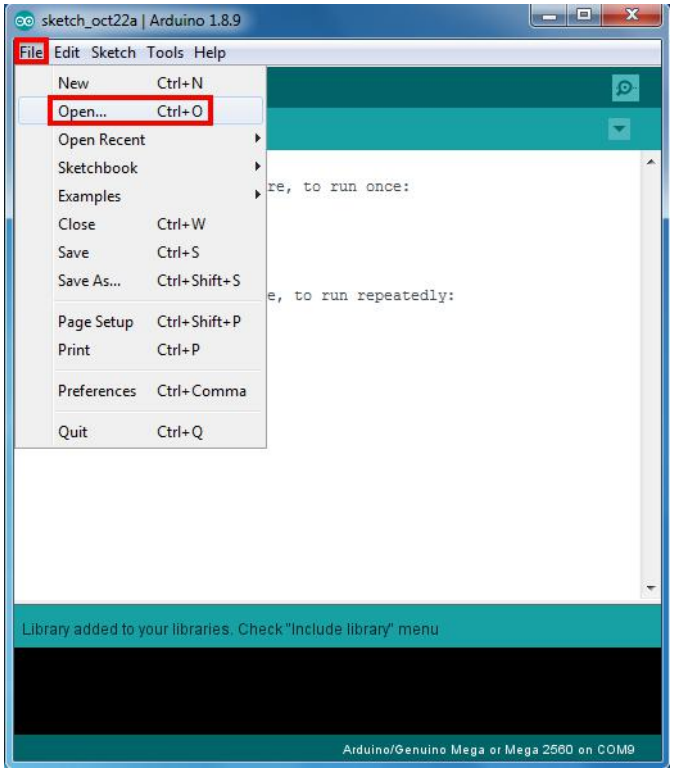
Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson13”:
http://osoyoo.com/driver/smarthome/smarthome-lesson13.zip

Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE: Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file-Open,then choose code “smarthome-lesson13.ino” in the folder, load up the sketch onto your Arduino.

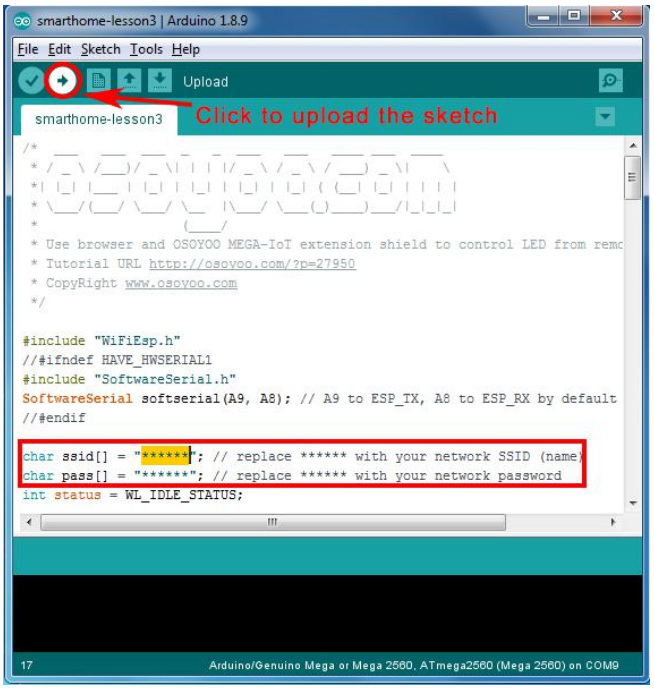


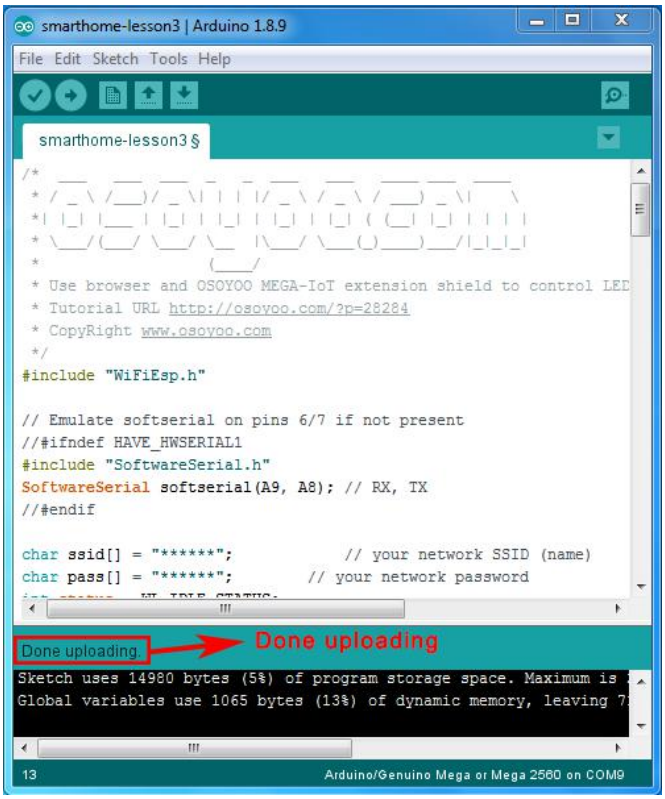
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "*******"; // your network SSID (name)

char pass[ ] = "*******"; // your network password

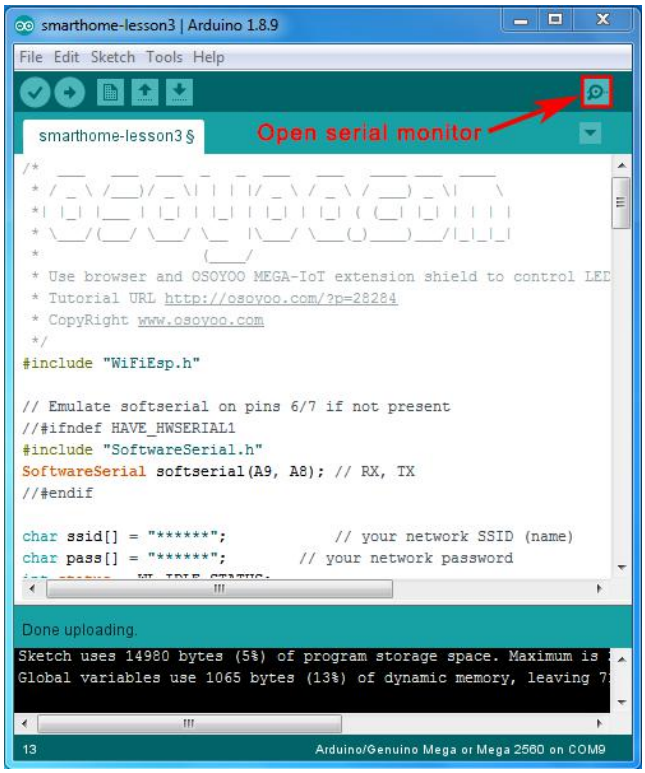
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

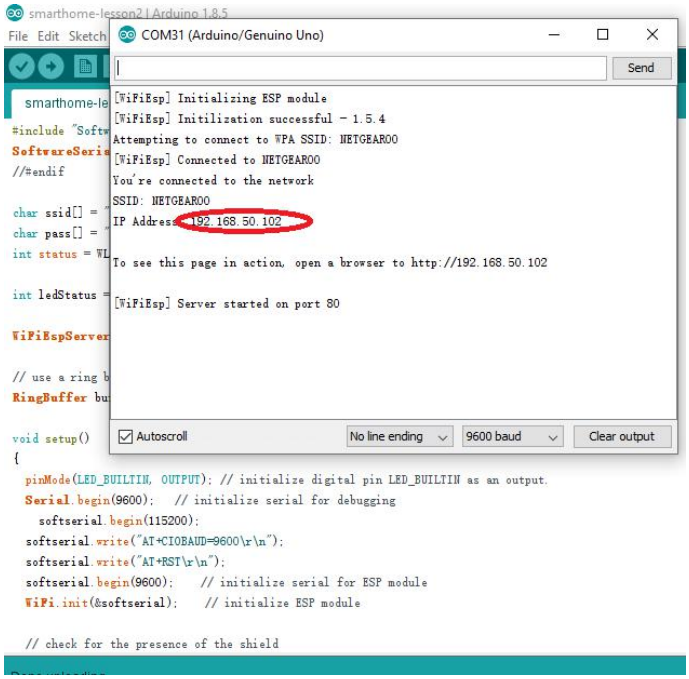




HOW TO PLAY

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





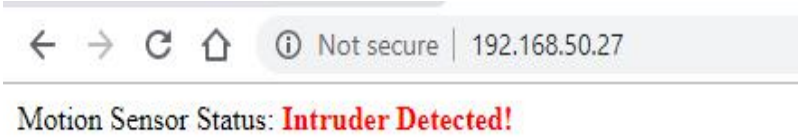
From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:

Above result means there is no intruder (motion signal) is detected. The Red LED on the D13 pin of MEGA-IoT shield is off and Green LED is ON which shows the same result.

Now put your hand close to motion sensor, You will see the Green LED on IoT shield will be off and Red LED will turn ON, buzzer will alarm.

Now check the web browser , after about 2 to 5 seconds, the browser will show following result.



Lesson14: LCD Screen

OBJECTIVE

In this lesson, we will show you how to make use Internet send message from remote browser to remote 16x2 LCD.

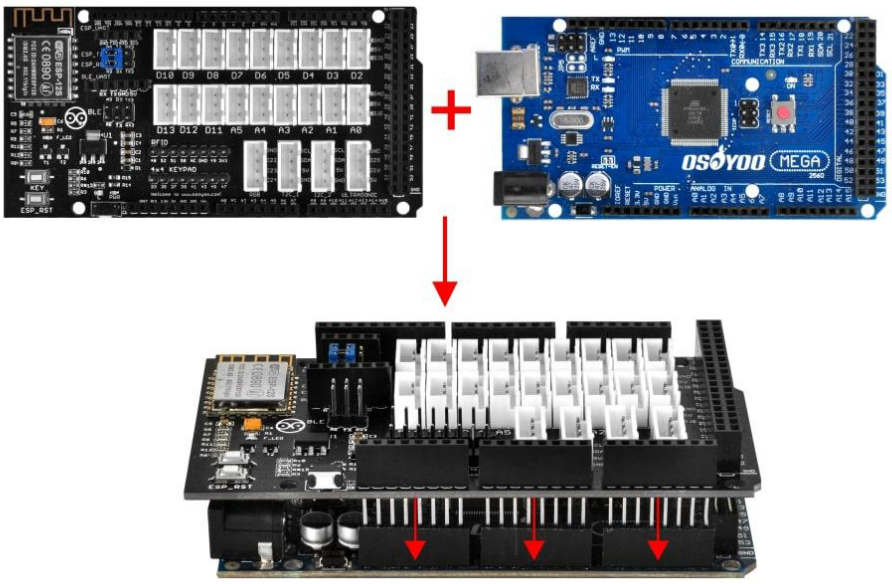
We will use Osoyoo Mega-IoT Shield to connect 1602 LCD and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. We will use browser can send "your name" string to this web server and display Welcome your name message in the 1602 LCD screen.

PARTS & DEVICES

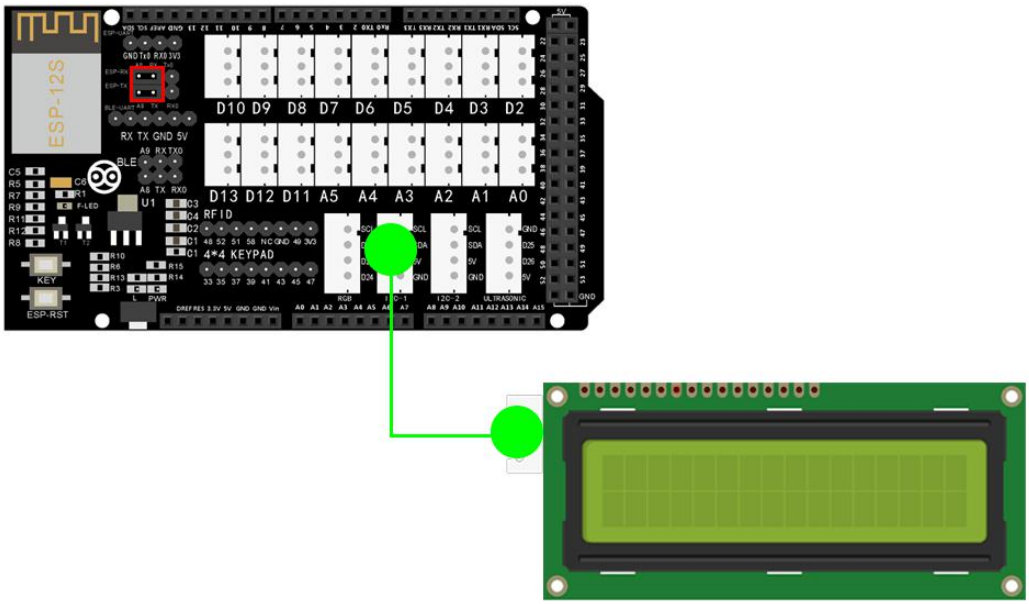
- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- 1602 LCD Screen PnP module x 1
- 4-Pin PnP Cable x 1

HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the I2C 1602 LCD Screen to the I2C_1 port of the OSOYOO MEGA-IoT Extension Board with a 4-pin PnP cable as below (Jumper Cap should connect ESP8266 RX with A8, TX with A9):



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

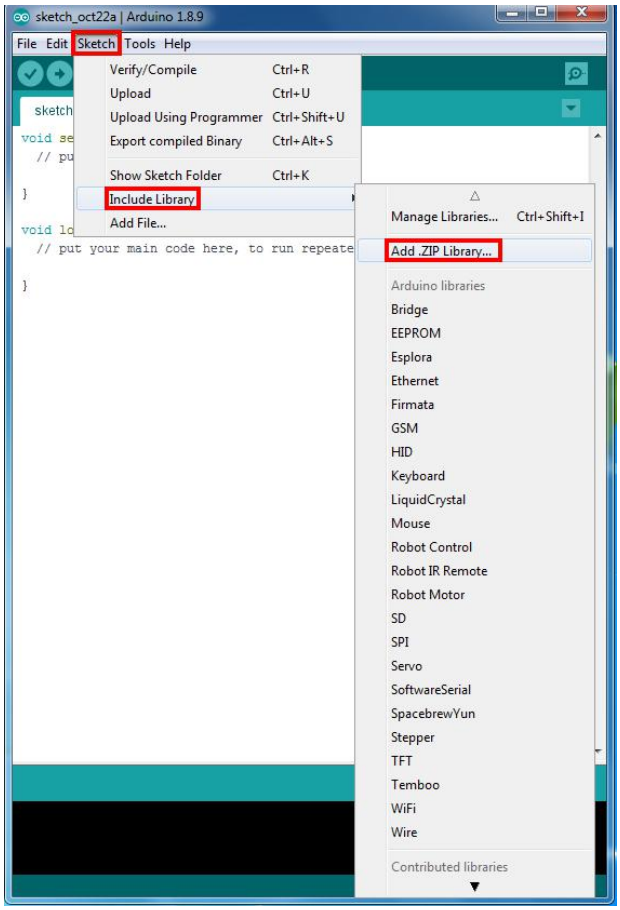
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

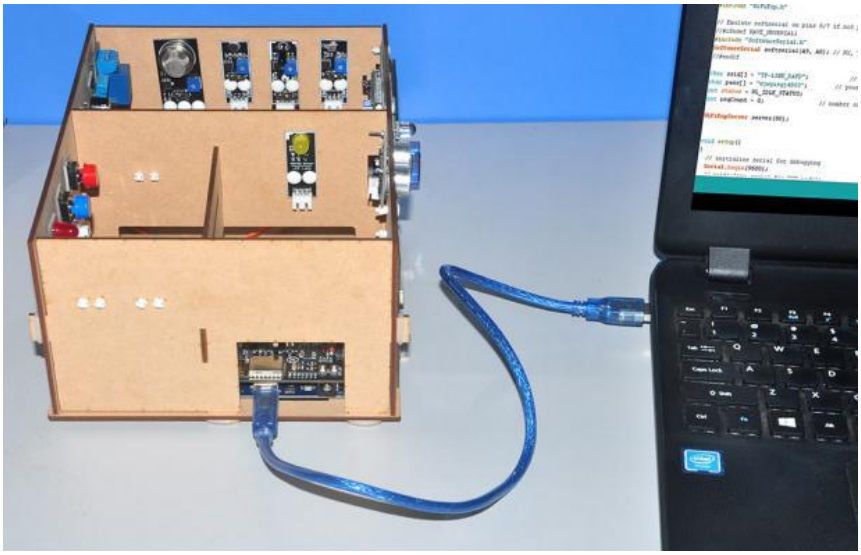
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



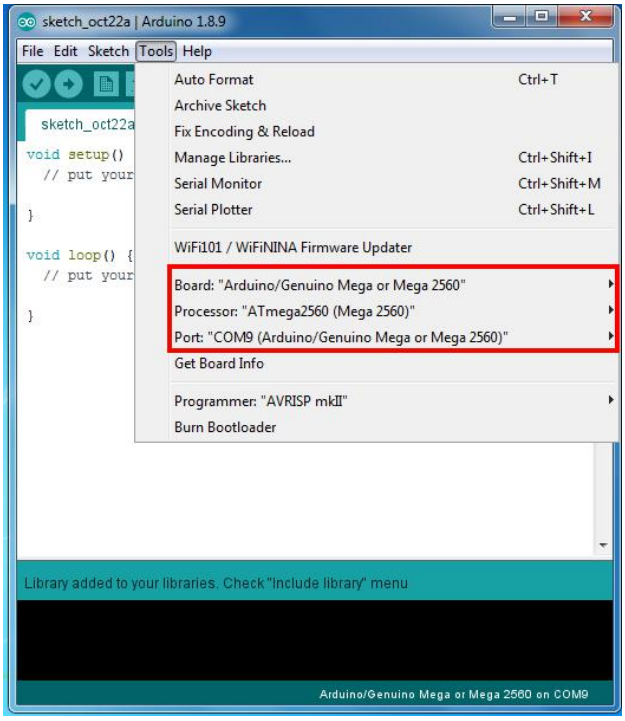
Step 3 You need install I2C library and save it as above operations. You can test 1602 LCD I2C address, please read following tutorial:
http://osoyoo.com/2017/07/09/arduino-lesson-i2c-lcd1602-display/

Step 4 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson14”:
http://osoyoo.com/driver/smarthome/smarthome-lesson14.zip

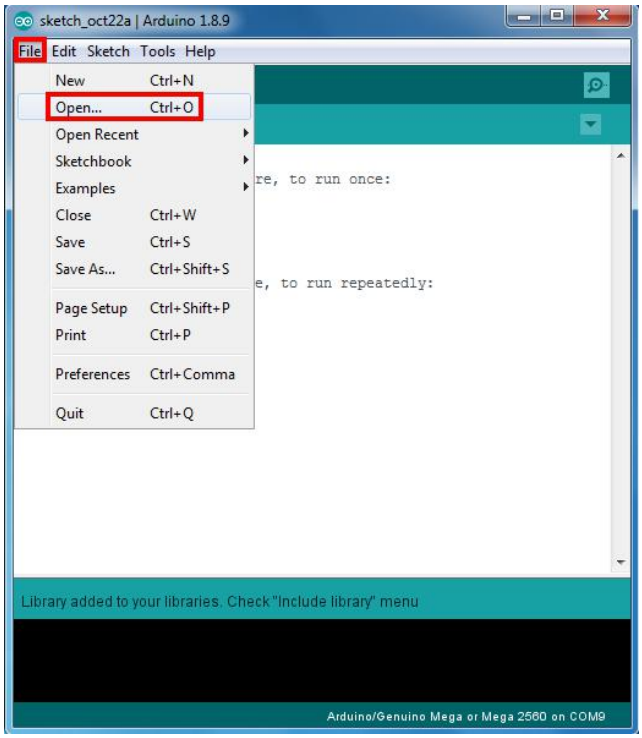
Step 5 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 6 Arduino IDE:Choose corresponding board type and port type for you project.



Step 7 Arduino IDE: Click file-Open,then choose code “smarthome-lesson14.ino” in the folder, load up the sketch onto your Arduino.

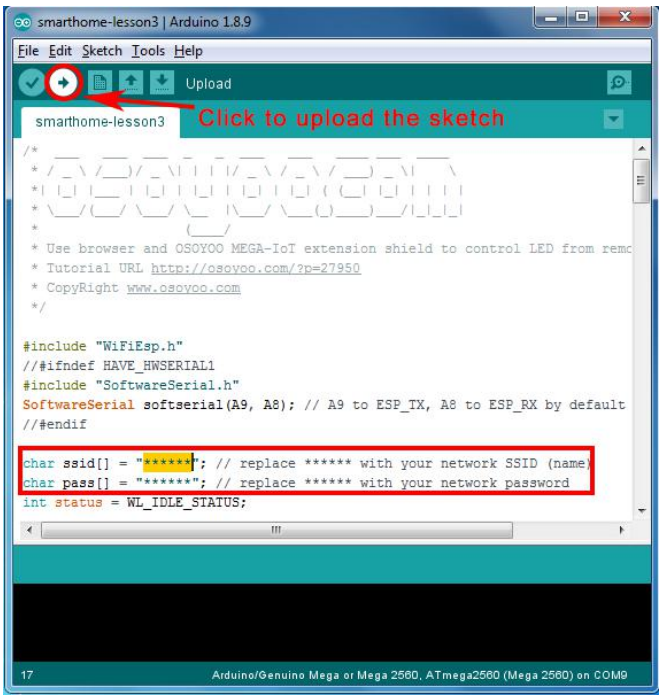


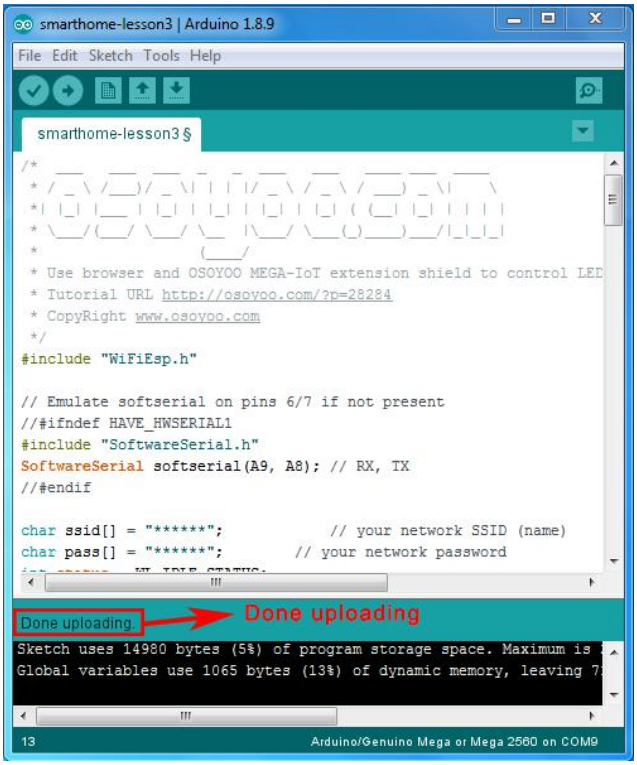
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "*******"; // your network SSID (name)

char pass[ ] = "*******"; // your network password

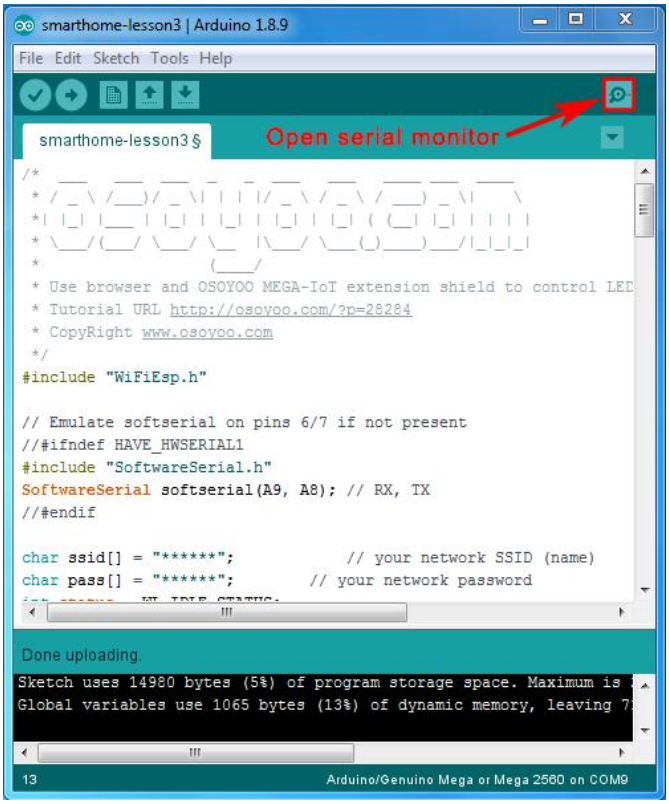
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

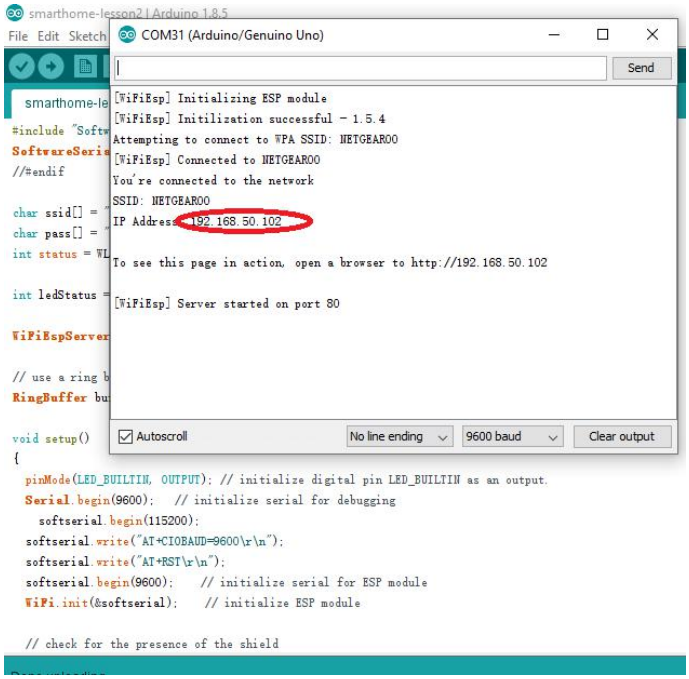




HOW TO PLAY

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:

In put your name "Alex" in the text field and click Submit button.
You will see message showed in remote LCD screen as following:

Welcome

Alex

Lesson15: 1-Channel Relay

OBJECTIVE

Relay is a useful electronics switch which can be controlled by low voltage signal. Relay is often used by computer to control high voltage circuit.

In this lesson, we will show you how to turn on/off Relay and Buzzer from a remote browser through internet .

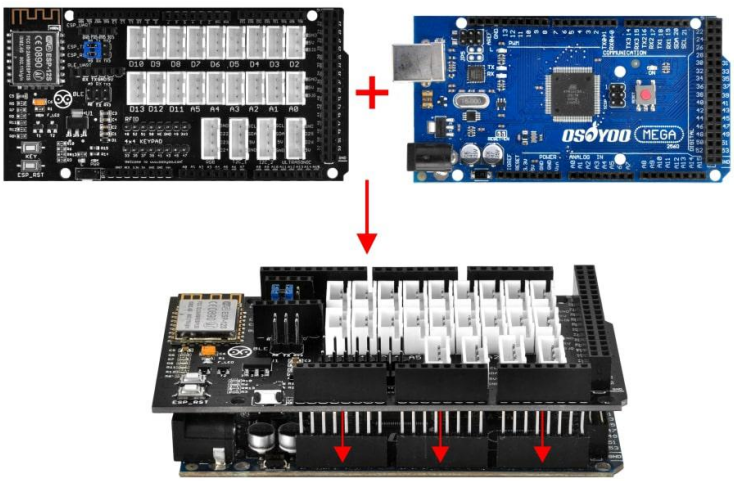
We will use Osoyoo Mega-IoT Shield to connect Relay, LED and MEGA2560 MCU board. Arduino MEGA2560 board can work as a web server. Remote browser can access this web server and control the Relay connected to D13 pin of MEGA2560.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- Relay module x 1
- Buzzer module x 1
- PnP cable x 1
- male to female Jumper x 3
- male to male Jumper x 1

HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Jumper Cap should connect ESP8266 RX with A8, TX with A9.

Relay - OSOYOO MEGA-IoT Extension Board

Relay Module - D6

COM - 5V (Jumper)

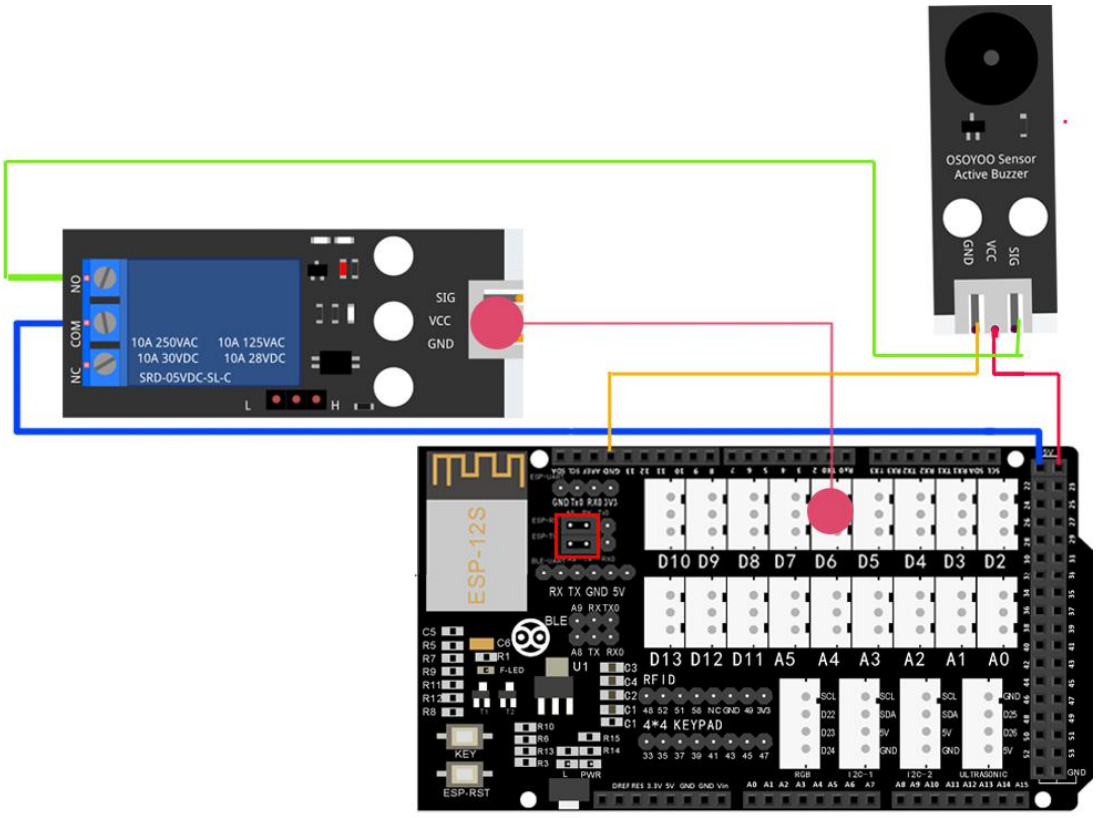
Buzzer Module - OSOYOO MEGA-IoT Extension Board

VCC - 5V (Jumper)

GND - GND (Jumper)

Relay - Buzzer Module

No - SIG (Jumper)



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

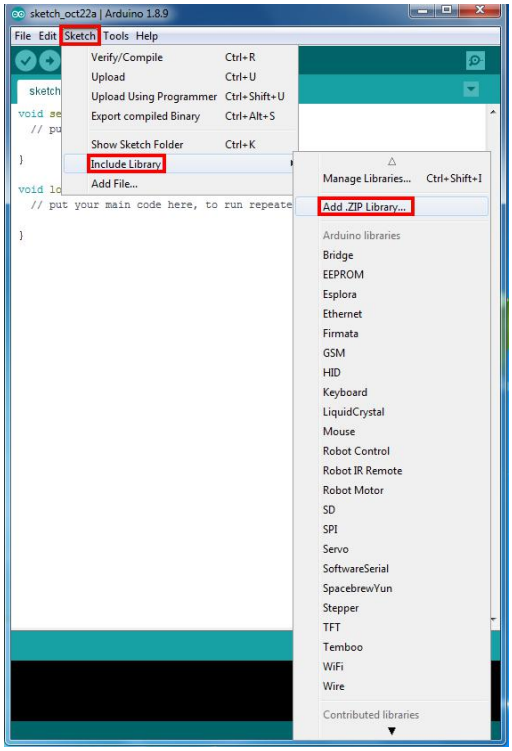
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

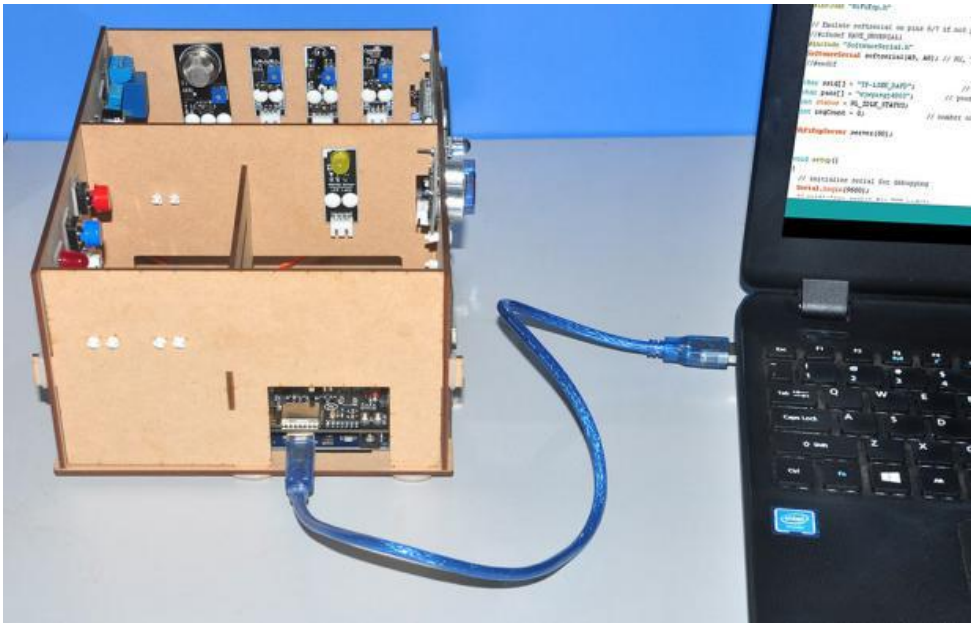
To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.

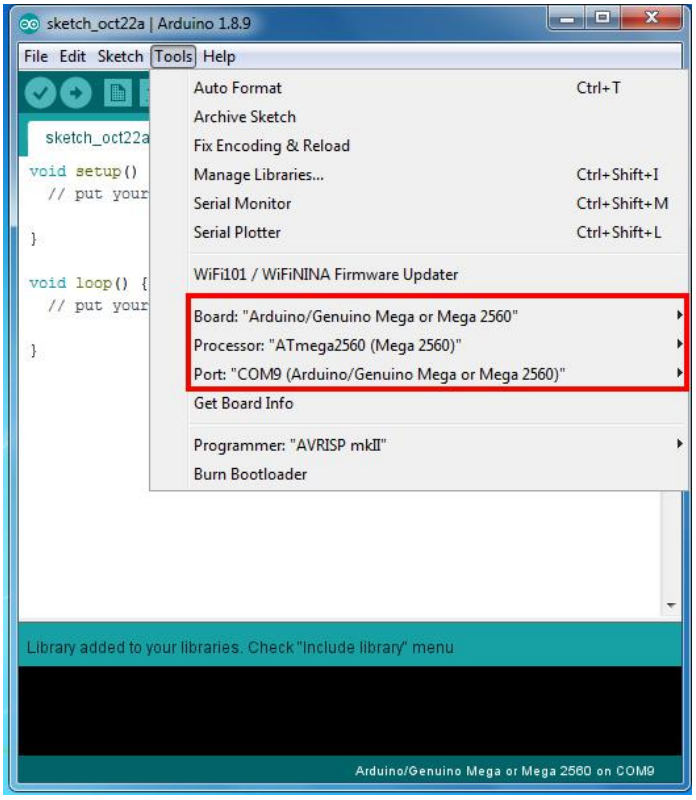


Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson15”:
https://osoyoo.com/driver/smarthome/smarthome-lesson15.zip

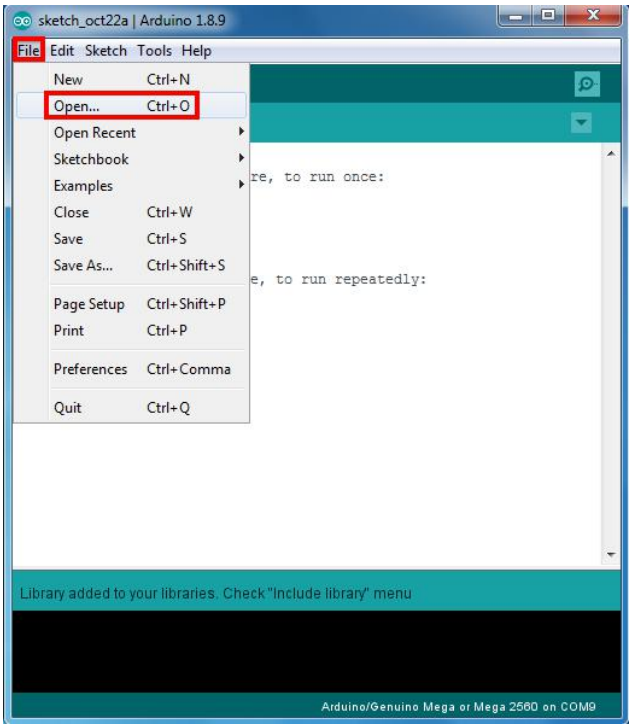
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.



Step 5 Arduino IDE:Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file-Open,then choose code “smarthome-lesson15.ino” in the folder, load up the sketch onto your Arduino.

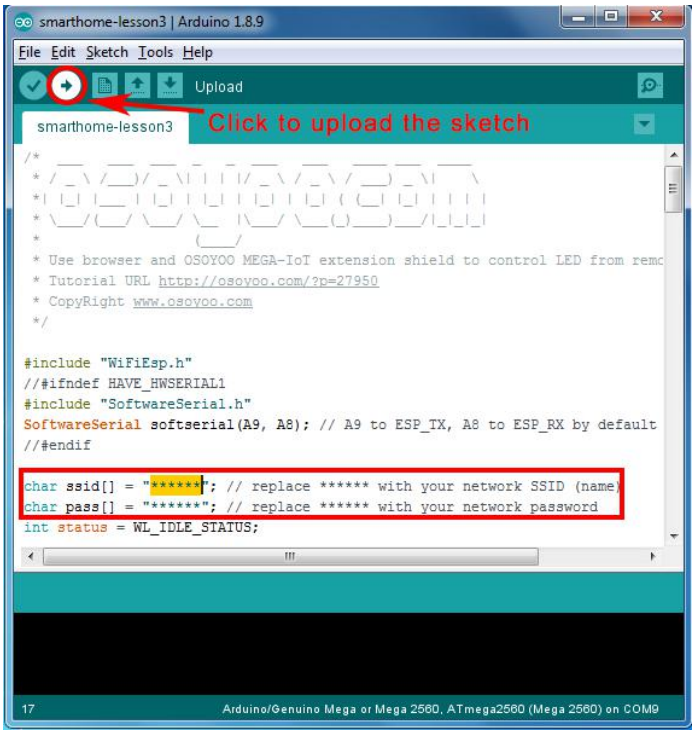


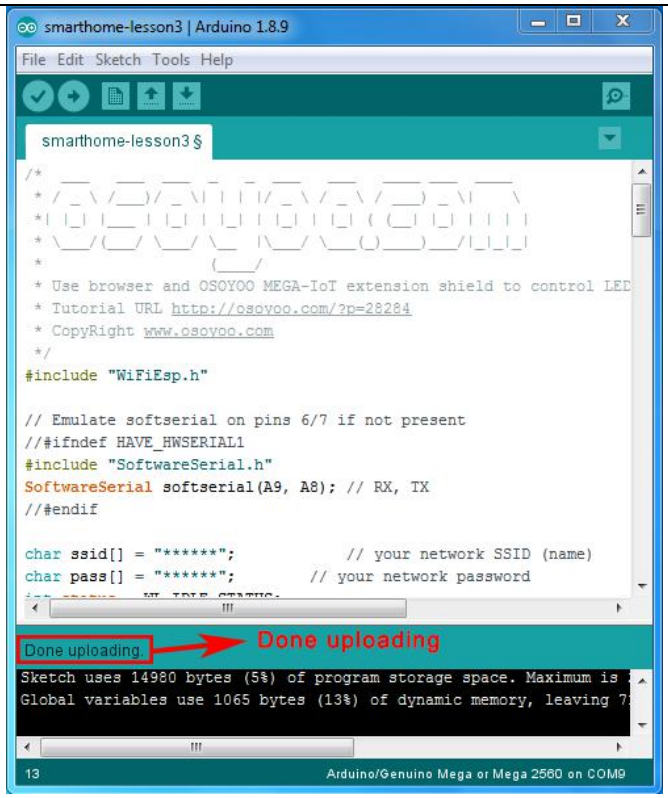
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "******"; // your network SSID (name)

char pass[ ] = "******"; // your network password

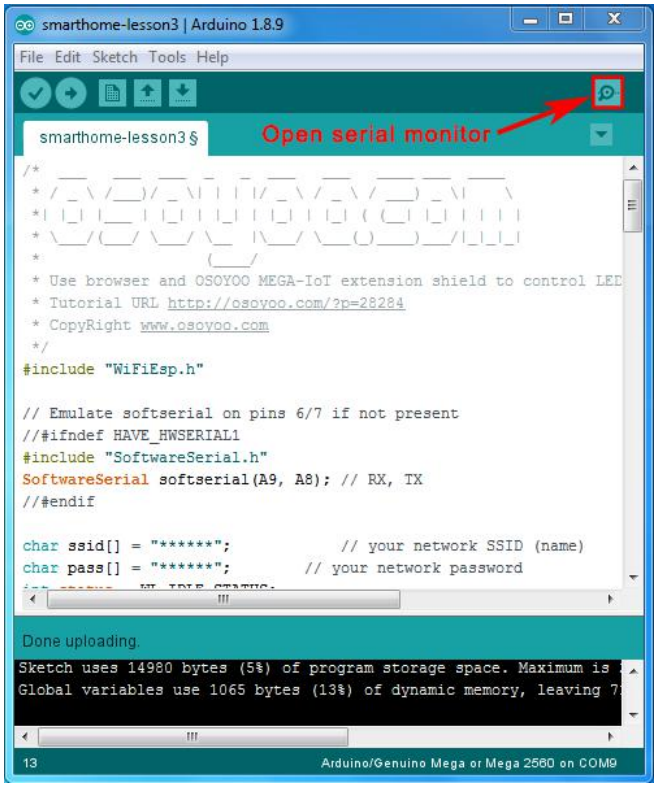
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

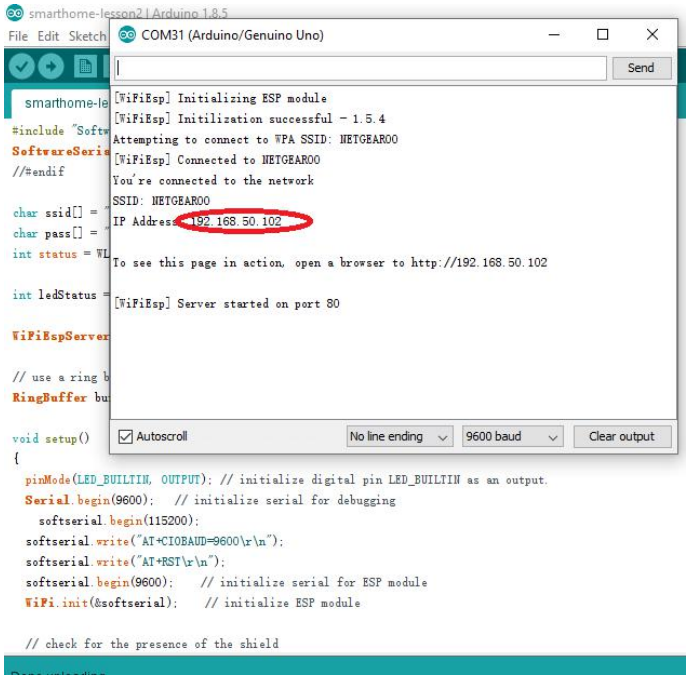




HOW TO PLAY

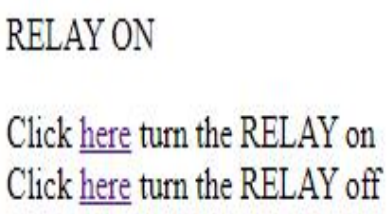
After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Then use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



Click the two links as showed in above picture, you will turn on/off the Relay module which is connected to your MEGA2560 through the IoT Shield.

If Relay is turned on, you will hear buzzer alarm, if relay is off, buzzer will also be turned off.

Lesson16: RFID Switching Door

OBJECTIVE

In this project, we will make a simple RFID (IC card) + IoT controlled security door system. We use Cell phone APP to send control signal through UDP protocol similar to Lesson 8.

Security Door normally is often opened by servo motor. To make things simple, we just use servo turning 180 degree to imitate door open and rotate back to 0 degree to imitate door close.

The whole procedure will be work as follows:
When an IC card detected by RC522 RFID module, Arduino will verify if its ID matches record.

If ID matches record, then servo turn 90 degree . Green LED turn on and Red LED turn off.

If ID does not match record, then, servo does not move, instead, the buzzer will alarm(you need use browser to turn off alarm from remote computer).

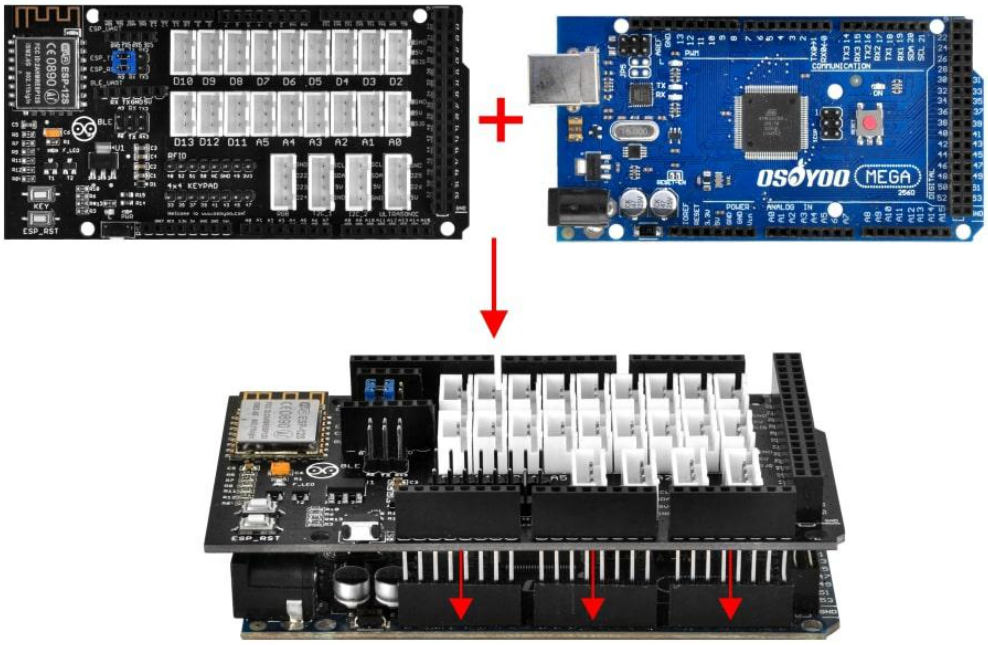
At any time, remote browser can open the door(servo rotate to 90 degree) or close the door (servo back to 0 degree) or turn off buzzer and monitor door status.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- LED module Green x 1, Red x 1
- Buzzer module x 1
- Micro Servo Motor x 1
- RFID Module x 1
- PnP Cable x 3
- 8pin 12cm Female to Female Cable x 1
- USB Cable x 1
- PC x 1

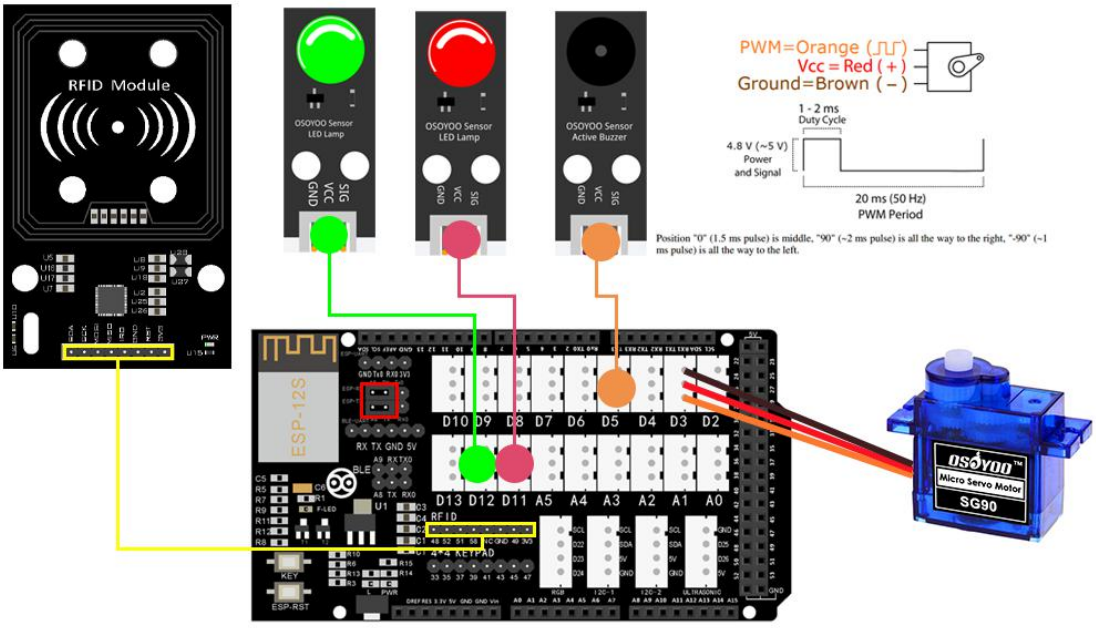
HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with three 3-pin PnP cables and one 8pin 12cm Female to Female Cable as below (Jumper Cap should connect ESP8266 RX with A8, TX with A9):

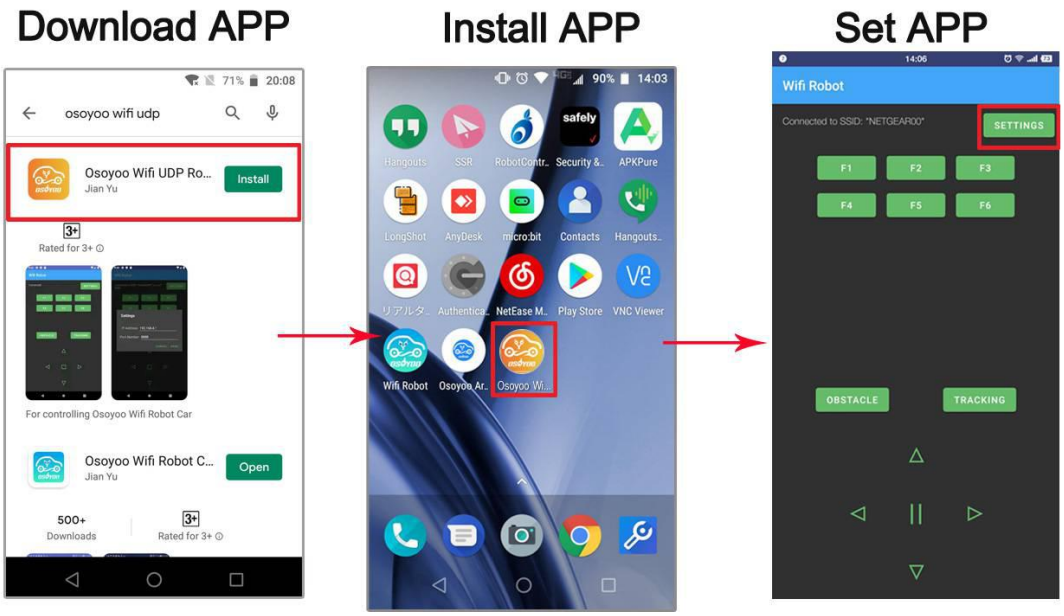
Green LED Module - D12
Red LED Module - D11
Buzzer Module - D5
Micro Servo Motor - D3
RFID Module - RFID



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Download OSOYOO Wifi UDP Robot Car control APP
In Google Play or Apple Store, please search key words “OSOYOO Wifi UDP Robot Car”, you will find an orange icon APP as following:



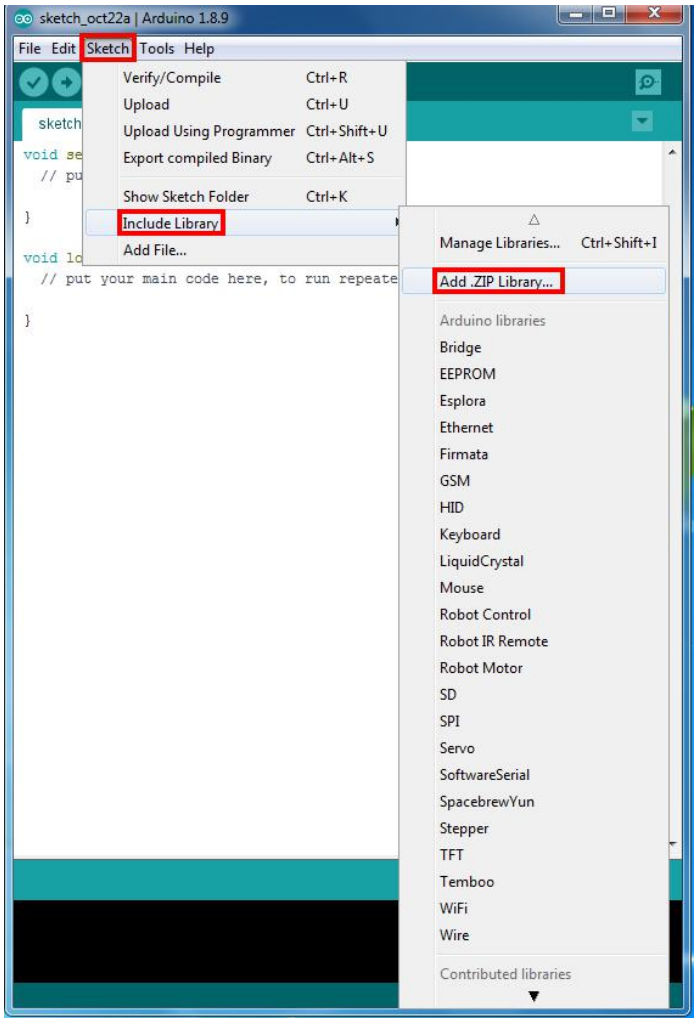
Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino

sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



Step 3 RFID Library Installation

You need install RFID library and save it as above operations. Please read following article to test RFID library:

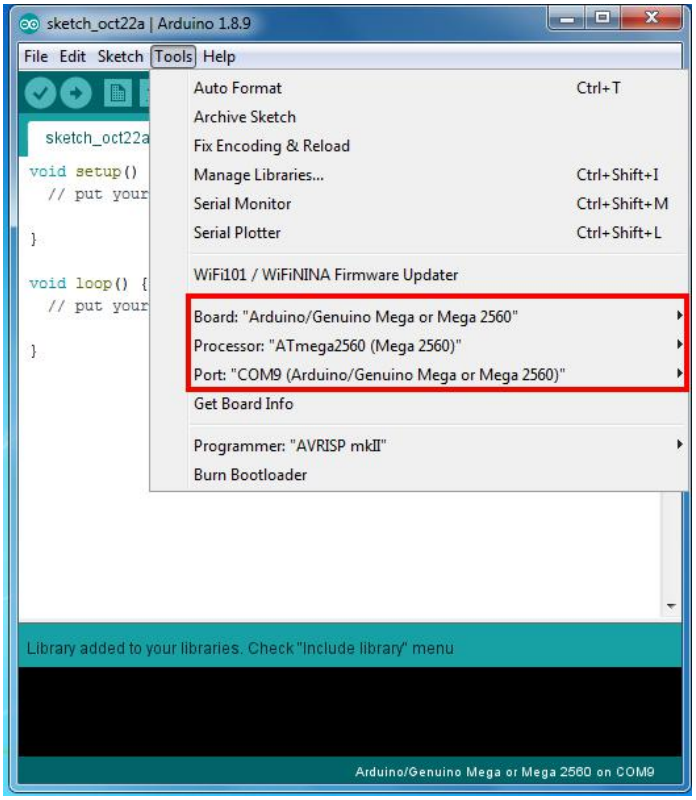
https://osoyoo.com/2019/10/14/osoyoo-mega-iot-shield-rfid-tutorial/

Remember to change write down the RFID number of one ID card.

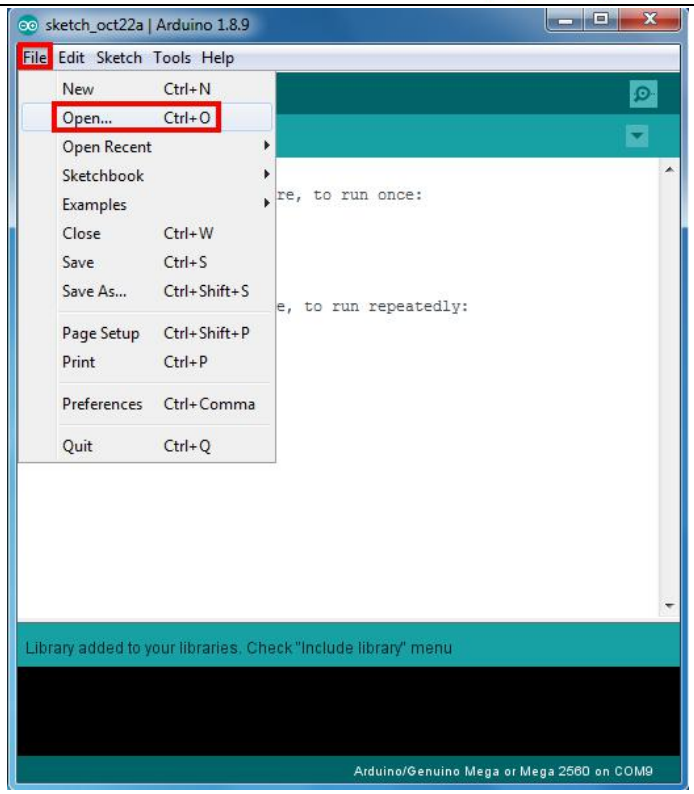
Step 4 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson16B”:
https://osoyoo.com/driver/smarthome/smarthome-lesson16B.zip

Step 5 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 6 Arduino IDE:Choose corresponding board type and port type for you project.

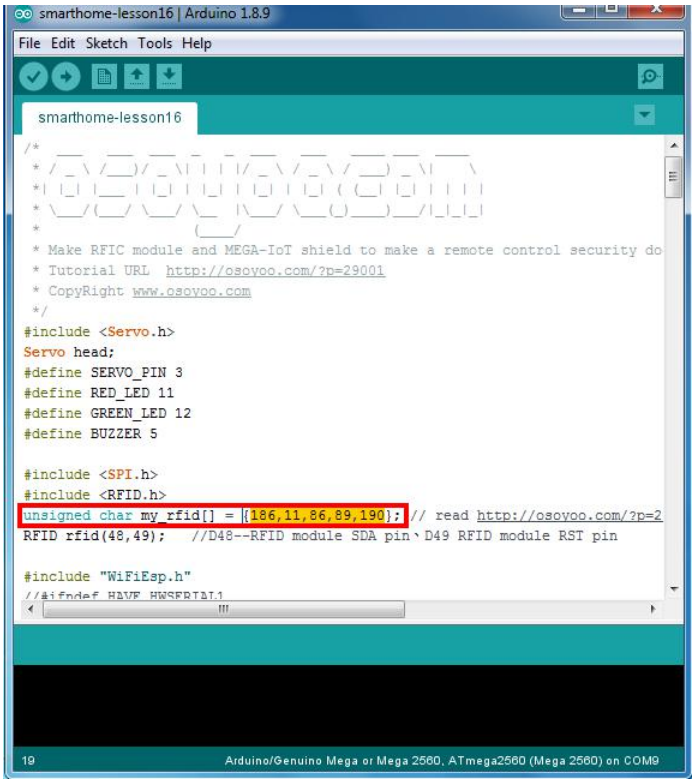


Step 7 Arduino IDE: Click file-Open,then choose code “smarthome-lesson16.ino” in the folder, load up the sketch onto your Arduino.



Remember to change the lines 19 of the code with the card number you got from

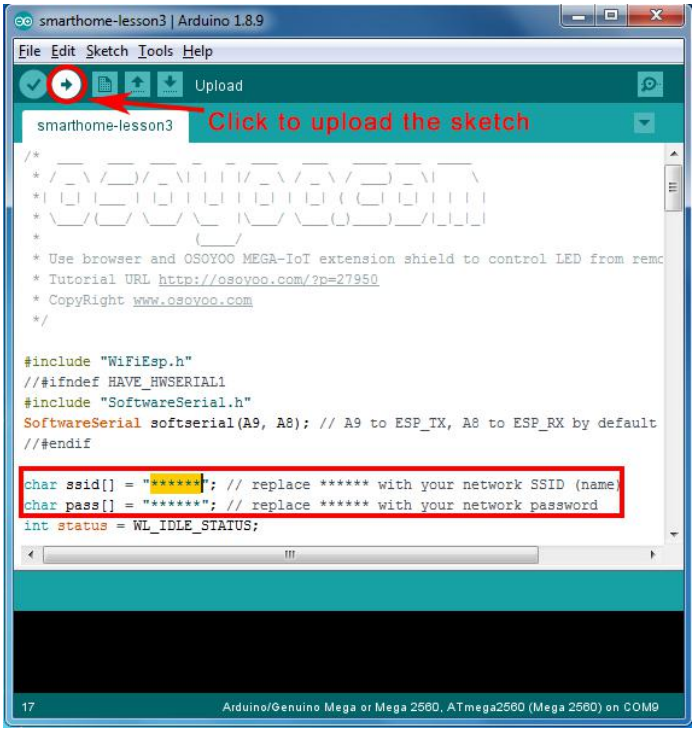
Step 3): unsigned char my_rfid[] = {186,11,86,89,190}; // replace {186,11,86,89,190} with your own RFID card number

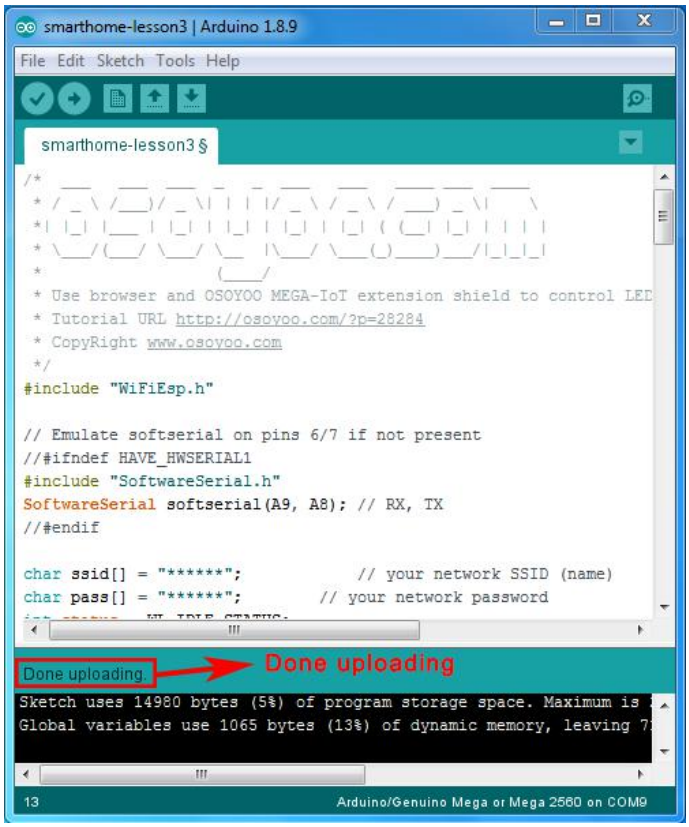


Note: In the sketch, find line 31, 32 as following:

char ssid[] = "******"; // your network SSID (name)char pass[] = "******"; // your network password

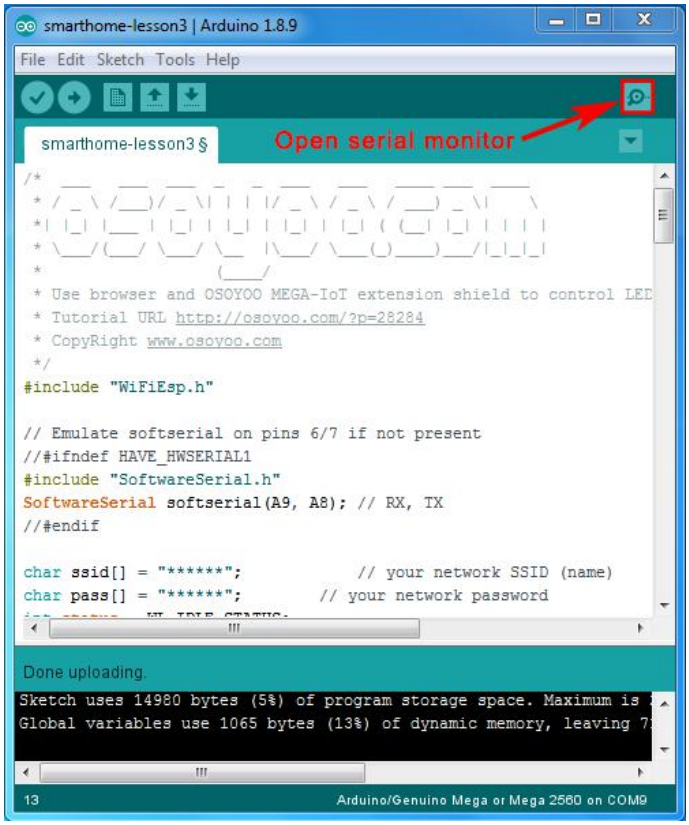
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

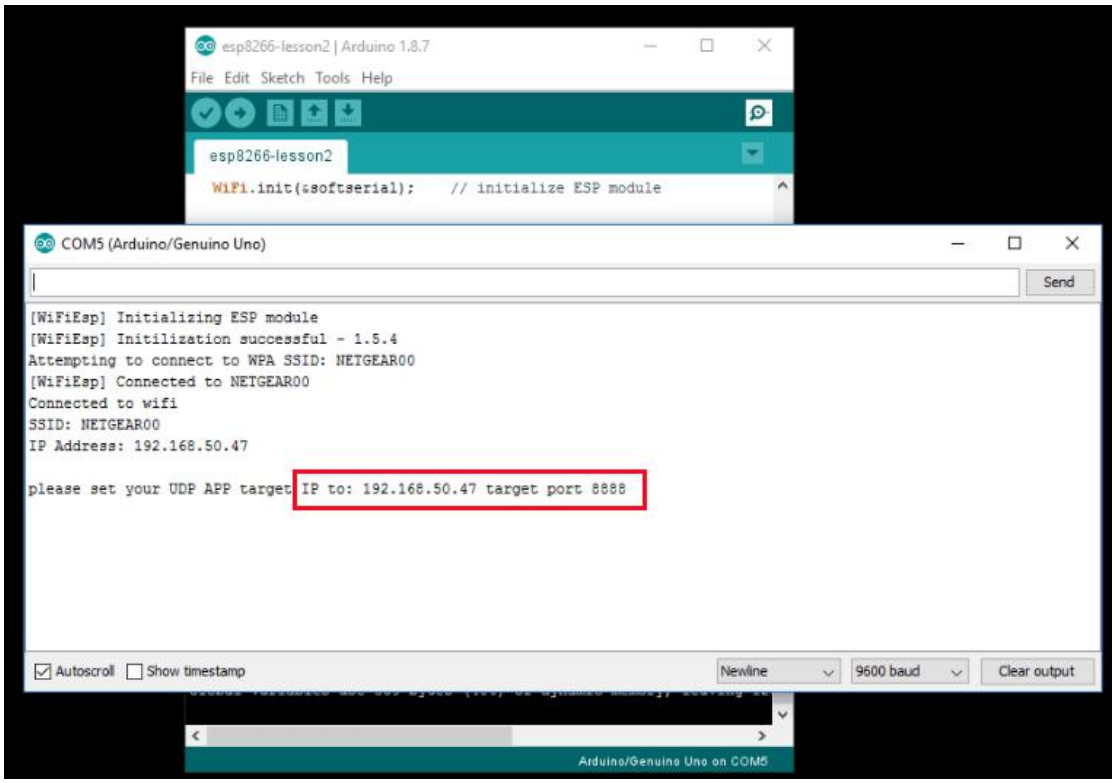




HOW TO PLAY

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, IP is 192.168.50.47), default port 8888, you need to set this IP address and port number in cell phone APP.

Now Open your Orange color APP and click Setting, write IP address into the APP as following:

Running Result:
When you use an IC card which matches the value in code line 19, the door will open(servo rotate to 90 degree) and Green LED is ON.

When you use an IC card which does not match value of line 19, the door will NOT open and RED LED is ON. Buzzer will also alarm.

If you use Cell phone APP to control the Servo, the control method will be as following:

when you click ◄ button, the servo will point zero degree, Green LED is OFF.
Serial Monitor will show Close THE DOOR!

when you click ▲ button, the servo will point 90 degree, Green LED is OFF.
Serial Monitor will show Half Close THE DOOR!

when you click ► button, the servo will point 180 degree, Green LED is ON.
Serial Monitor will show OPEN THE DOOR!

when you click || button, the buzzer will turn off.

Lesson17: Tracing Human Movement

OBJECTIVE

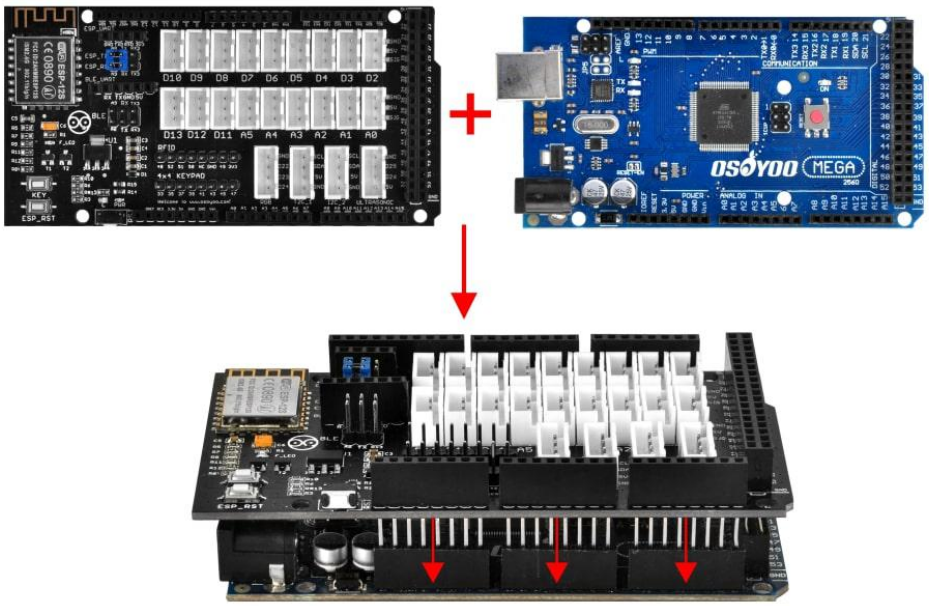
In this lesson, we will show you how to use motion sensor to detect human movement and how to use MEGA-IoT Shield to report the intruder status to remote computer(browser).

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 1
- OSOYOO MEGA-IoT Extension Board x 1
- USB Cable x 1
- LED module Red x 1 Greenx 1 Yellowx 1 Whitex 1
- Ultrasonic Distance Sensor PnP Module x 1
- 3-pin PnP cable x 4
- 4-pin PnP cable x 1

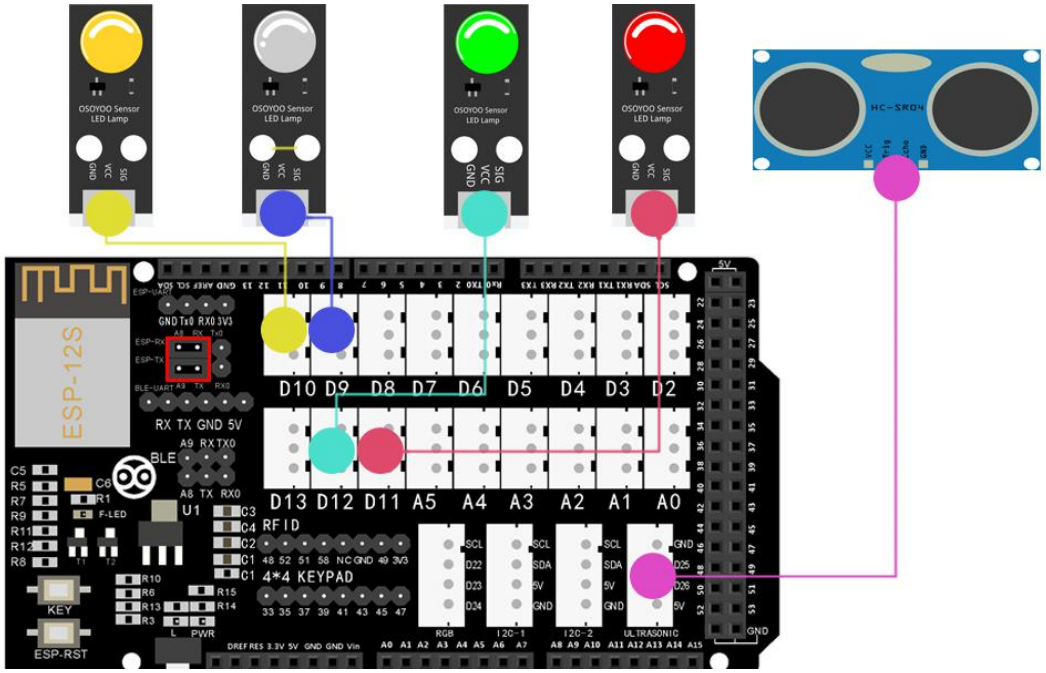
HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with the OSOYOO MEGA-IoT Extension Board with four 3-pin PnP cables as below. (Jumper Cap should connect ESP8266 RX with A8, TX with A9)

White LED Module - D9
Yellow LED Module - D10
Red LED Module - D11
Green LED Module - D12
Ultrasonic Sensor - Ultrasonic slot (4-pin PnP cable)



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

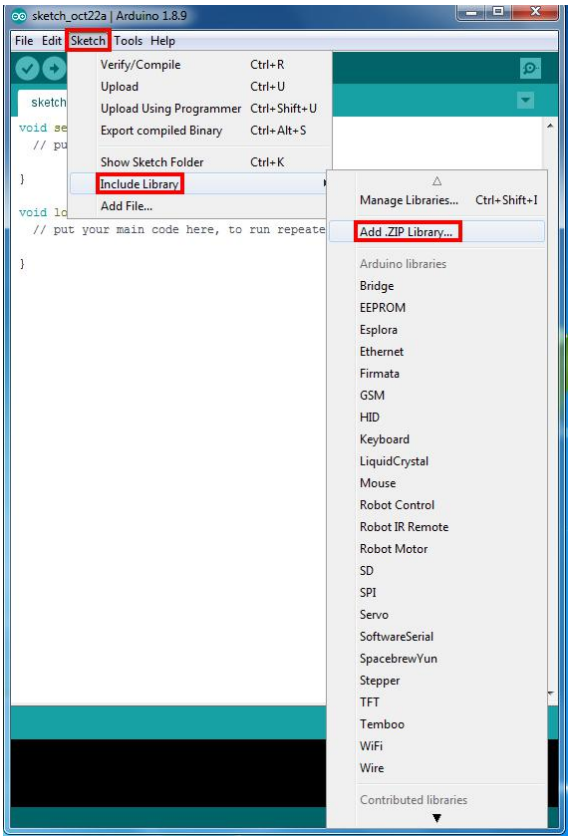
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

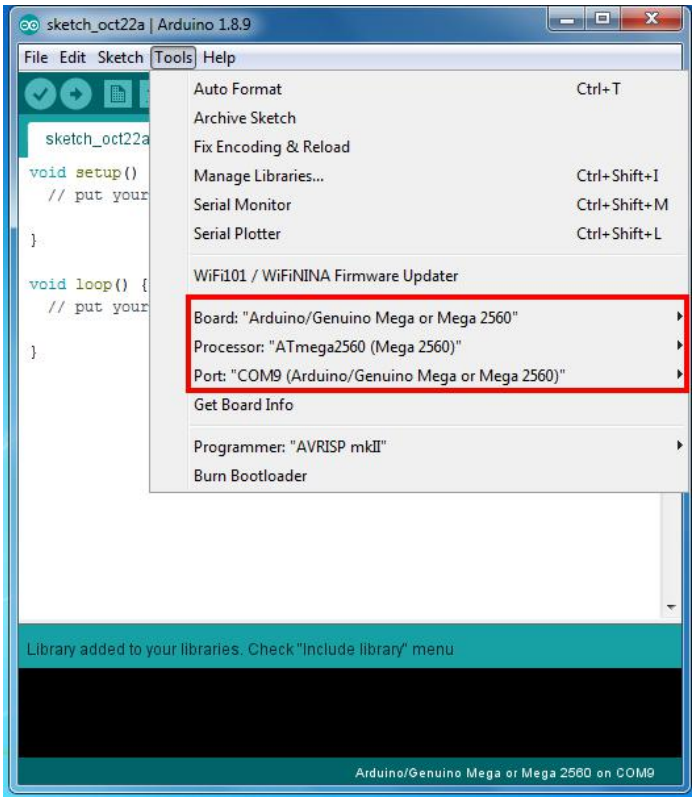
Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



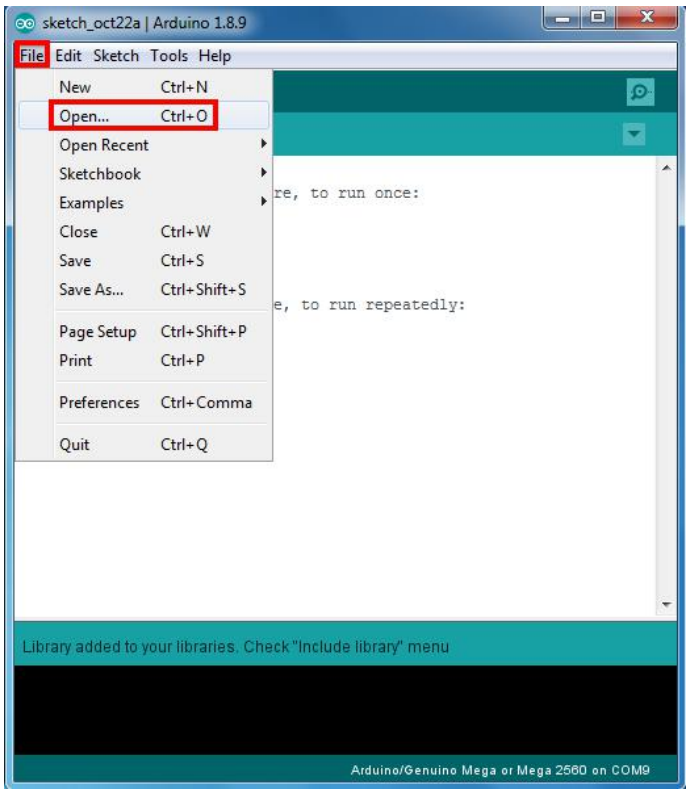
Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson17”:
https://osoyoo.com/driver/smarthome/smarthome-lesson17.zip

Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE:Choose corresponding board type and port type for you project.



Step 6 Arduino IDE: Click file-Open,then choose code “smarthome-lesson17.ino” in the folder, load up the sketch onto your Arduino.

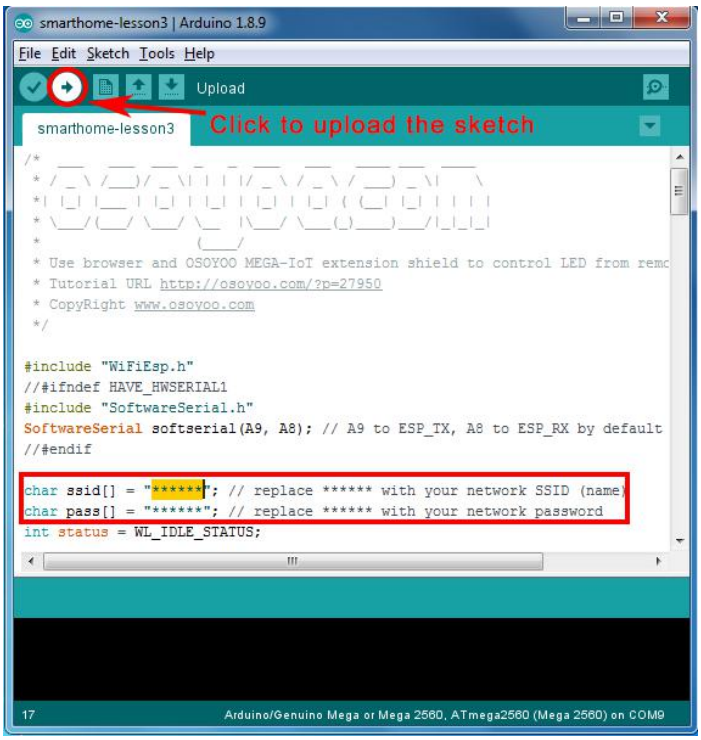


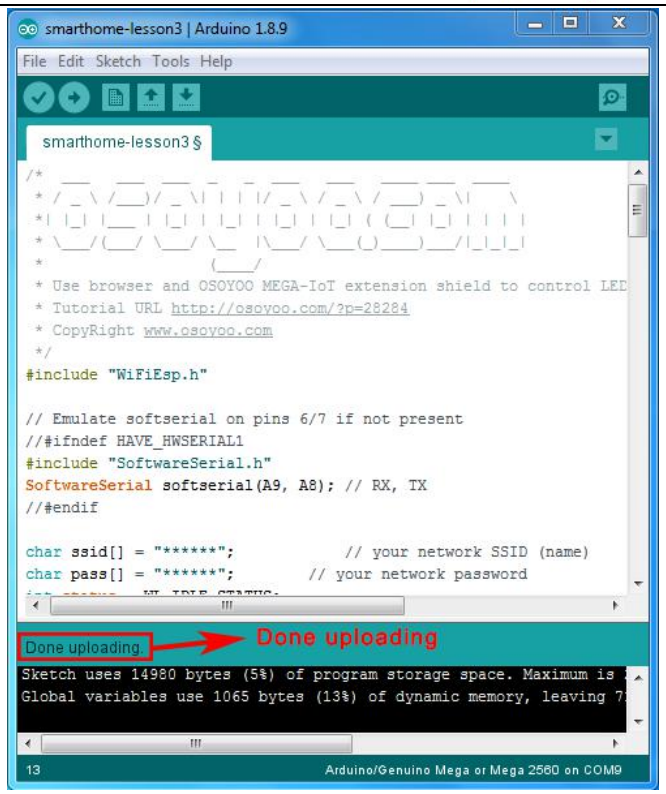
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "******"; // your network SSID (name)

char pass[ ] = "******"; // your network password

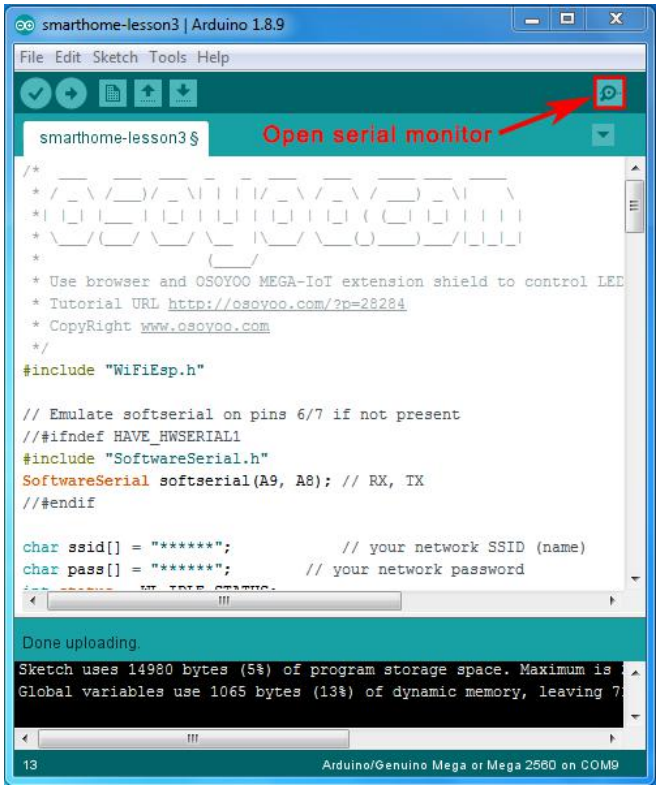
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

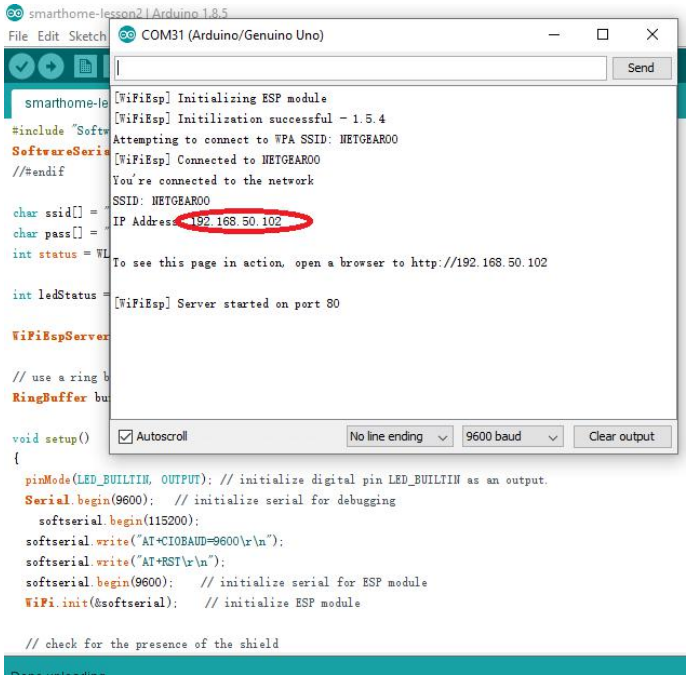




HOW TO PLAY

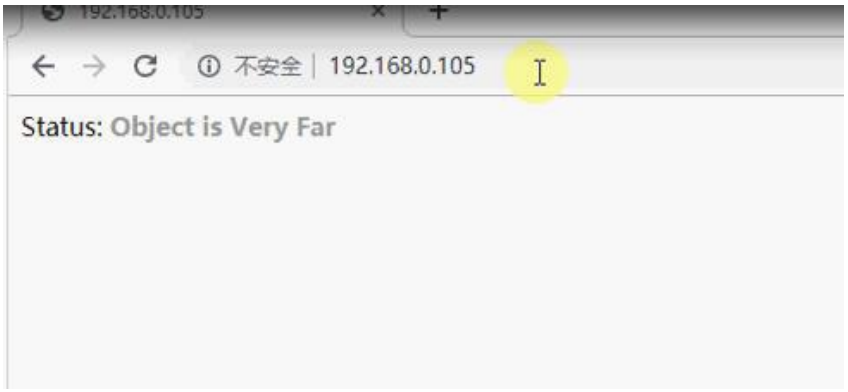
After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:





From the serial monitor, you can see the IP address of your MEGA2560 board in the read circle (in above picture, 192.168.50.102).

Put some obstacle object in front of the ultrasonics sensor, use your browser to visit the website http://mega2560-ip-address (in above case, http://192.168.50.102), you will see following result:



You will see the red LED will turn on at the same time.

As you slowly move the object from ultrasonic sensor to close distance location, the LED will turn to Green, Yellow, white .

The browser will also show the similar result(but you can not move very fast, browser only update its status every 5 seconds).

Lesson18: Two Mega-IoT Devices

OBJECTIVE

In previous lessons, we have learnt many example on how to use web browser in PC to monitor to control a remote device through HTTP protocol. Such HTTP protocol has some problem.

First, it needs run a web server in Arduino which has limited memory. Therefore the performance is slow and not stable.

Second, it can only has one direction control (from PC to control remote device). It is not a 100% Thing to Thing connection required by many IoT applications.

This lesson we will discuss how to use two MEGA-Iot Shields to make Things-to-Things communication by UDP protocol.

Please be noted that if you need do experiment in this lesson, you need buy two pcs of Osoyoo Mega-IoT extension shields.

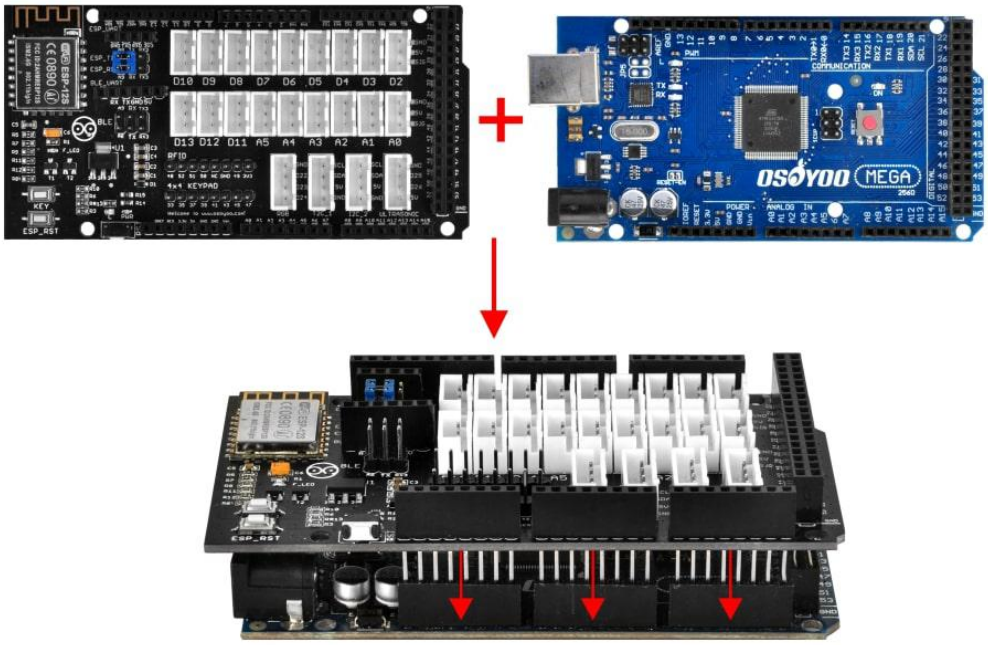
In order to make duplex communication between two IoT, we need use a new internet protocol called UDP. UDP is very commonly used by email and IP phone service. It is a very simple protocol which allows internet device to send one way data to destination device. You only need tell UDP software the IP address and Port number, then destination can get the message.

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 2
- OSOYOO MEGA-IoT Extension Board x 2
- USB Cable x 2

HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



HOW TO CODE

Notice: Unplug your power adapter when upload sketch code to Arduino.

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

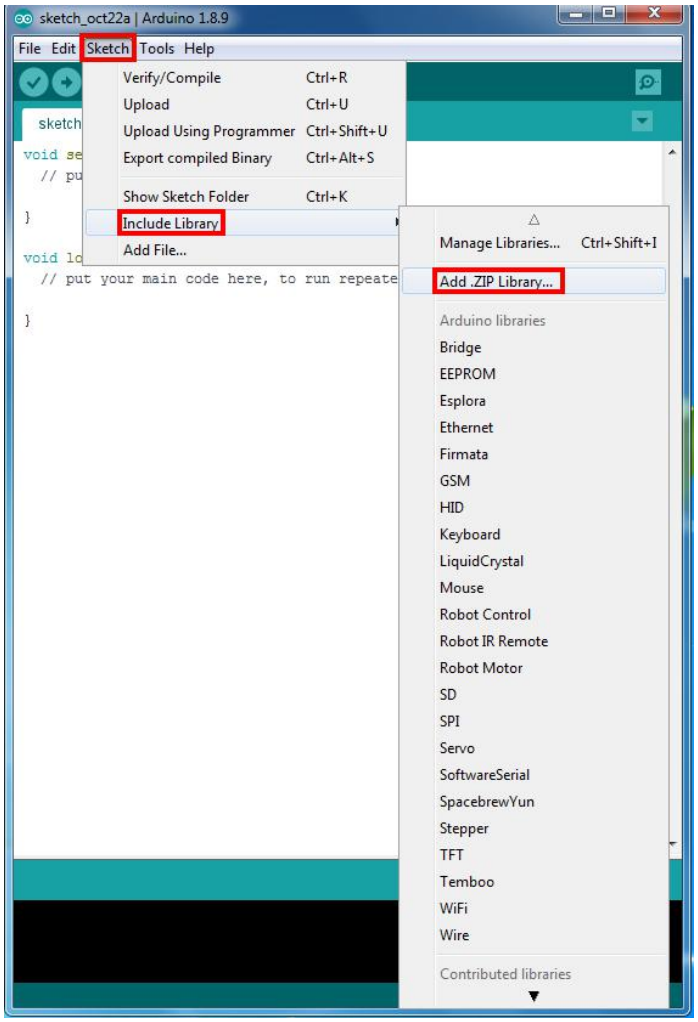
Download Arduino from https://www.arduino.cc/en/Main/Software?setlang=en , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



Step 3 After installing above library, please download the main code from following link, unzip it, you will see a folder called “smarthome-lesson18”:
https://osoyoo.com/driver/smarthome/smarthome-lesson18.zip

Unzip the downloaded zip file, you will see two sub-folders in smarthome-lesson18:

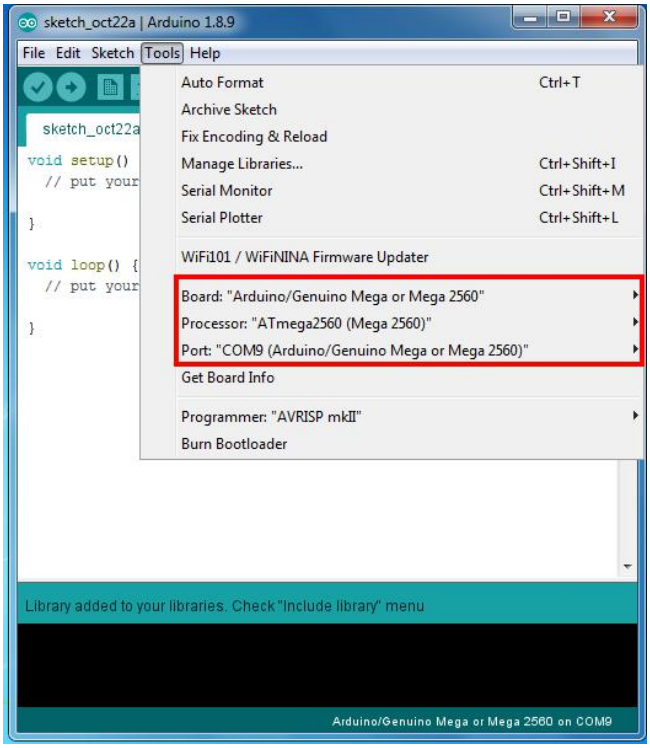
UdpSend and **UDPreceive** .

UdpSend should be installed in the sender Arduino device. It is to send UDP data(in the sample code,message is "what's your name?"

UDPreceive should be installed on the other Arduino device which receive data from sender device. It is to show incoming UDP message and send response "my name is alice" back to sender device).

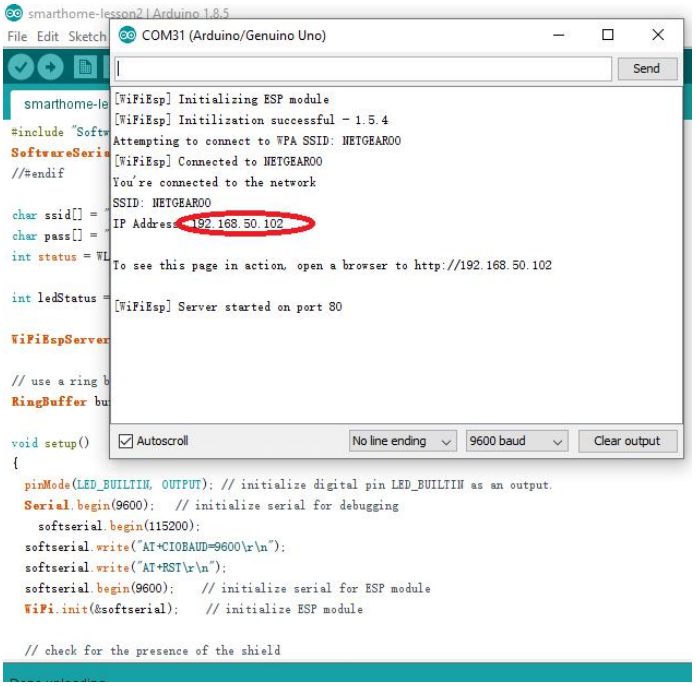
Step 4 After above operations are completed, connect OSOYOO MEGA2560 Board to PC with USB cable.

Step 5 Arduino IDE:Choose corresponding board type and port type for you project.

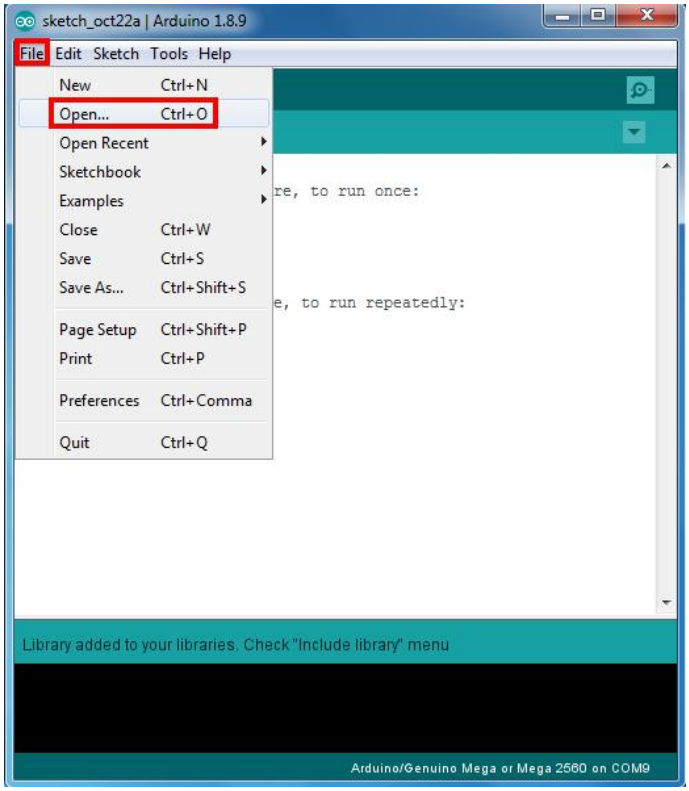


Load UdpReceive.ino to Receiver Arduino device

Step 6 Please run sample code for receiver device in lesson 3, please record the receiver device IP address, you'll need it in the step below.



Step 7 Arduino IDE: Click file – Open to load UdpReceive.ino to Receiver Arduino device

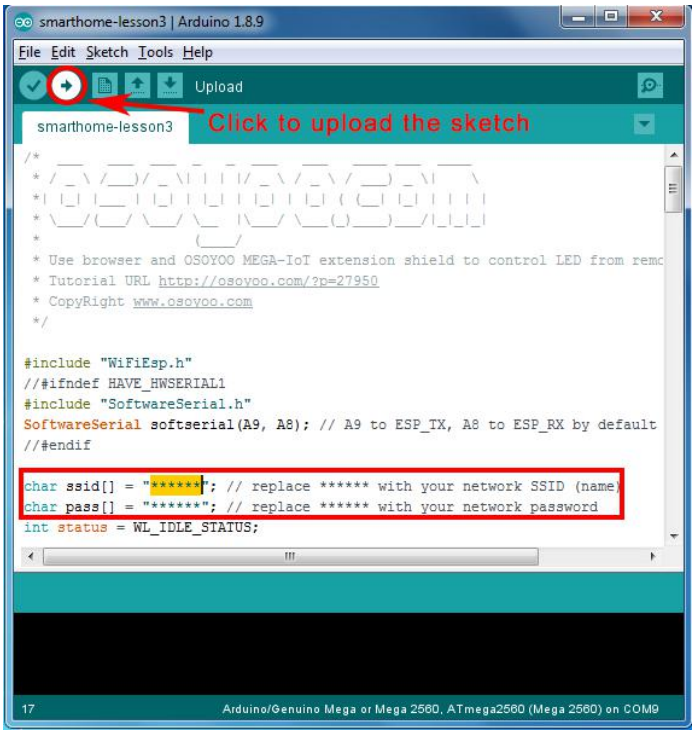


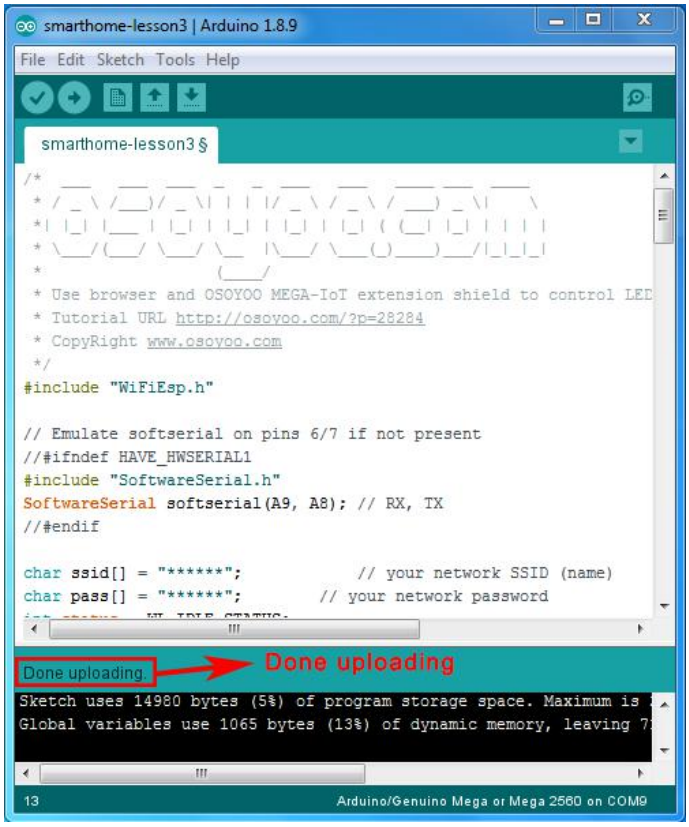
Note: In the sketch, find line 24，25 as following:

char ssid[ ] = "******"; // your network SSID (name)

char pass[ ] = "******"; // your network password

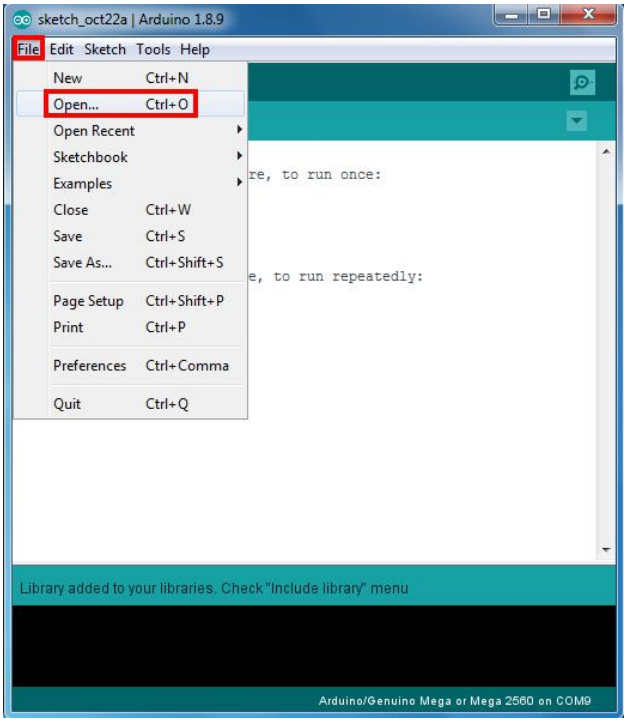
please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.





Load UdpSend.ino to Sender Arduino device

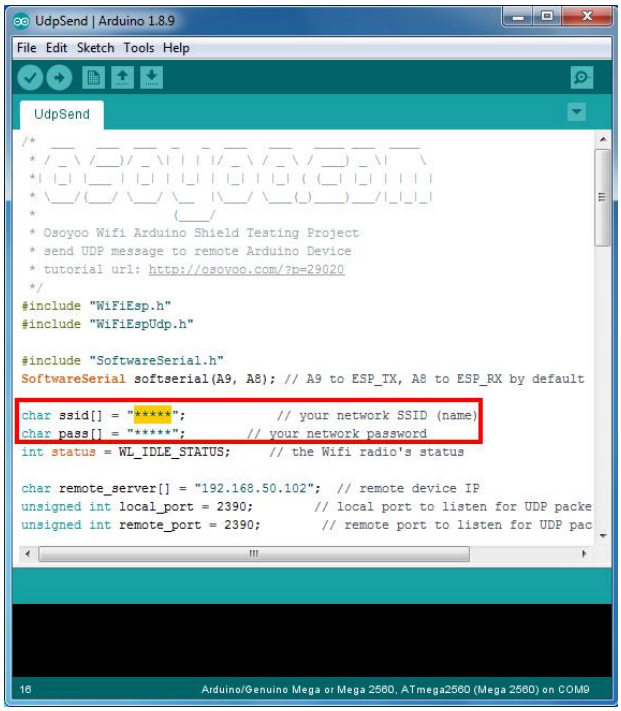
Step 8 Arduino IDE: Click file – Open to load UdpSend.ino to Sender Arduino devicev



Note: In the sketch, find line 16,17 as following:

char ssid[] = "******"; // your network SSID (name)char pass[] = "******"; // your network password

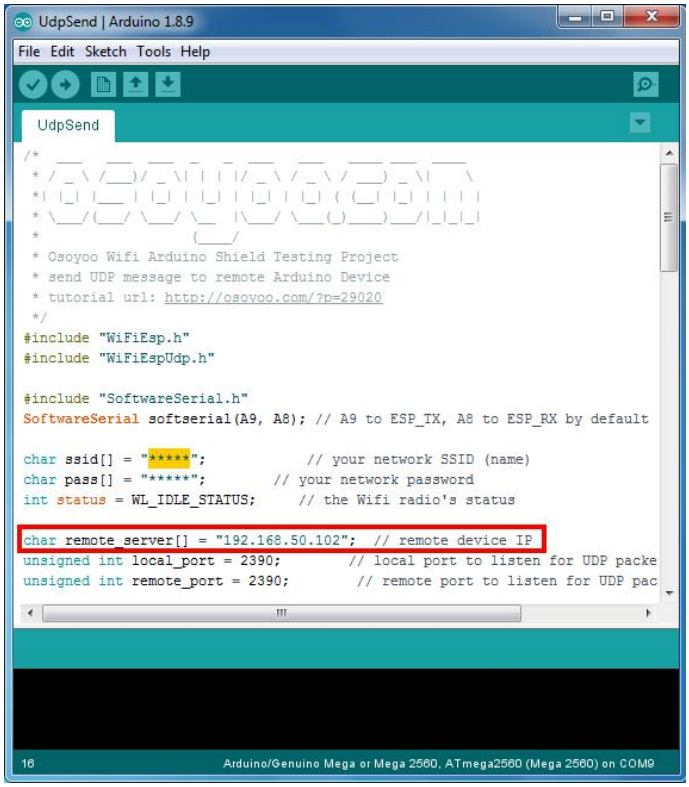
Please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.

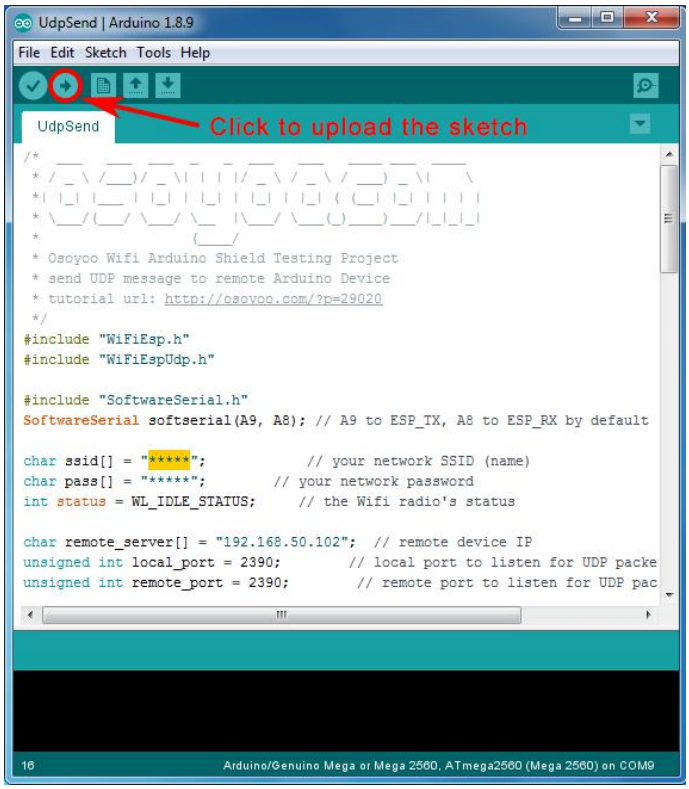


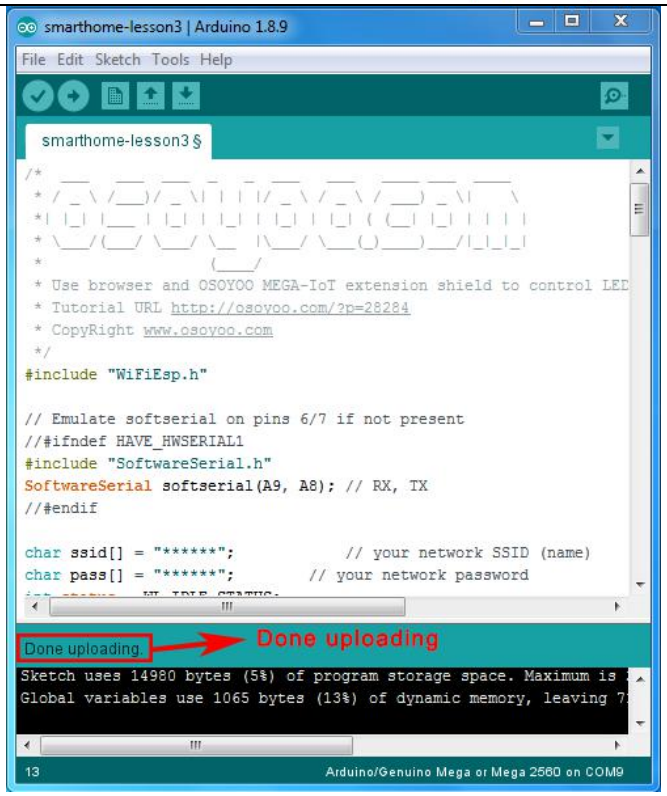
You also need change line 20 as following (recorded in step 6):

char remote_server[] = "192.168.50.102"; // replace receiver device ip address here.

If you don't know receiver device IP address, you need run sample code for receiver device in lesson 3

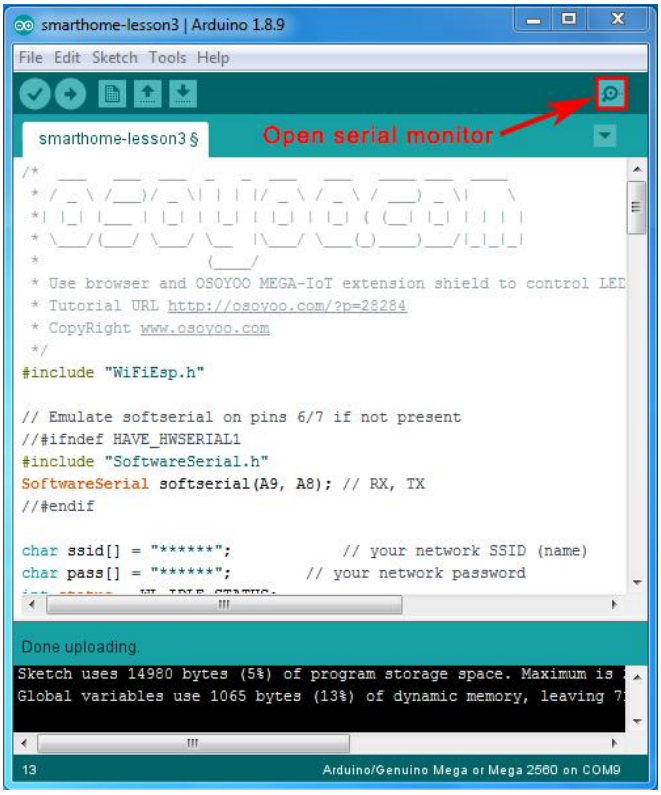


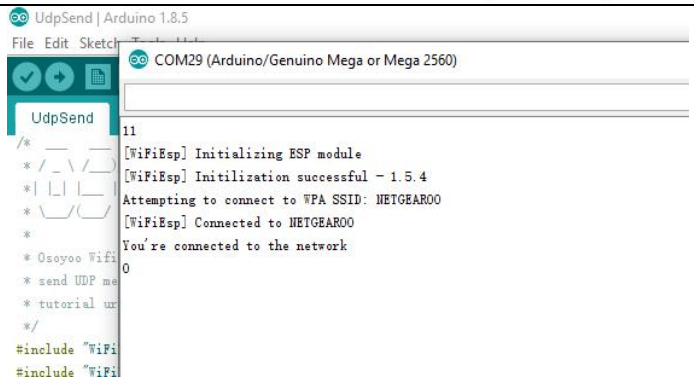




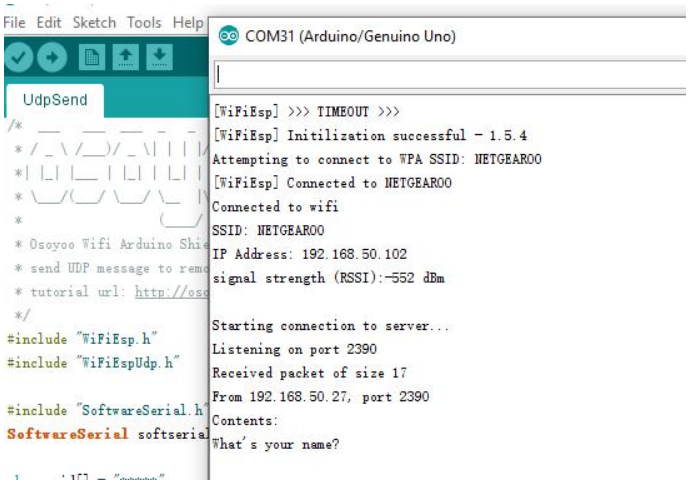
HOW TO PLAY

After loading the sketch to Arduino, open the serial monitor in the upper-right corner of Arduino IDE, you will see following result:



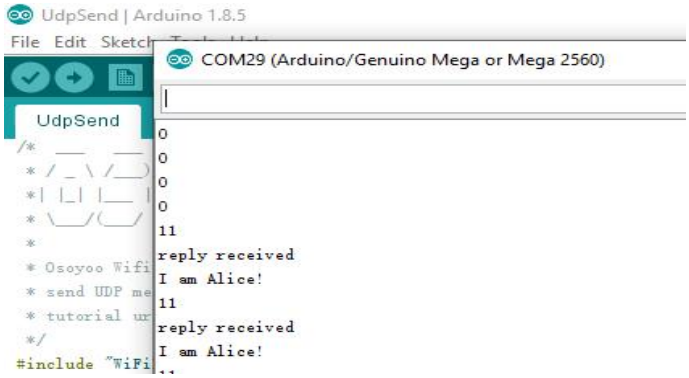


Open receiver's serial monitor, you will see following screen:



You can see Sender's message "**What's your name**?"

Now back to sender's serial monitor, you will see following screen:



Now you can see new response message "**I am Alice**" which is from receiver device.

Lesson19: Arduino IoT Capstone Project

OBJECTIVE

In this lesson, we will make a complex Capstone project which will use many of our previous knowledge. We will make two groups of sensors and actuators installed on two MEGA-IoT shields (to make things simple, we call Device A and Device). We also need use ArduinoJson Library which can use short string to transfer data through json format.

The project has following functions:

Device A has DHT 11 temperature sensor which will send data to Device B and display temperature/humidity value in 1602 LCD in Device B.

Device A has Gas Sensor which will send data to Device B . If Gas is detected , buzzer in Device B will alarm.

Device A has RFID module which can send IC card ID to Device B 1602 LCD .

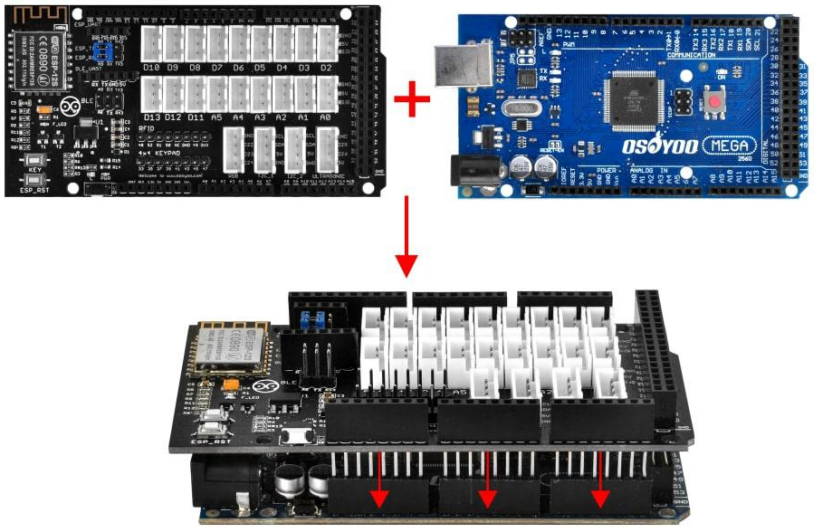
Device B has Red LED which can be turned on/off by push buttons in Device A

PARTS & DEVICES

- OSOYOO MEGA2560 Board x 2
- OSOYOO MEGA-IoT Extension Board x 2
- USB Cable x 2
- Red LED PnP module x 2
- Push Button PnP Module x 2
- I2C 1602 LCD PnP module x 1
- Gas detection PnP module x 1
- RFID modules x 1
- Buzzer PnP module x 1

HOW TO MAKE

First,please plug OSOYOO MEGA-IoT Extension Board into MEGA2560 board:



Then connect the modules with two OSOYOO MEGA-IoT Extension Boards with PnP cables as below. (Jumper Cap should connect ESP8266 RX with A8, TX with A9)

Modules - Device A

DHT11 - D2

RFID Module - RFID

Gas Sensor - A3

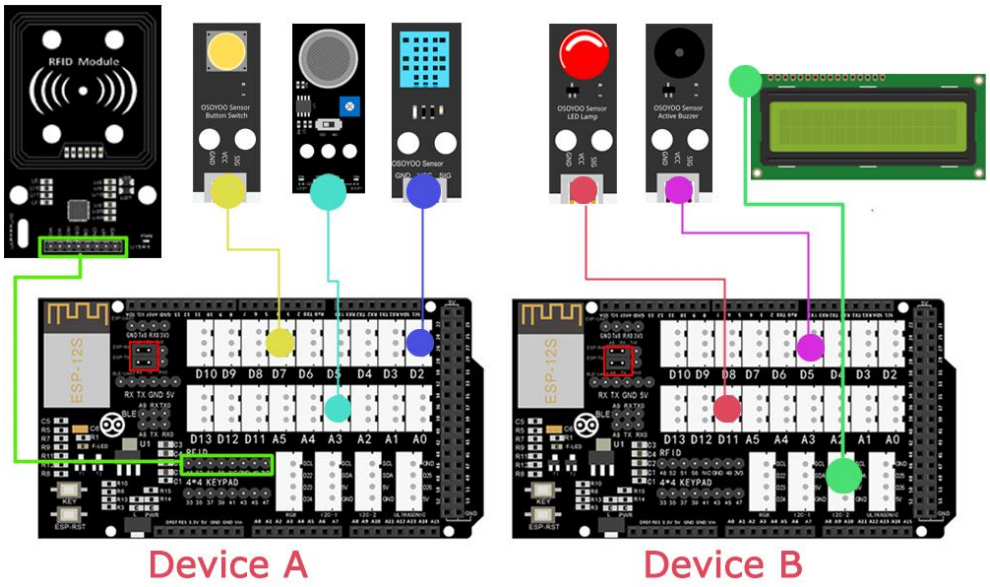
Push Button Module - D7

Modules - Device B

1602 LCD Module - I2C

Buzzer Module - D5

Red LED Module - D11



Notice: Unplug your power adapter when upload sketch code to Arduino.

Please be noted that in this lesson, you need two pcs of Osoyoo Mega-IoT extension shields,mega 2560 and devices (Device A and Device B).

Step 1 Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).

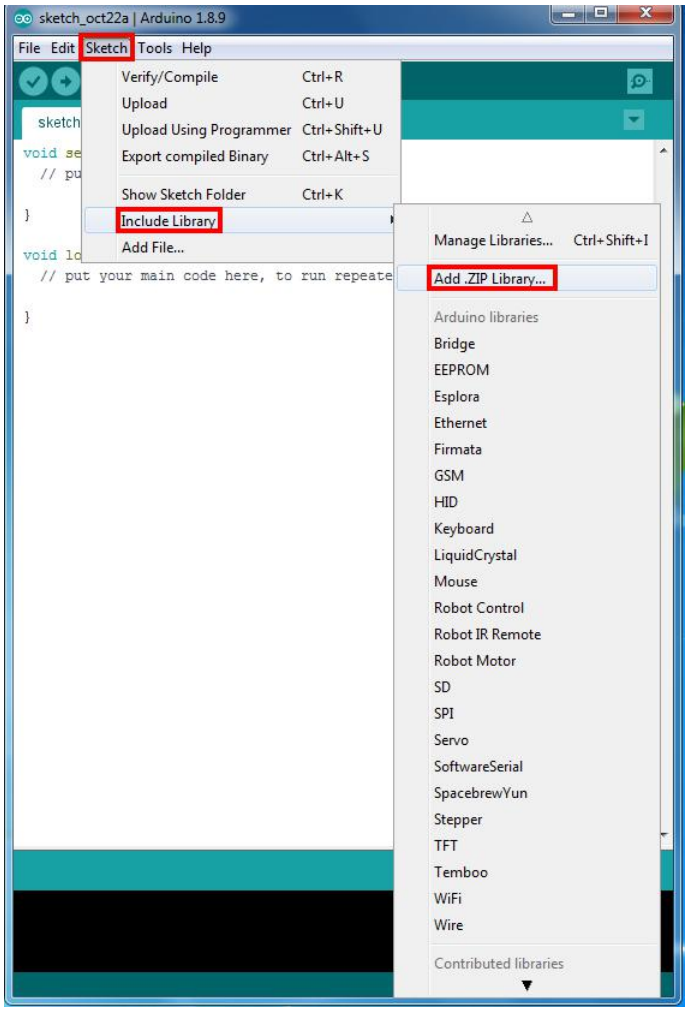
Download Arduino from **https://www.arduino.cc/en/Main/Software?setlang=en** , then install the software.

Step 2 WifiEsp Library Installation (if you have installed WifiESP library, please skip this step).

OSOYOO MEGA-IoT extension TX/RX pin to Arduino A9/A8 pin by default. So in Arduino sketch code, we need use Software Serial Port to communicate with ESP8266 (set A8 as RX and A9 as TX in softwareserial object).

To use this wifi shield in Arduino IDE, we need download WiFiEsp-master library from following link:http://osoyoo.com/driver/WiFiEsp-master.zip

Step 3 Open Arduino IDE, click Sketch – Include Library- Add .Zip library to load above zip files into Arduino IDE.



Step 4 Download ArduinoJson library from
https://osoyoo.com/driver/smarthome/ArduinoJson.zip

Save it as above operations.

Step5 Download ArduinoJson library from
https://osoyoo.com/driver/smarthome/ArduinoJson.zip

Save it as above operations.

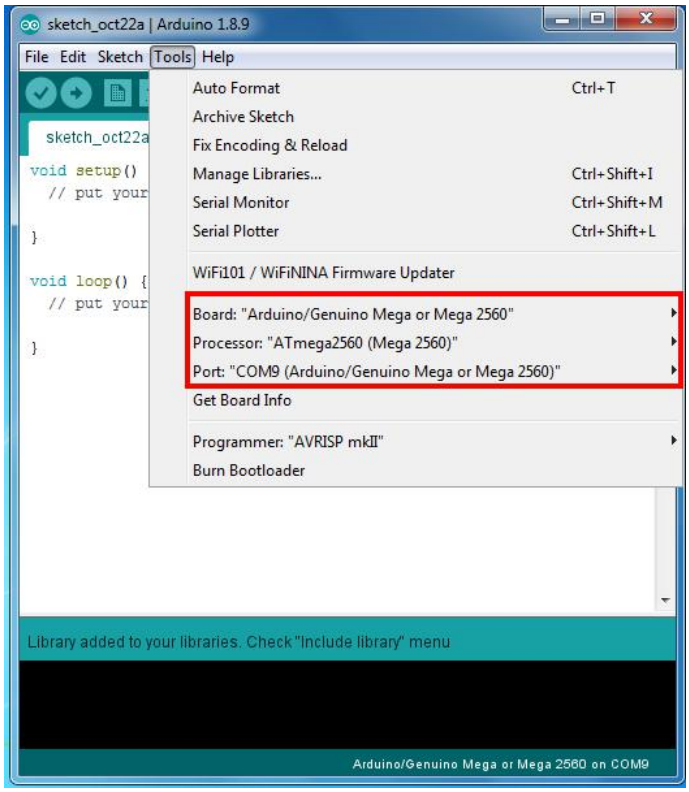
Step 6 After installing above library, please download the main code from following link.unzip the download zip file lesson19.zip, you will see a folder called smarthome-lesson19
https://osoyoo.com/driver/smarthome/smarthome-lesson19.zip

Unzip the downloaded zip file, you will see two sub-folders in smarthome-lesson19: **deviceA** and **deviceB**

Step 7 After above operations are completed, connect OSOYOO MEGA2560 Boards to

PCs with USB cables.

Step 8 Open the Arduino IDE and choose corresponding board type and port type for you project.



Step 9 Arduino IDE: Click file -> click Open -> choose code “smarthome-lesson19”, **load up sketch in folder deviceA to Device A and sketch in deviceB folder to device B.**

Note:

In sketch deviceA, you need change Wifi SSID and password in Line 28,29, you also need set device B IP address in line 32.

In sketch deviceB, you need change Wifi SSID and password in Line 22,23, you also need set device A IP address in line 26.

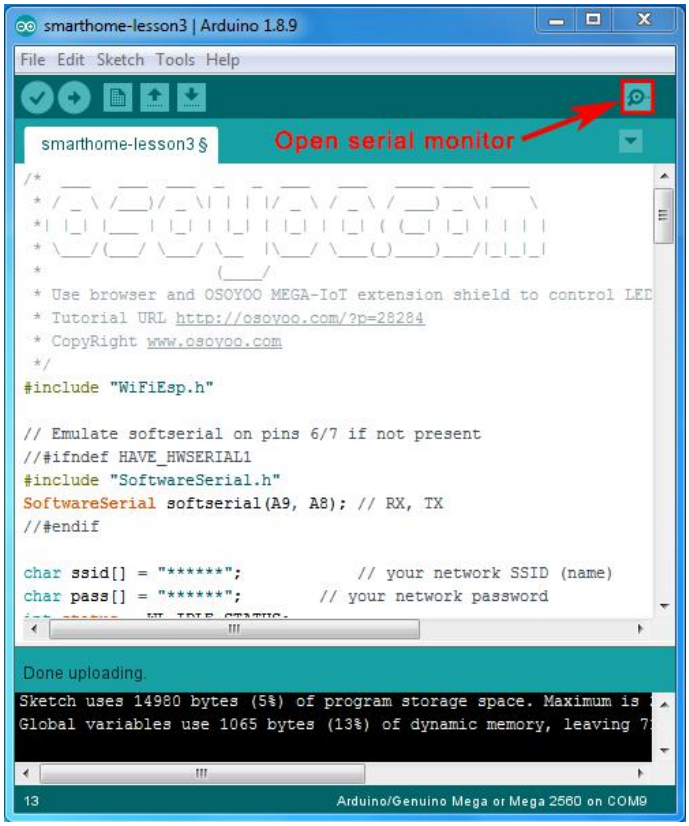
HOW TO PLAY

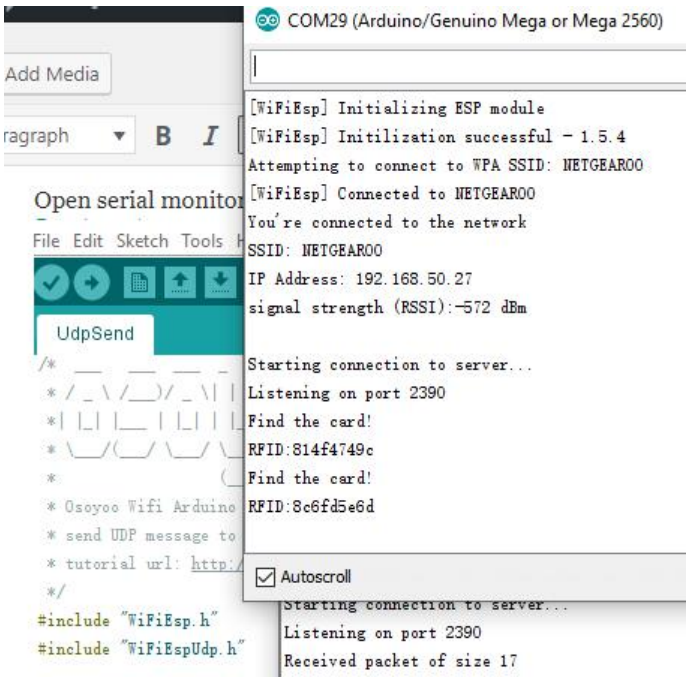
Step 1) Please load deviceA.ino to Sender Arduino device.

Make sure have changed line 22,28,32 with correct wifi password,ssid and device B IP address.

If you don't know receiver device IP address, you need run sample code in lesson 3

Open serial monitor, put a IC card to RFID module, you will see following screen:

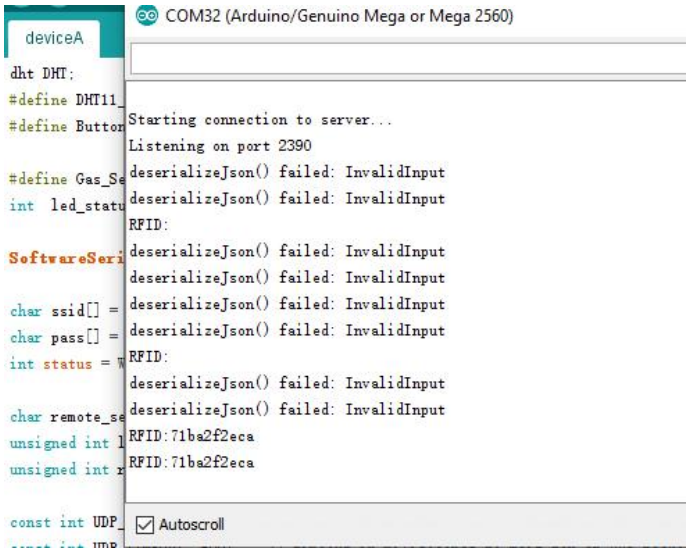




As receiver Arduino sketch is not running, you can not get any action at this moment.

Step 2) please load deviceB.ino to device B Arduino board, also change the wifi ssid, password and device A Ip address properly.

Open serial monitor, you will see following screen:



At the beginning , there is some error because no IC card detected in device A. After you Put an IC card to device A RFID moduel, it will show RFID number in serial monitor.

Now check the LCD which is connected to I2C 1 slot of Device B, it will show Temperature, Humidity and RFID# which is sent from Device DHT11 sensor and RFID module.

Red LED in Device B which can be turned on/off by push buttons in Device A.

Let’s use a gas lighter to leak some gas to gas sensor, buzzer in Device B will alarm.

You can add some more sensors and actuators in this project and make far more complex IoT projects. If you have any question, please contact support@osoyoo.info to get help.