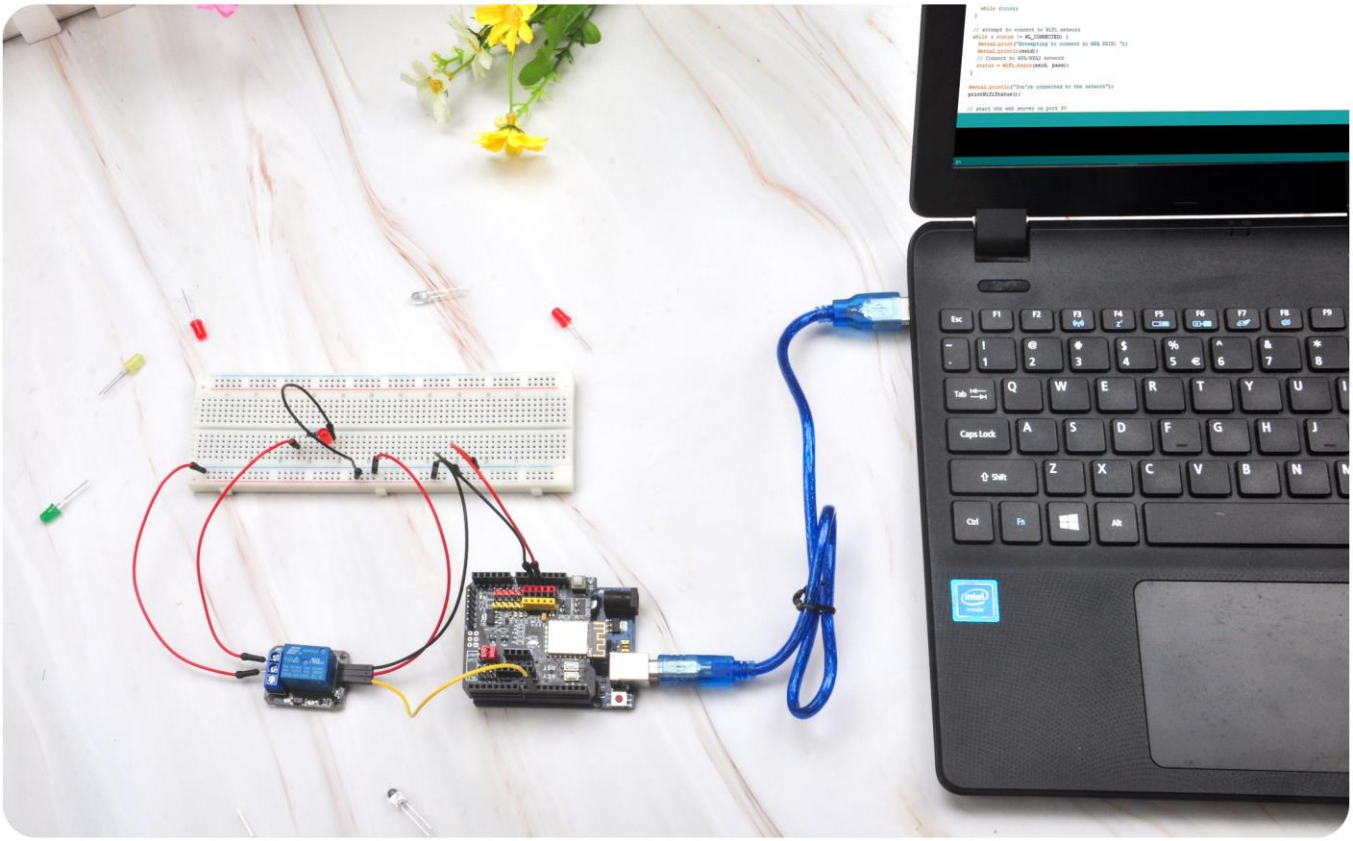
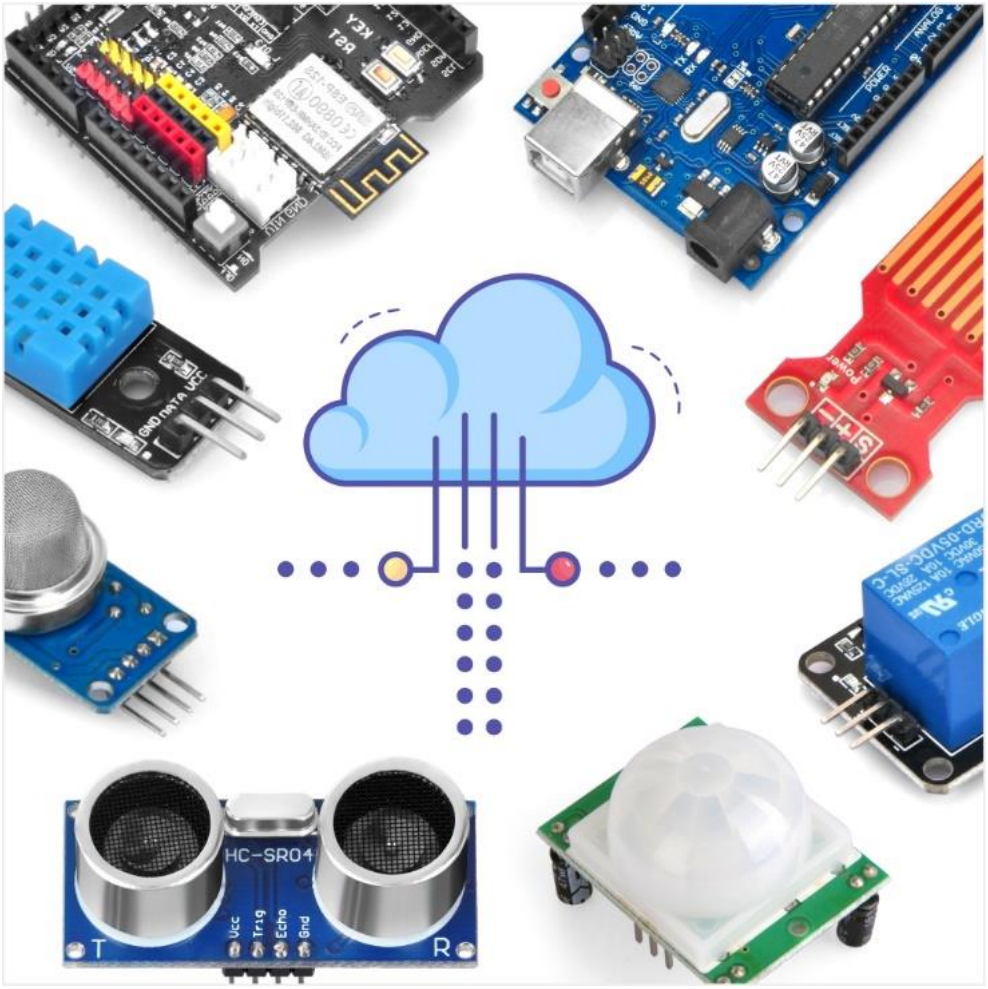
WIFI INTERNET OF THINGS LEARNING KIT FOR ARDUINO



User Guide

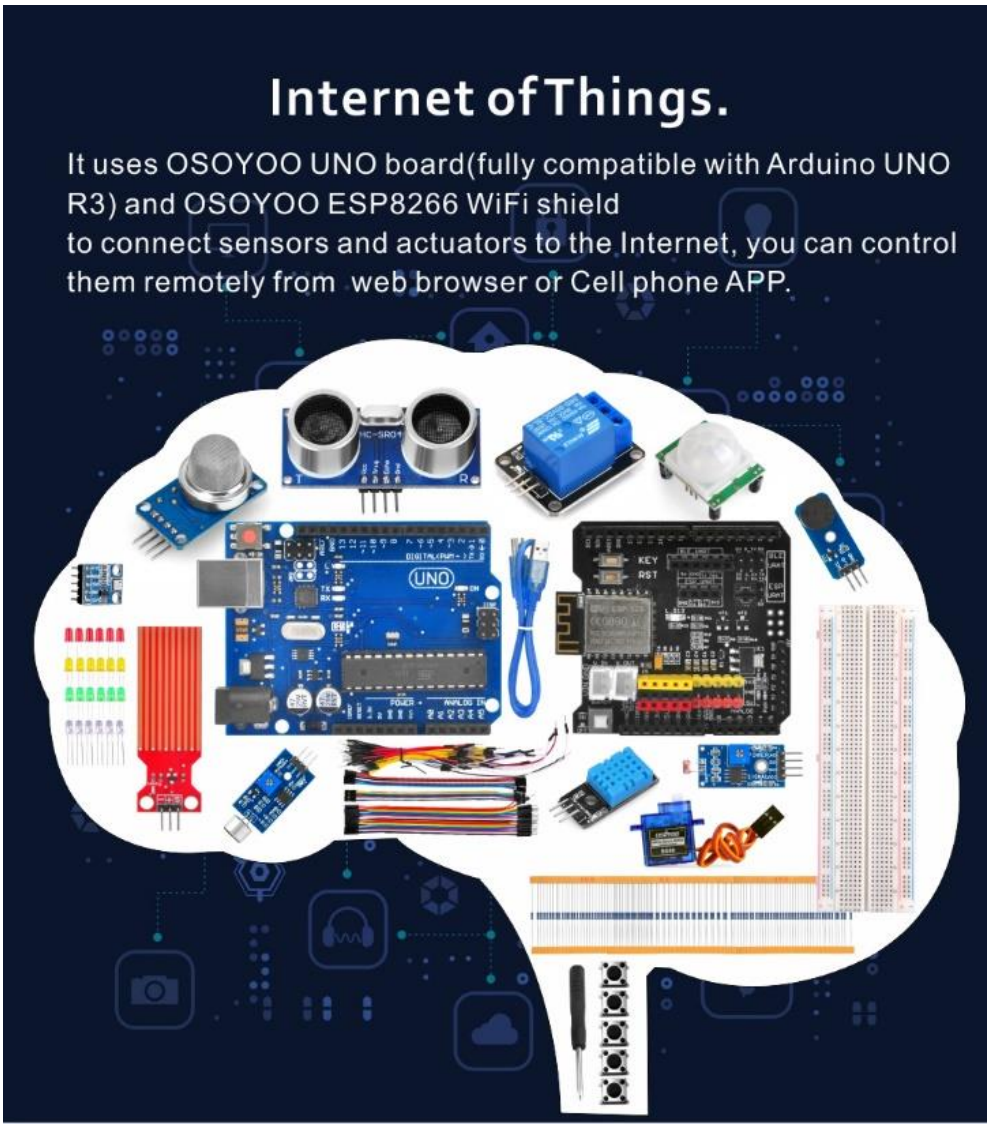
OSOYOO WiFi Internet of Things Arduino Learning Kit is built with the goal to help beginners to get hands-on experience on .



About this kit

OSOYOO WiFi Internet of Things Arduino Learning Kit is built with the goal to help beginners to get hands-on experience on . The kit comes with a step-by-step tutorial, video and sample code which can save lots of your research and learning time.


WI-FI
wifi control
PIR Humen
Motion Detection
Ultrasonic
Detection
OSOYOO WiFi Internet of Things Learning Kit For Arduino
WIFI INTERNET OF THINGS
LEARNING KIT FOR ARDUINO
Temperature &
Humidity
Monitoring
Lighting
Control
Gas
Detection


Internet of Things.
It uses OSOYOO UNO board(fully compatible with Arduino UNO R3) and OSOYOO ESP8266 WiFi shield
to connect sensors and actuators to the Internet, you can control them remotely from web browser or Cell phone APP.

⊙14 DIGITAL GPIO (6PWM)

⊙based on arduino ecosystem

⊙Flash Memory 32 KB
（0.5KB bootloader）

⊙SRAM 2 KB （Atmega328）

⊙EEPROM 1 KB （Atmega328）

CONTENTS

Lesson 1: Hello World

OBJECTIVE

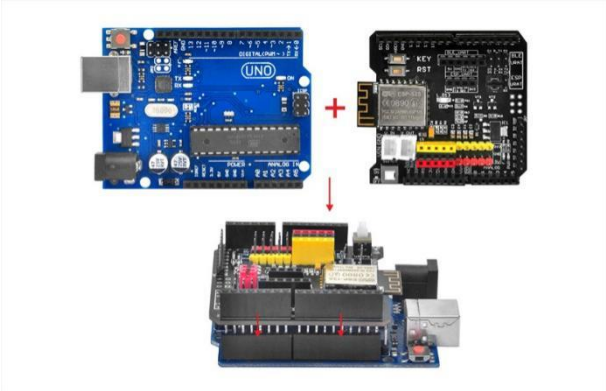
In this lesson, we will show how to use OSOYOO ESP8266 wifi Shield and Arduino UNO board to work as Web Server and show “hello world!” message in browser.

PARTS&DEVICES

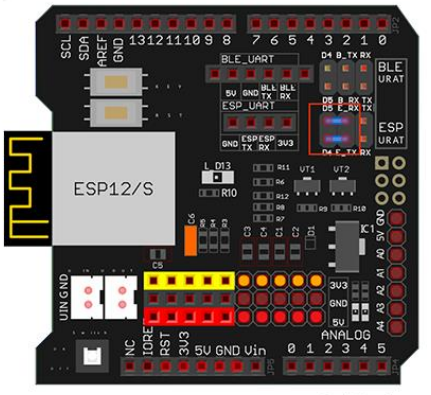
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1

HOW TO MAKE

Just simply insert OSOYOO ESP8266 WiFi shield to Arduino UNO board,



Use jumper cap to connect E_TX to D4 and E_RX to D5 as per following picture:

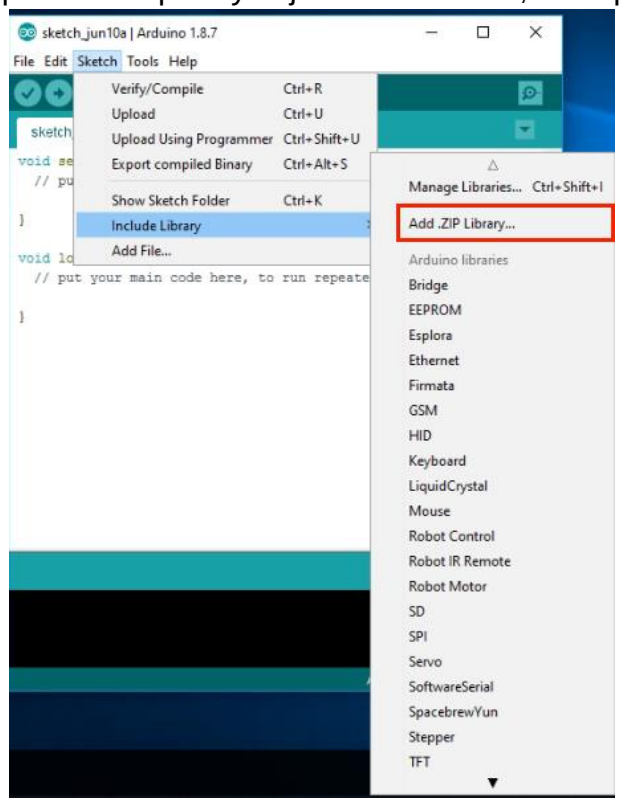


E_TX Default jumper connect D4
E_RX Default jumper connect D5

HOW TO CODE

Software IDE:
Arduino IDE (version 1.6.4+)
Software Installation
Step A) 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 B) WifiESP Library is required to run OSOYOO ESP8266 shield sketch code. If you have installed this library, please skip this step.
WifiESP library can be downloaded from following link:
https://osoyoo.com/driver/WiFiEsp-master.zip
Then in your Arduino IDE ->Sketch->Include Library->Add .ZIP Library and select the WiFiEsp-master.zip file you just downloaded, and upload it to Arduino.



Step C) Download and Edit esp8266-lesson1.ino file
Please download sketch from:

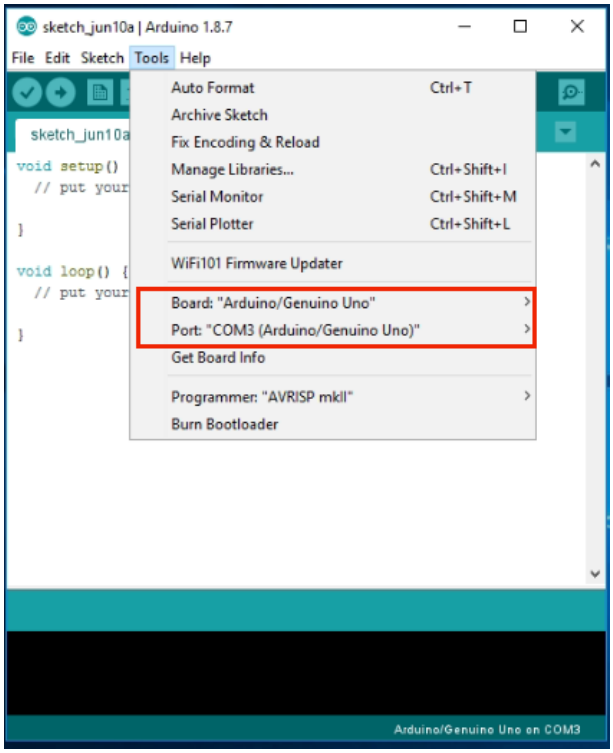
https://osoyoo.com/driver/wifi-iot/lesson1/esp8266-lesson1.zip and unzip the file and double click esp8266-lesson1.ino file, you can edit this file in Arduino IDE.

Step D) Connect the Arduino UNO board to computer via USB cable,

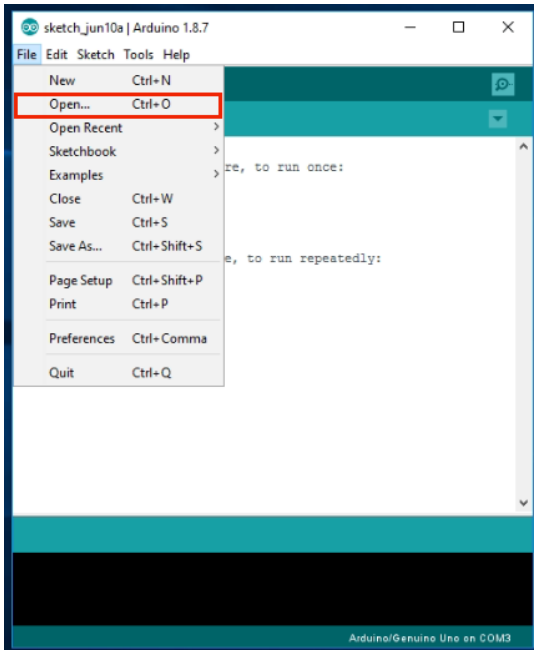
Step E) Open the Arduino IDE and choose corresponding board type and port type for you project.

Board : ”Arduino/Genuino UNO”

Port: Choose your own Serial Port for your UNO board



Step F) Arduino IDE: Click **file** -> click **Open** -> choose code “esp8266-lesson1”, load up the sketch onto your Arduino.

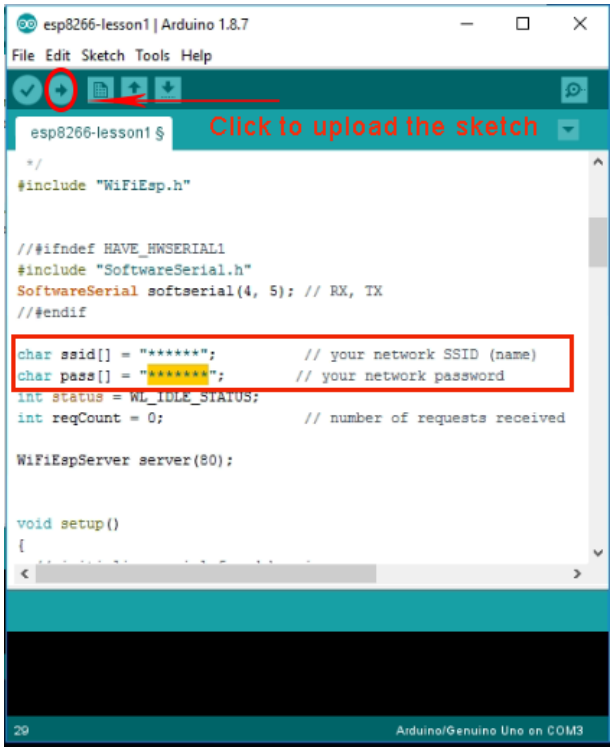


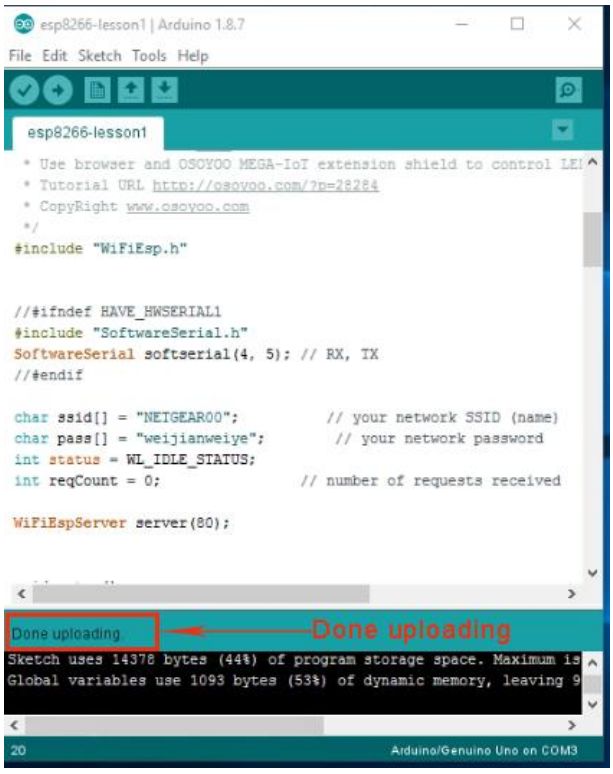
In the sketch, find following lines:

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

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

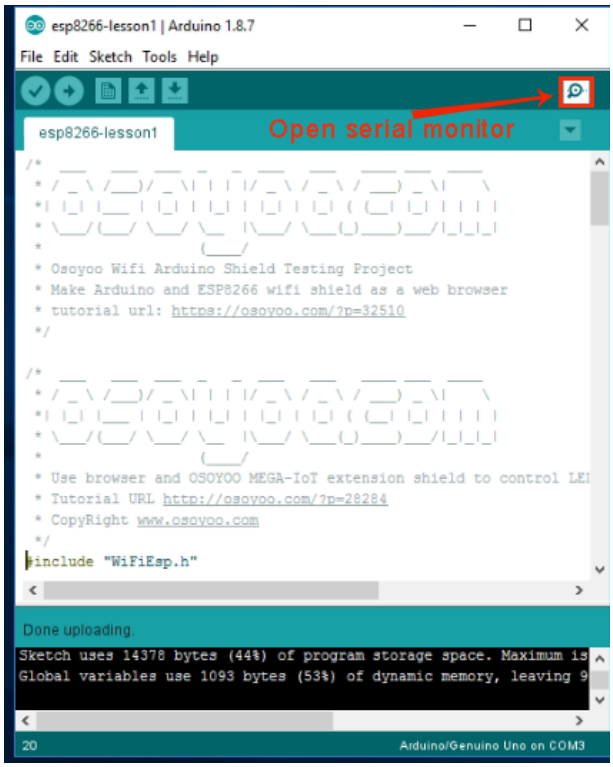
Please replace the ****** with your correct wifi SSID and password, otherwise your project cannot connect to Internet. Not connect to Internet.



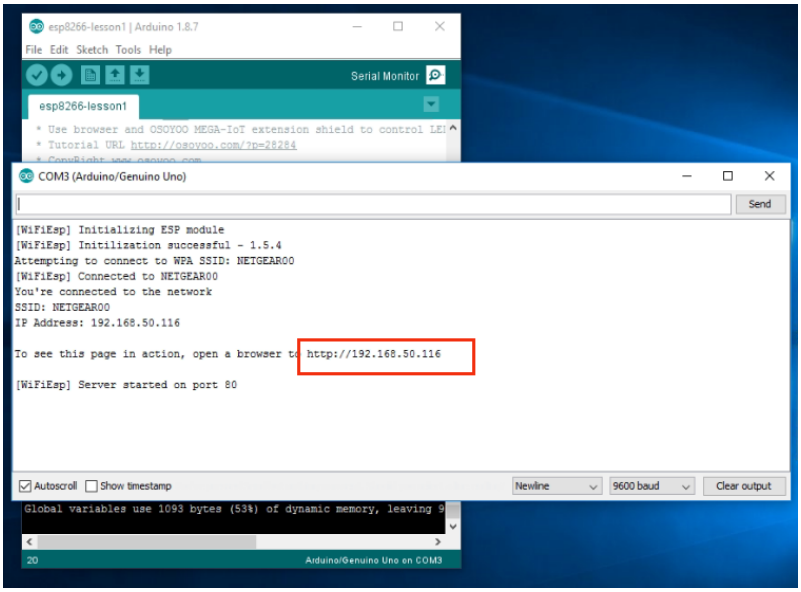


HOW TO PLAY

After loading the sketch to Arduino , open the serial monitor in the upper-right corner of Arduino IDE

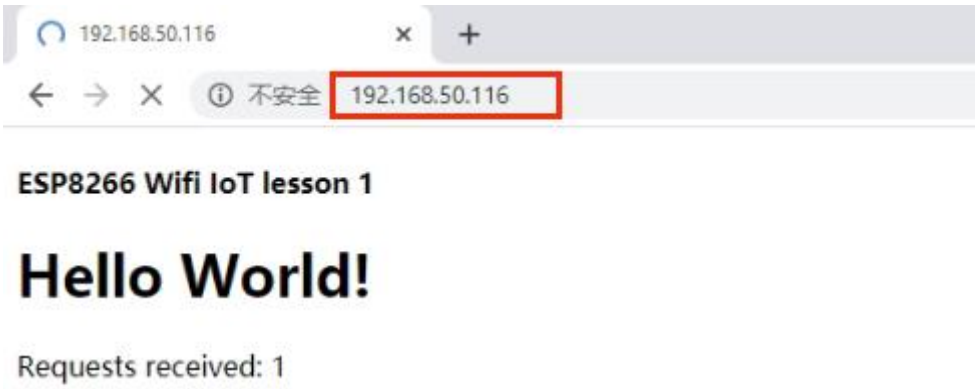


You will see following message:



From the serial monitor, you can see the IP address of your UNO board in the red circle (in above picture, 192.168.50.116).

Then use your browser to visit the website http://192.168.50.116, you will see following result:



Lesson 2: Remote control LED

OBJECTIVE

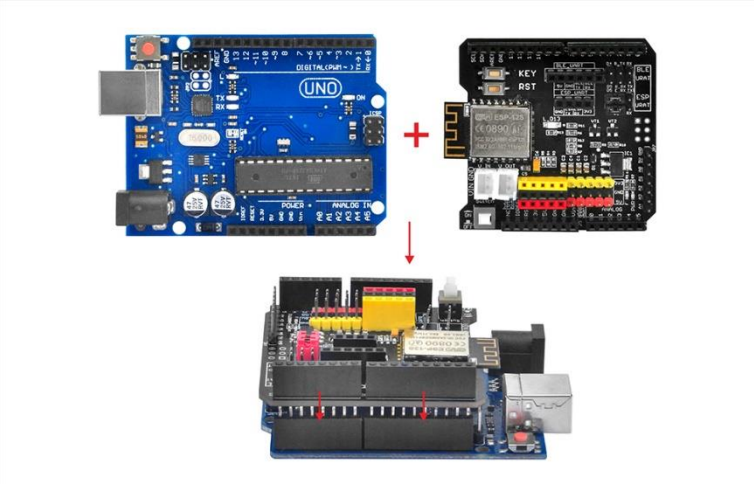
In lesson 1 , we have learned how to use Arduino to make simple web server and display “Hello World” in your remote browser. The Arduino is using a protocol called HTTP to exchange data with remote client device (browser). In this lesson, we will teach you to use a very simple and power protocol called UDP which is commonly used for Email service and control signal. We will use a cell phone APP to turn On/Off an LED in Arduino remotely through UDP protocol.

PARTS&DEVICES

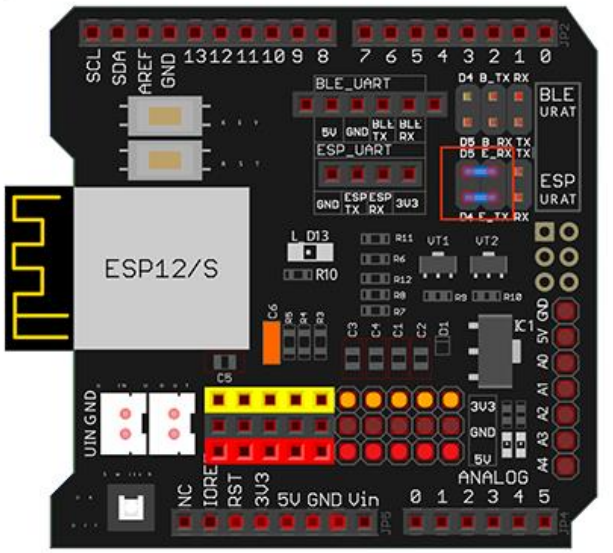
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
USB cable x 1
LED x 1
200 ohm resistor x 1

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

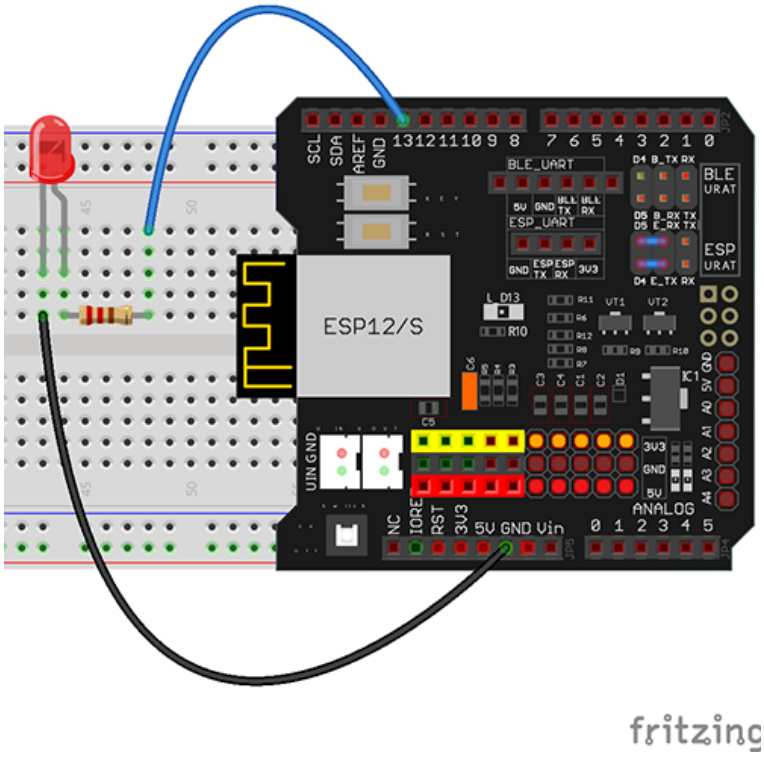


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Then connect the LED long pin to D13 in Wifi shield through a 200 ohm resistor, LED short pin to GND, circuit is as below:

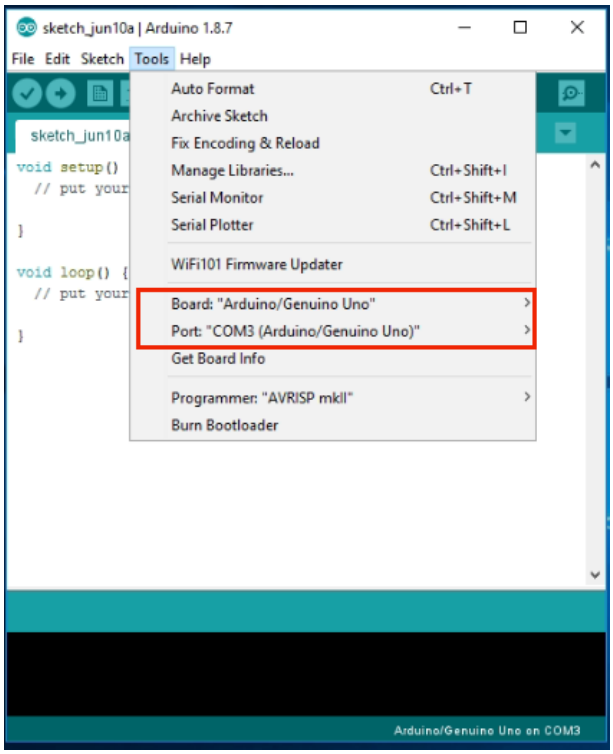


HOW TO CODE

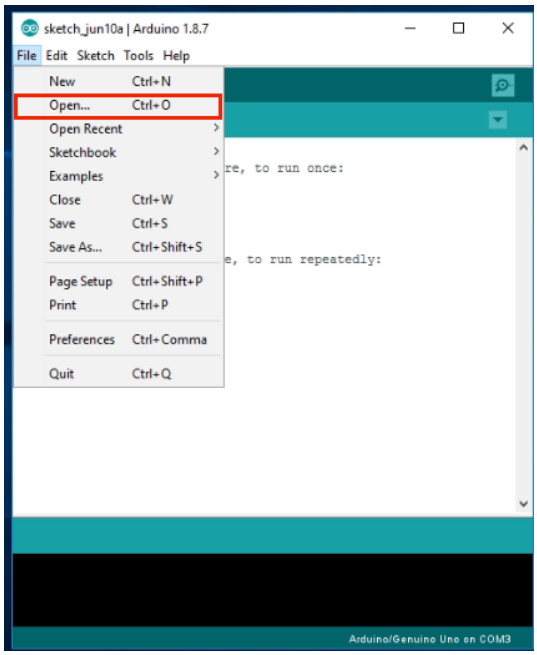
Step A Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).
Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software.

Step B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

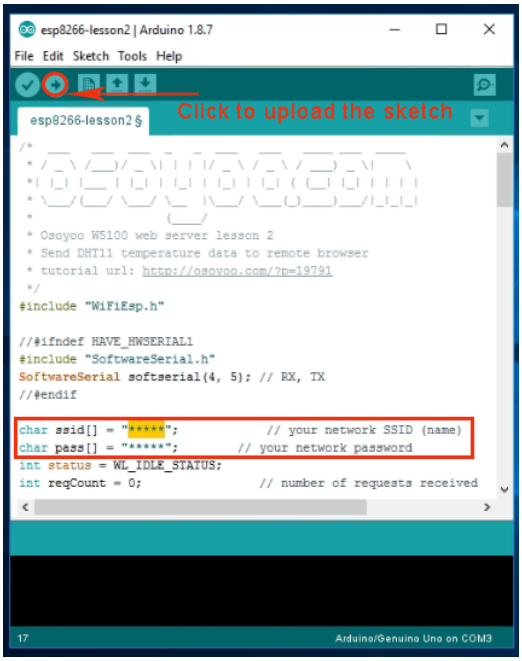
- Board:"Arduino/Genuino UNO"
- Port: Choose your own Serial Port for your UNO board



Step D) Download the sketch file from : https://osoyoo.com/driver/wifi-iot/lesson2/esp8266-lesson2.zip
Unzip the download file and enter the folder esp8266-lesson2.
Step E) Arduino IDE: Click **file** -> click **Open** -> choose code “esp8266-lesson2”, load up the sketch onto your Arduino.

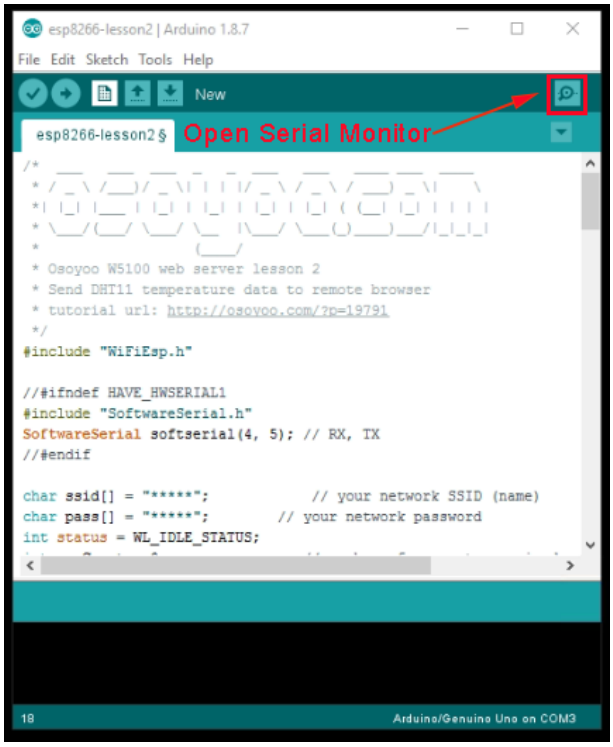


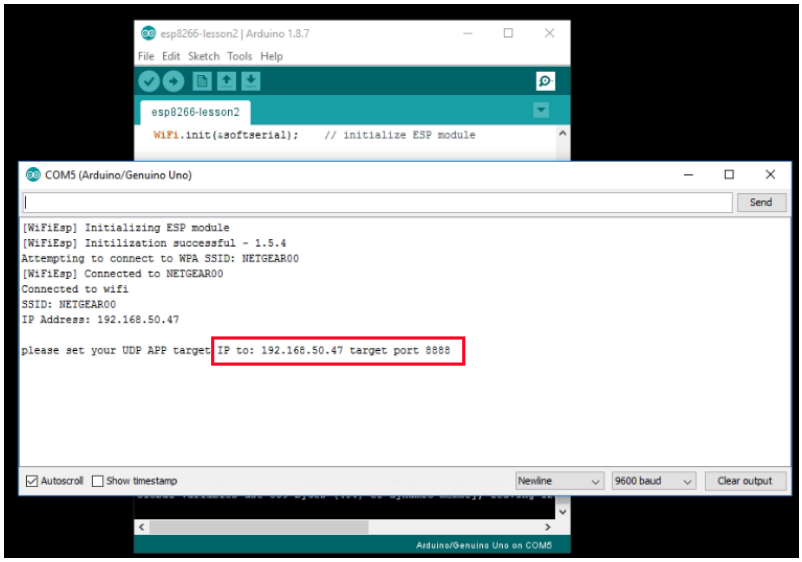
In the sketch, find following lines:
*char ssid[] = "******"; // your network SSID (name)*
*char pass[] = "******"; // your network password*
please replace the ****** with your correct wifi SSID and password, otherwise your project cannot connect to Internet.



HOW TO PLAY

Now upload the sketch to Arduino board and open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.47 is the IP address of my Arduino, we need to set this IP address in our APP in next step.

Step F) Install UDP send Mobile APP

You can use any UDP send APP to run this lesson. In this lesson, we use **OSOYOO Wifi UDP Robot Car APP** to make test.

In **Google Play** or **Apple Store**, please search key words **"OSOYOO Wifi UDP Robot Car"**, you will find a yellow icon APP.

In APP UI screen, click F1 button, your LED will be turn on, then click F2 button, your LED will be turn off.

FAQ about the Wifi UDP APP and sketch Code:

Q 1) What happened when you press buttons in OSOYOO WiFi UDP Robot Car APP ?

A: When you press a button of the APP, APP will send a single-letter message through UDP protocol to target device (in this example, our Arduino Wifi Shield)

Button	UDP message
F1	F
F2	G
F3	H
F4	I
F5	J
F6	K
▲	A
▼	B
>	R
<	L
square	E

Q2: How do Arduino react to App command

A: Our sample code (esp8266-lesson2.ino) line 69 to line 76 switch statement handle the remote UDP command:

```
switch (c)      //serial control instructions
{
   case 'F': digitalWrite(ledPin, HIGH) ;break; //TURN ON LED
   case 'G':digitalWrite(ledPin, LOW) ;break; //TURN OFF LED

   default:break;
}
```

In above code lines, variable **c** is the message we got from Mobile APP. If message is ‘F’, it means F1 key is pressed and we should turn on the LED, if message is ‘G’, it means F2 is pressed and we need turn on the LED.

Lesson 3: Photoresistor Sensor

OBJECTIVE

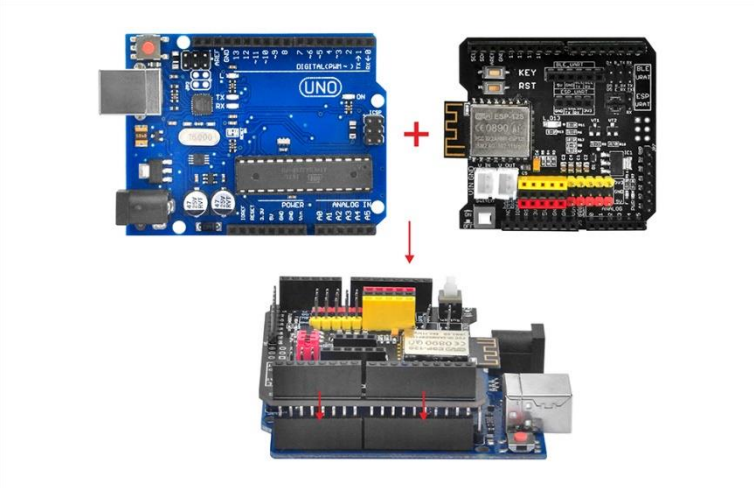
In Lesson 2, we learned how to use browser send control signal to a remote Arduino device and turn On/Off an LED. In this lesson, we'll show how to read remote sensor data to your browser. We will use a photoresistor (light sensor) to read remote environment light value. This is very useful in farms, greenhouses to control the light of plants.

PARTS&DEVICES

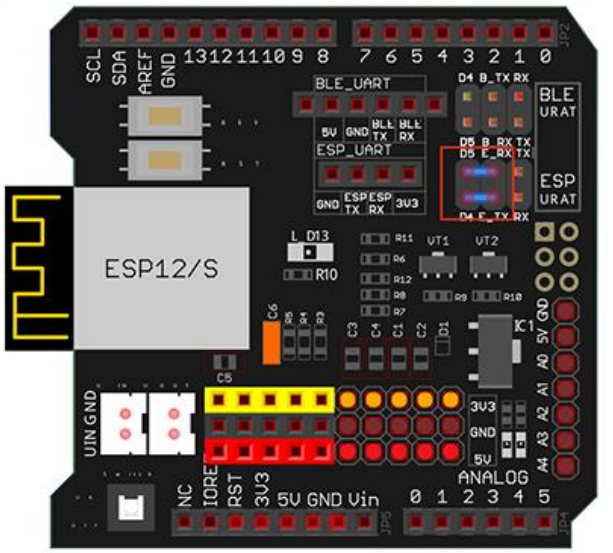
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Photoresistor sensor Module x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

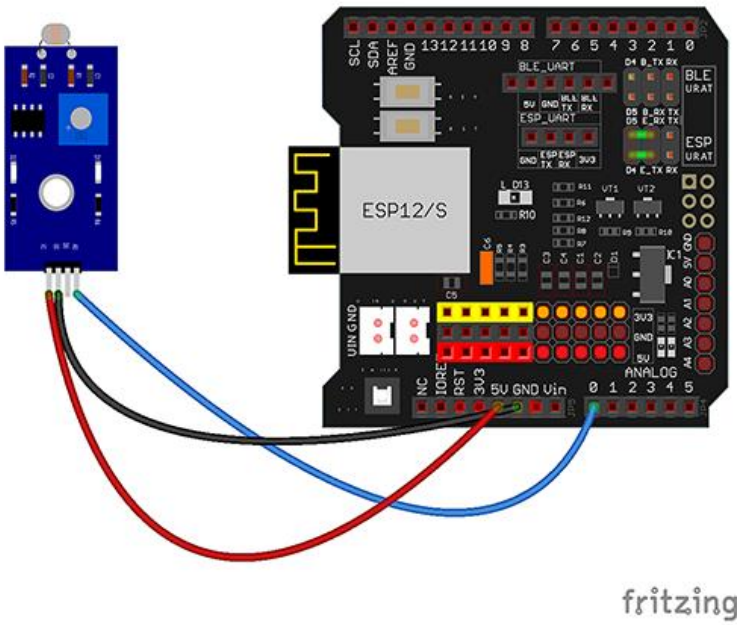


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect your Photoresistor with Uno as following diagram,



A couple of notes before you get started:
The Photoresistor uses analog output, so you will need to use the analog pins on the Arduino.

In this example, we are using a 5v power supply from the Arduino, but we could use the 3.3v as well.
The provided diagram is just an example of how to connect the hardware. There are many ways to connect devices, so try what works best for you!

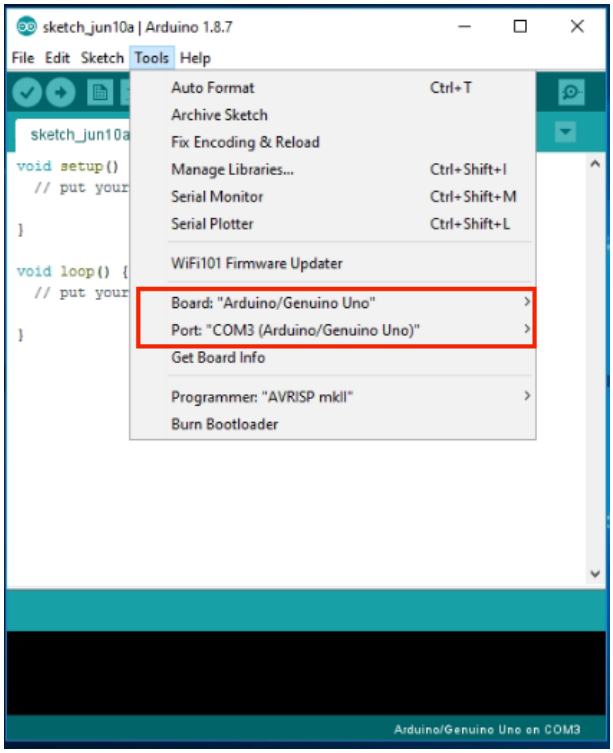
Arduino UNO Board	Photoresistor sensor module
A0	S
GND	-
5V	+

HOW TO CODE

Step A) 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 B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.
Board: Arduino/Genuino UNO

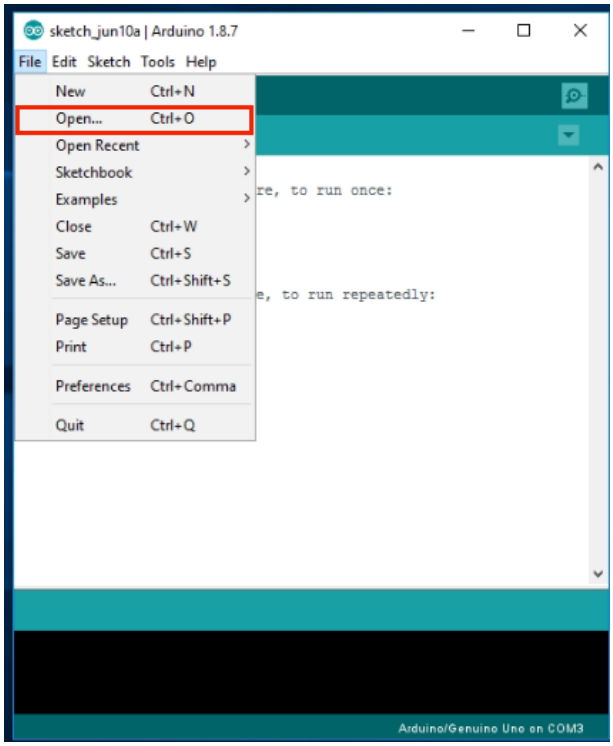
Port: Choose your own Serial Port for your UNO board .



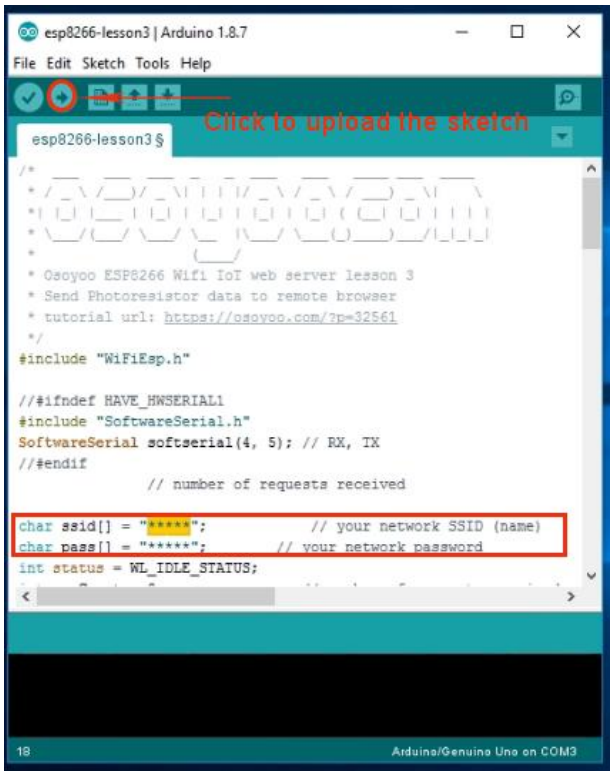
Step D) Download the sketch file from: https://osoyoo.com/driver/wifi-iot/lesson3/esp8266-lesson3.zip

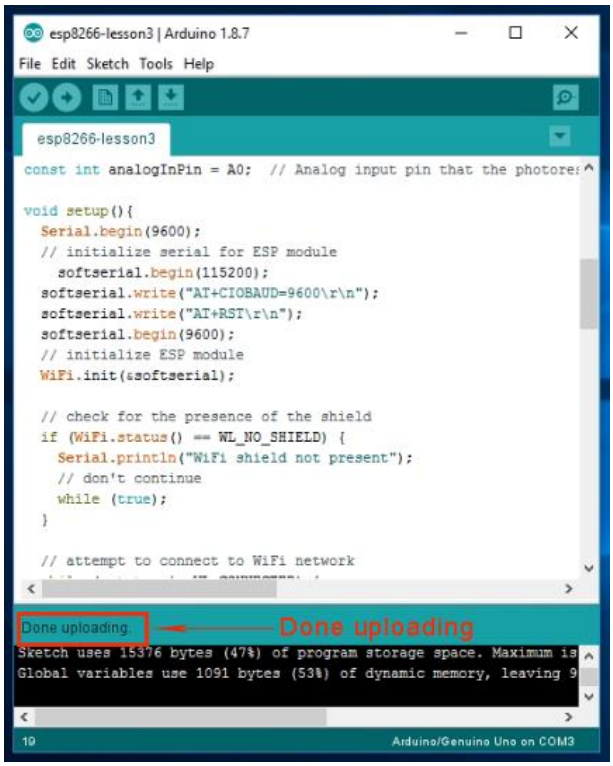
Unzip the download file and enter the folder esp8266-lesson3

Step E) Arduino IDE: Click **file** -> click **Open** -> choose code “esp8266-lesson2”, load up the sketch onto your Arduino.



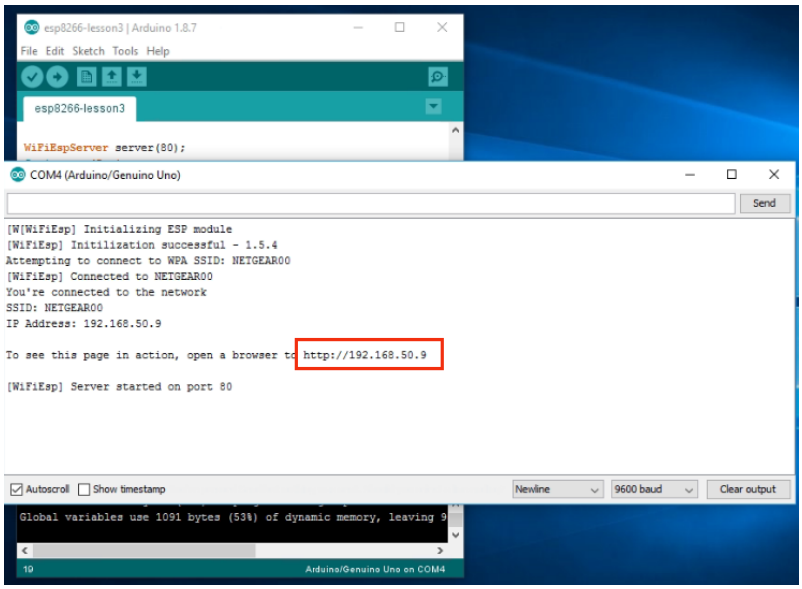
In the sketch, find following lines:
*char ssid[] = "******"; // your network SSID (name)*
*char pass[] = "******"; // your network password*
Please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet.
Step F) Upload the sketch to your Arduino.



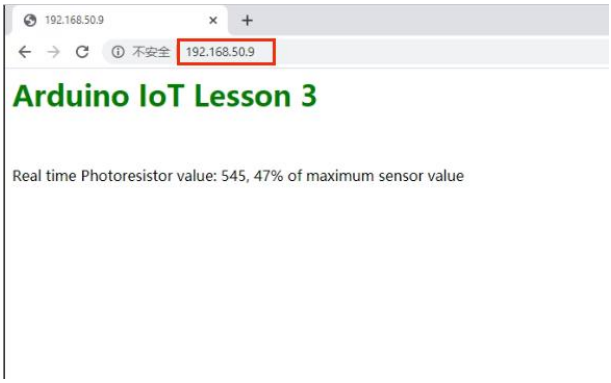


HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:



In above example, **192.168.50.9** is the IP address of my Arduino.
Now use another computer or your cell phone's browser to visit url : http://192.168.50.9
In your photoresistor sensor is exposure under light. Your browser will show following result:



Real time Photoresistor value: 545,47% of maximum sensor value.
1% means the environment is very dark.

Lesson 4: DHT11 Sensor

OBJECTIVE

In Lesson 3, we learned how to read remote Photoresistor sensor data to your browser. As farmer or agriculture scientist, in addition to get the brightness data of your greenhouse, you also need to know the temperature/humidity of your plant field.

In this lesson, we will use a DHT 11 sensor to read remote environment temperature and humidity data through browser.

PARTS&DEVICES

Arduino UNO board x 1

OSOYOO ESP8266 Wifi Shield x 1

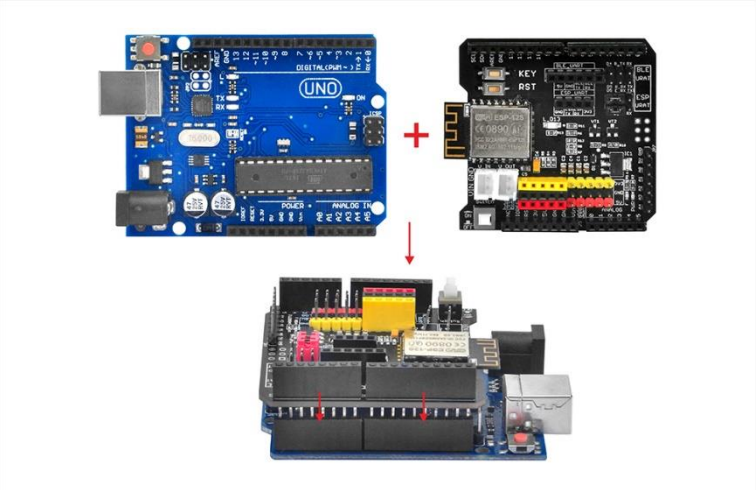
DHT11 sensor Module x 1

USB cable x 1

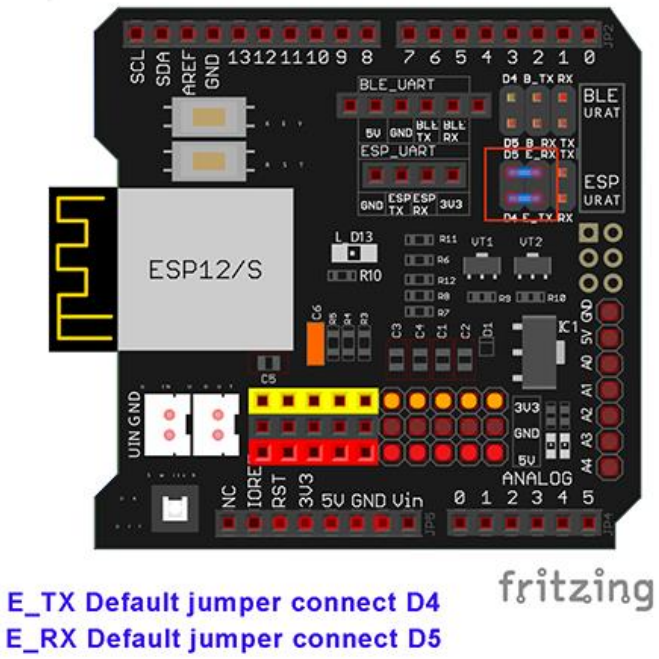
Jumper wires several

HOW TO MAKE

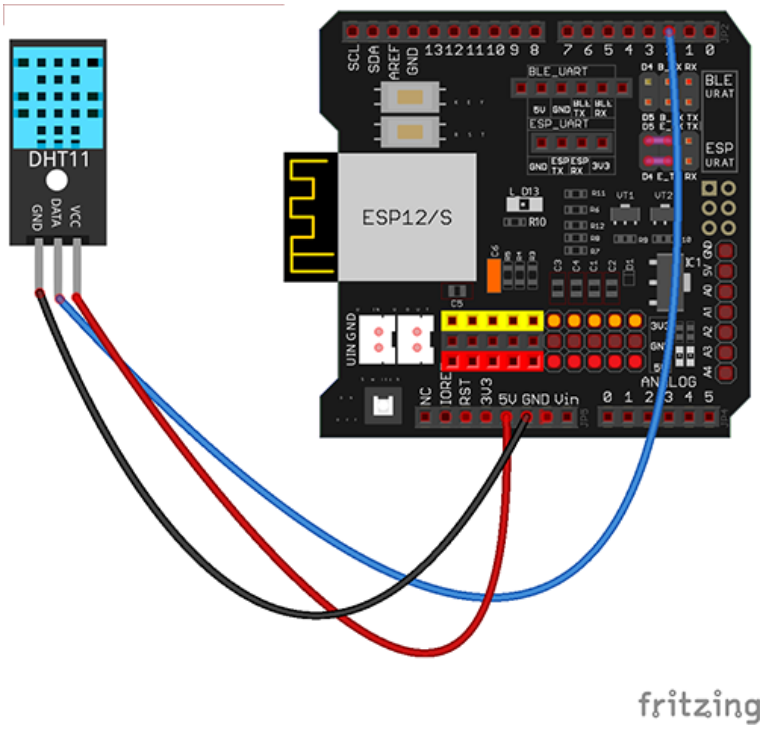
First, please insert the ESP8266 wifi Shield into your UNO board,



Make sure jumper cap connected E_TX to D4 and E_RX to D5.



Connect your DHT11 with Uno as following diagram,



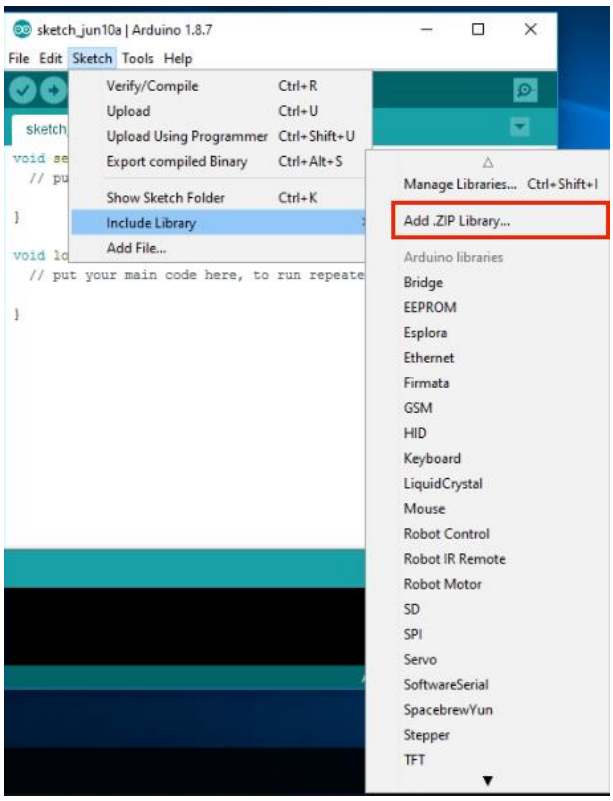
Arduino UNO Board	DHT11 sensor module
D2	S
GND	–
5V	+

HOW TO CODE

Software Installation

Step A）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

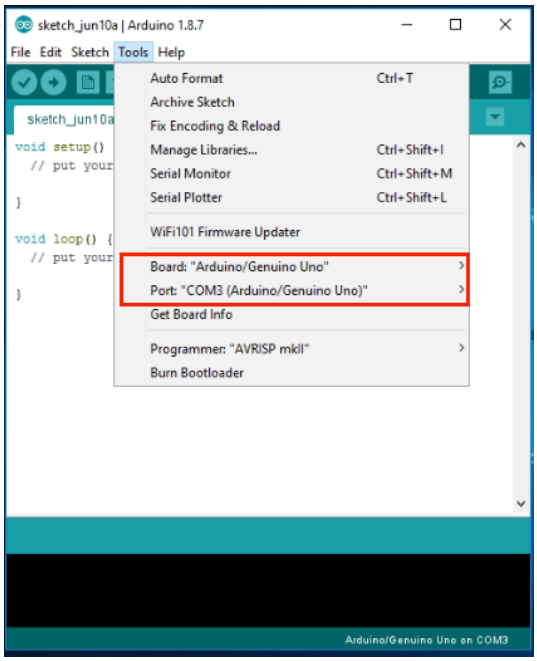
Step B) If you have DHT11 library, please skip this step. If you have not installed DHT11 library, please download the zip file from https://osoyoo.com/wp-content/uploads/samplecode/DHT.zip , then in your Arduino IDE ->Sketch->Include Library->Add .ZIP Library and select the DHT.zip file you just downloaded, and upload it to Arduino.



Step C) Connect the Arduino UNO board to computer via USB cable,

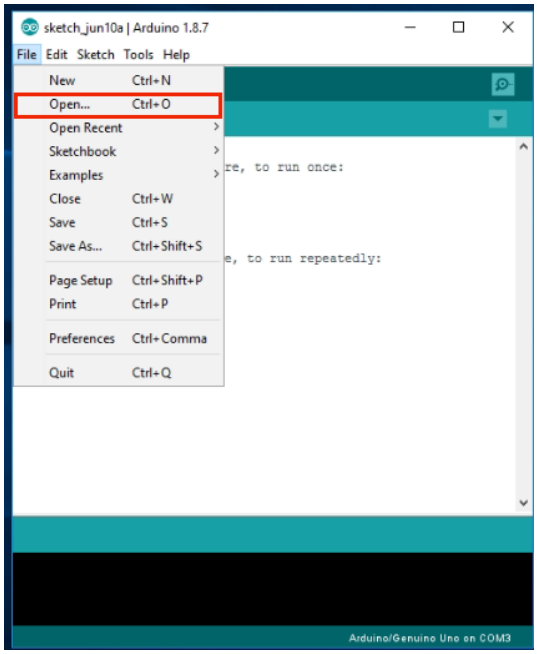
Step D) Open the Arduino IDE and choose corresponding board type and port type for you project.

- Board:"Arduino/Genuino UNO"
- Port: Choose your own Serial Port for your UNO board



Step E) Download sample code from https://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson4/esp8266-lesson4D.zip, unzip the file and double click the esp8266-lesson4D.ino file.

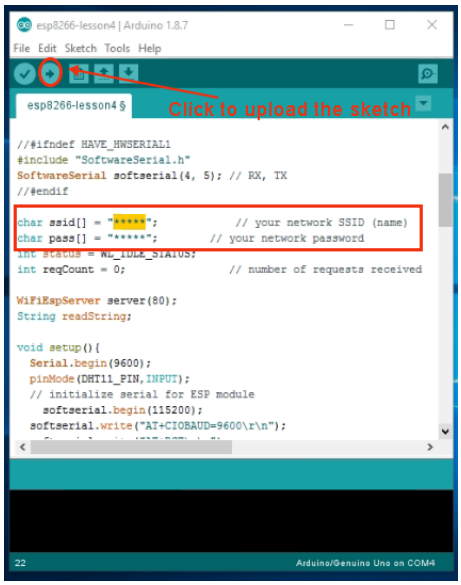
Step F) Arduino IDE: Click **file** -> click **Open** -> choose code "esp8266-lesson4", load up the sketch onto your Arduino.



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

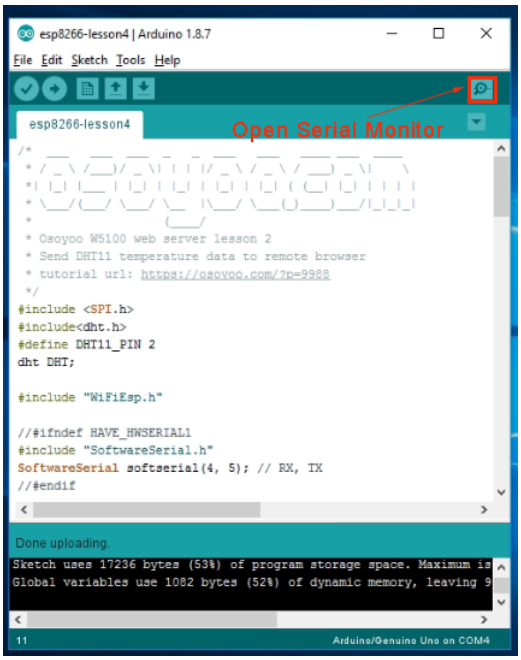
*char pass[] = “******”; // your network password*

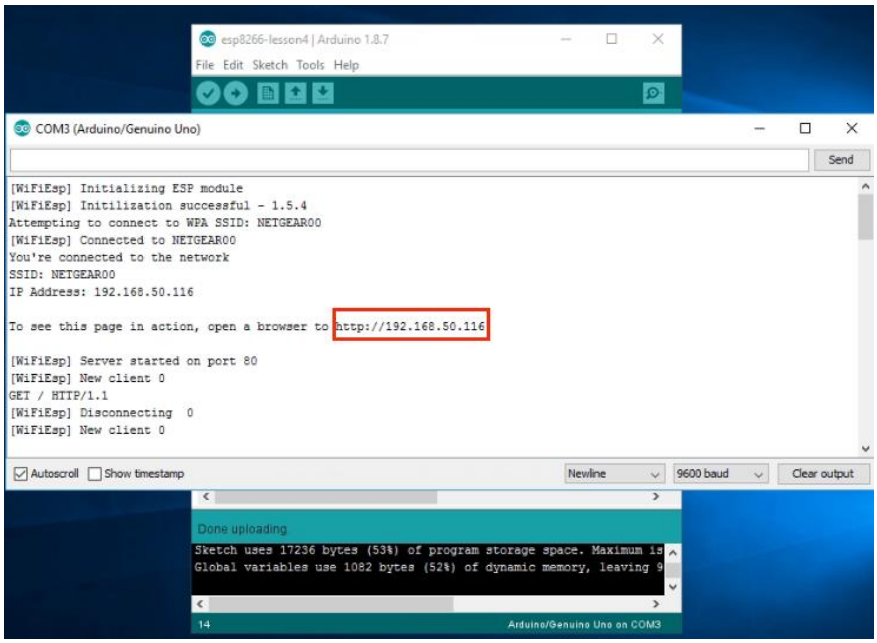
Please replace the ****** with your correct wifi SSID and password, otherwise your project can not connect to Internet. After change above lines, load the sketch into Arduino IDE.



HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino, as following:



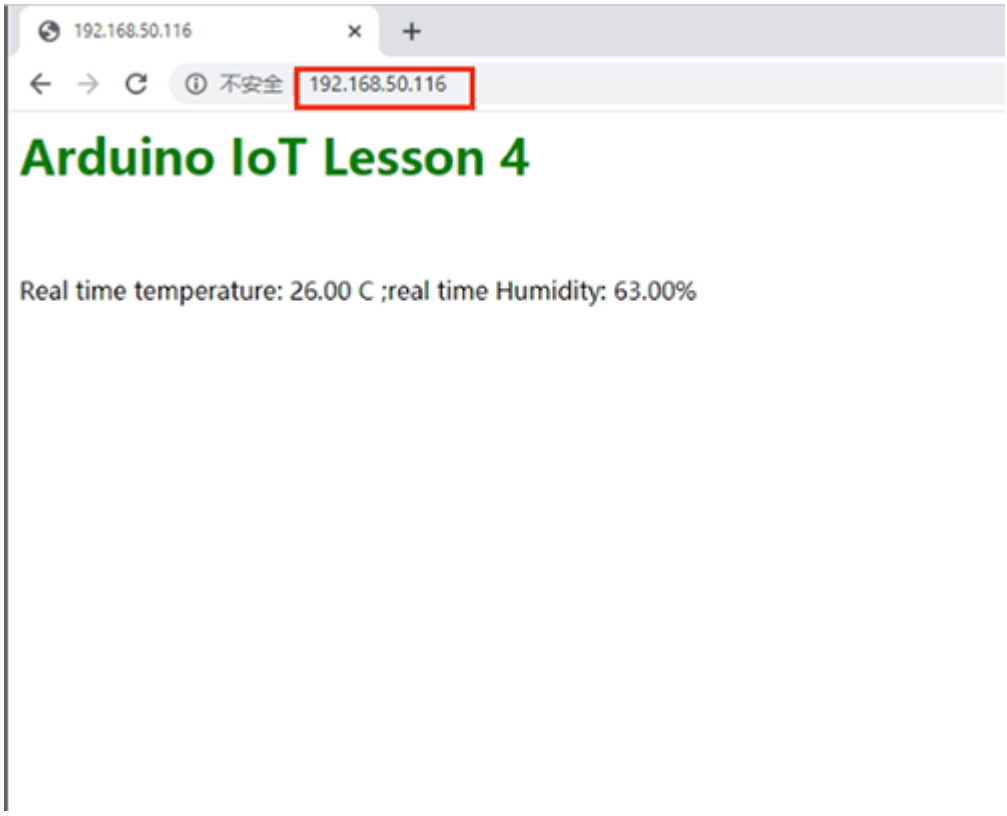


In above example, 192.168.50.116 is the IP address of my Arduino.

Now use another computer or your cell phone's browser to visit url:

http://192.168.50.116

Your browser will show following result:


192.168.50.116
不安全
192.168.50.116
Arduino IoT Lesson 4
Real time temperature: 26.00 C ;real time Humidity: 63.00%

Lesson 5: BMP180 Pressure Sensor

OBJECTIVE

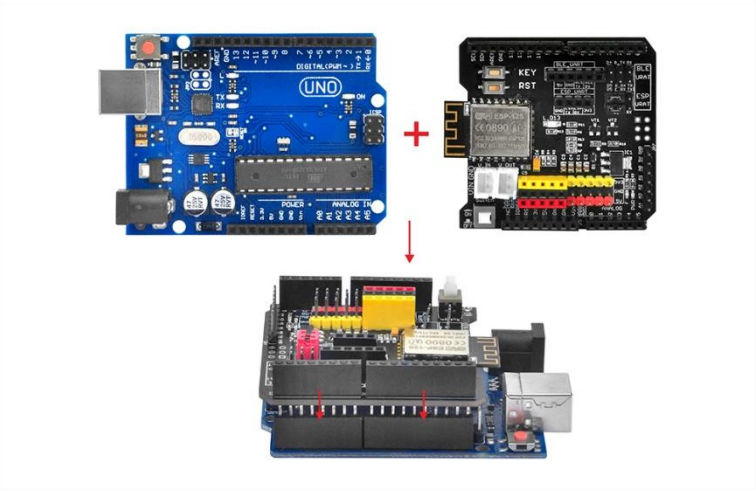
In Lesson 4, we learned how to read remote the DHT11 temperature/humidity sensor through browser.
In this lesson, we will use another powerful sensor called BMP180 which read pressure, temperature, sea level pressure and altitude data. We will use OSOYOO ESP8266 Wi-Fi Shield to send the data to remote browser.

PARTS&DEVICES

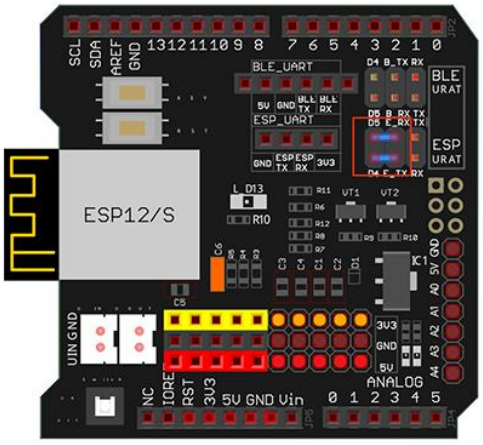
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
BMP180 sensor Module x 1
USB cable x 1
Bread board x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

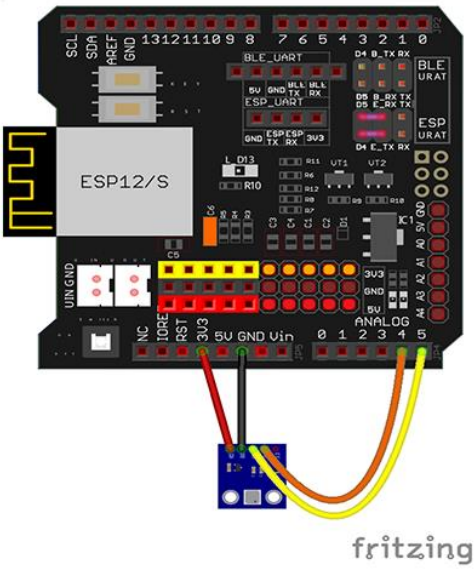


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect the BMP180 with UNO as following diagram:

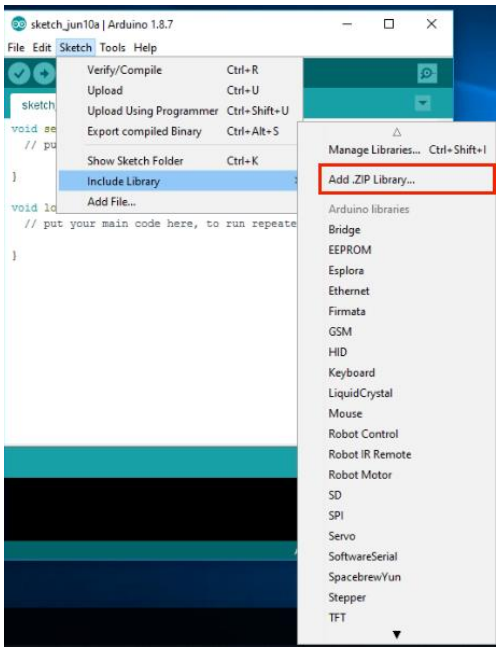


Arduino UNO Board	BMP180 sensor module
A4	SDA
A5	SCL
GND	–
3.3V	+

HOW TO CODE

Step A) Install library: (if you have installed Adafruit BMP085 library, please skit this step)

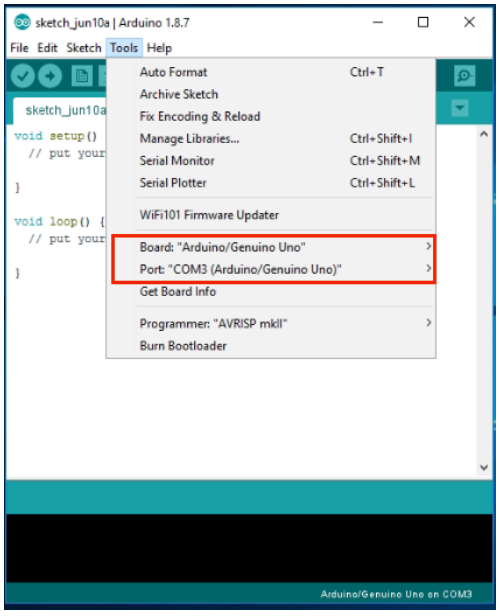
Download the library from https://osoyoo.com/wp-content/uploads/2018/05/Adafruit_BMP085_Library.zip.
Then in your Arduino IDE ->Sketch->Include Library->Add .ZIP Library and select the adafruit_bmp085_library.zip file you just downloaded, and upload it to Arduino.



Step B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

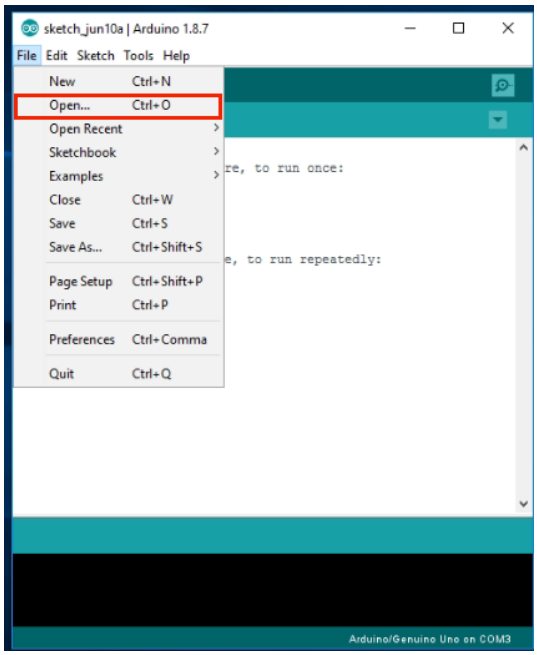
Board :"Arduino/Genuino UNO"

Port: Choose your own Serial Port for your UNO board

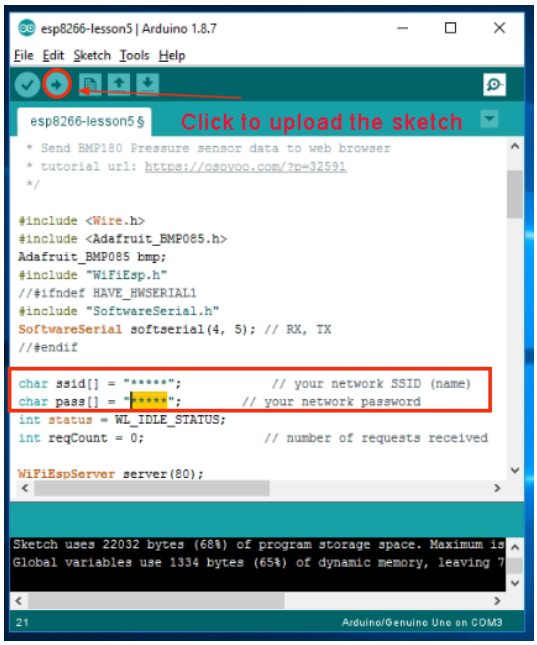


Step D) Download sample code from https://osoyoo.com/driver/wifi-iot/lesson5/esp8266-lesson5.zip, unzip the file and double click the esp8266-lesson5.ino file,

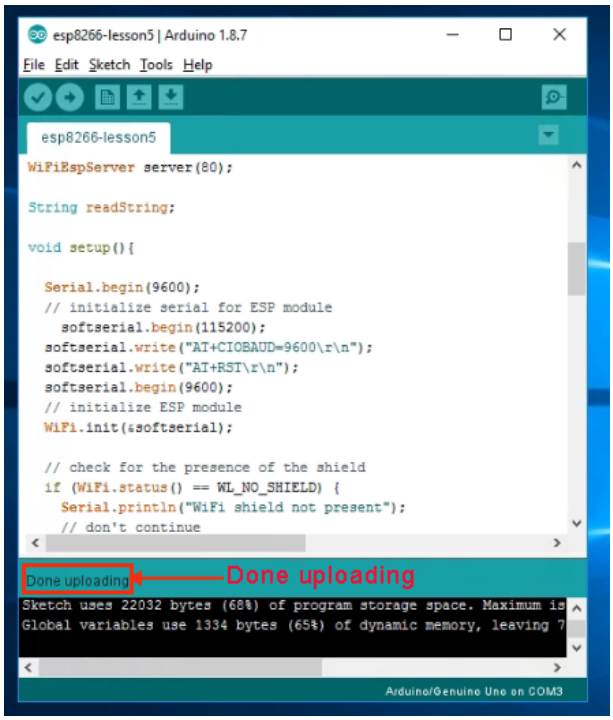
Step F) Arduino IDE: Click **file** -> click **Open** -> choose code “esp8266-lesson5”, load up the sketch onto your Arduino.



*char ssid[] = "******"; // your network SSID (name)*
*char pass[] = "******"; // your network password*
Please replace the ****** with your correct wifi SSID and password, otherwise your project cannot connect to Internet.

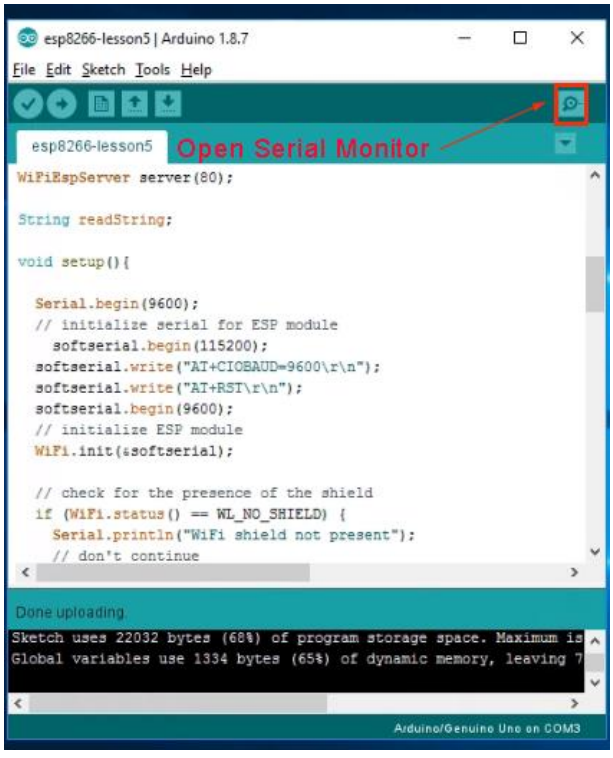


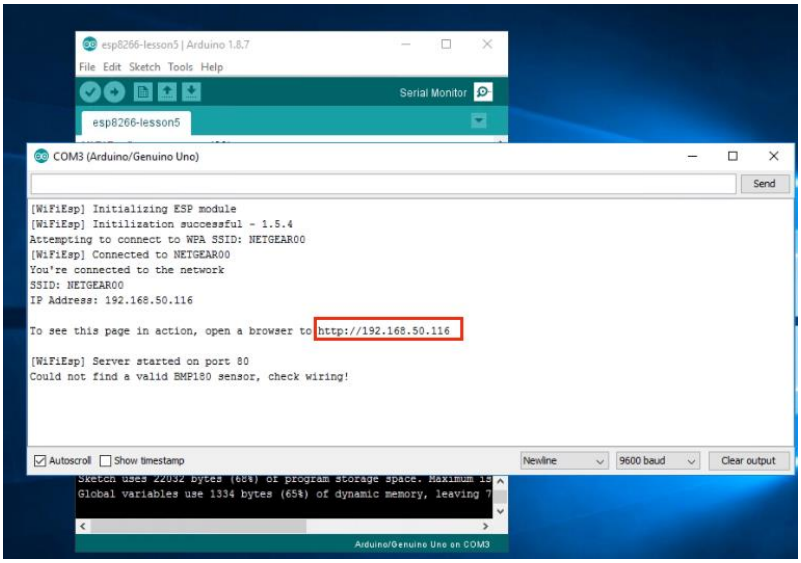
After change above lines, load the sketch into Arduino IDE.



HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.116 is the IP address of my Arduino. Now use another computer or your cell phone's browser to visit url: http://192.168.50.116 Your browser will show following result:

Lesson 6: Servo motor

OBJECTIVE

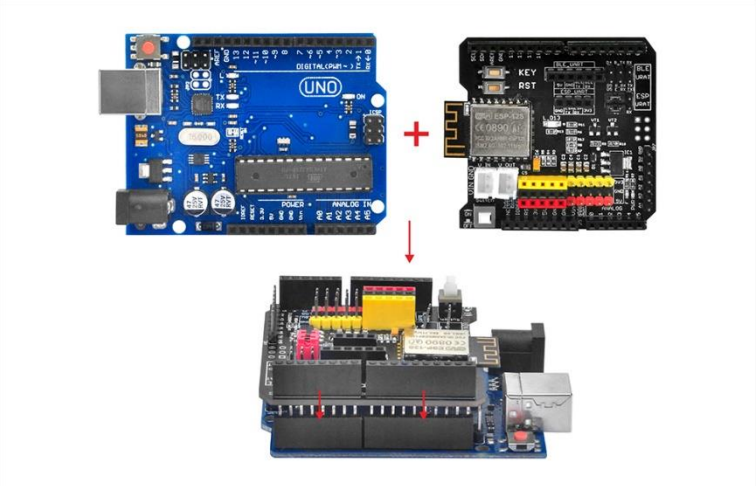
In previous lessons, we have showed how to use web browser to access Arduino Board through Internet. In these examples, we used a protocol called HTTP. Arduino works as a HTTP server (web server) and response to request from browser (client).
In this lesson, we will teach you to UDP protocol again. We will use a cell phone APP to control the rotation angle of a servo motor.

PARTS&DEVICES

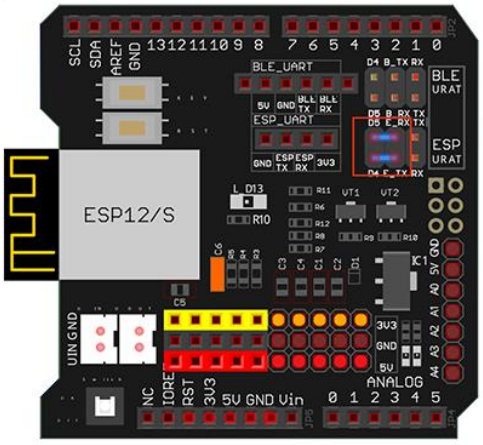
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Servo motor SG90 x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

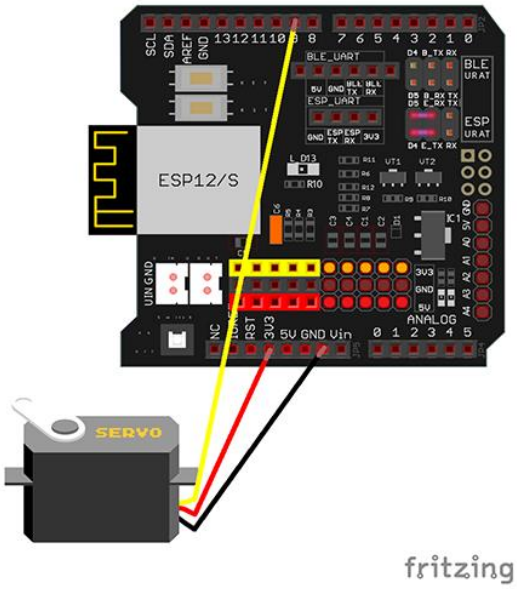


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect the servo motor SG90 with UNO as following diagram:



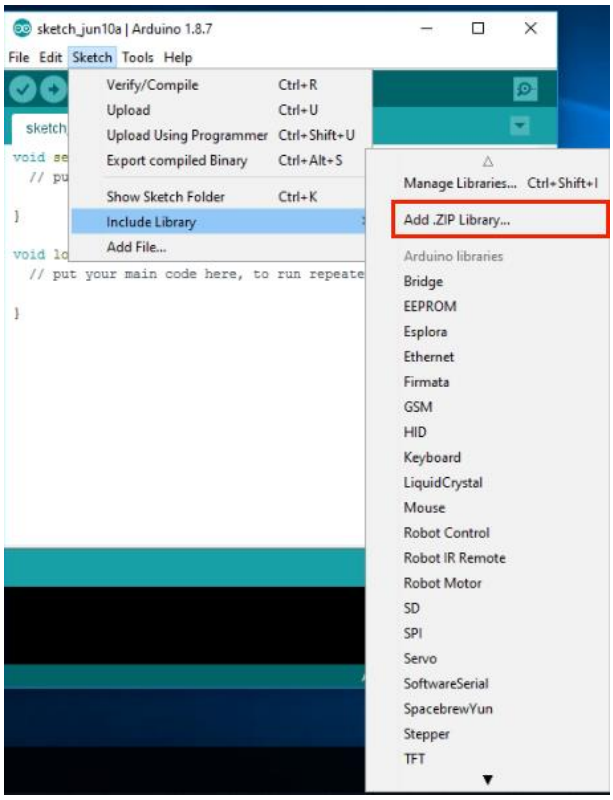
Arduino Wifi board	Servo Wire
GND	Brown
3.3V	Red
D9	Orange

HOW TO CODE

Step A）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.

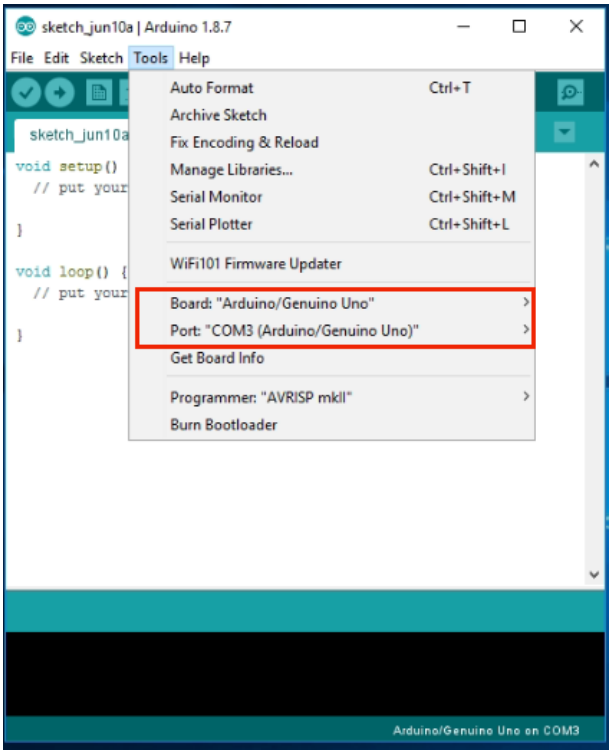
Step B) Install Servo library: (if you have installed Servo Library, please skit this step)
Download the library from: https://osoyoo.com/driver/Servo.zip
Then in your Arduino IDE ->Sketch->Include Library->Add .ZIP Library and select these two zip files you just downloaded, and upload it to Arduino.



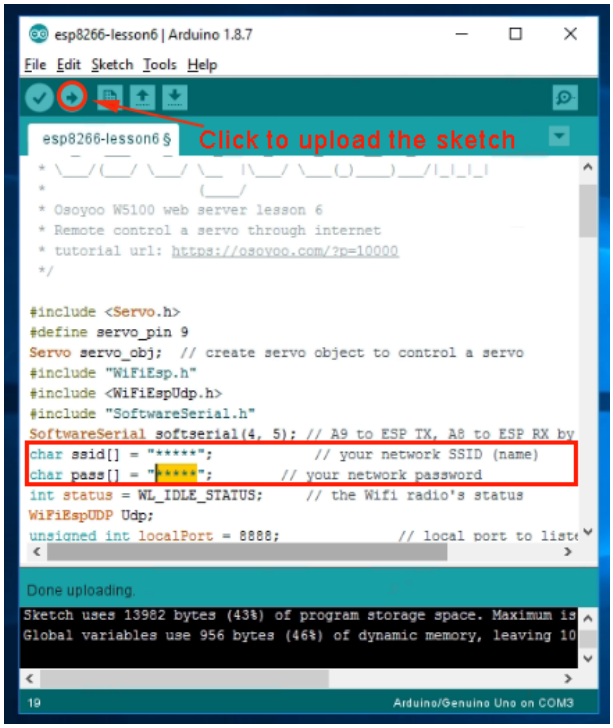
Step C) Connect the Arduino UNO board to computer via USB cable,
Step D) Open the Arduino IDE and choose corresponding board type and port type for you project.

- Board: Arduino/Genuino UNO

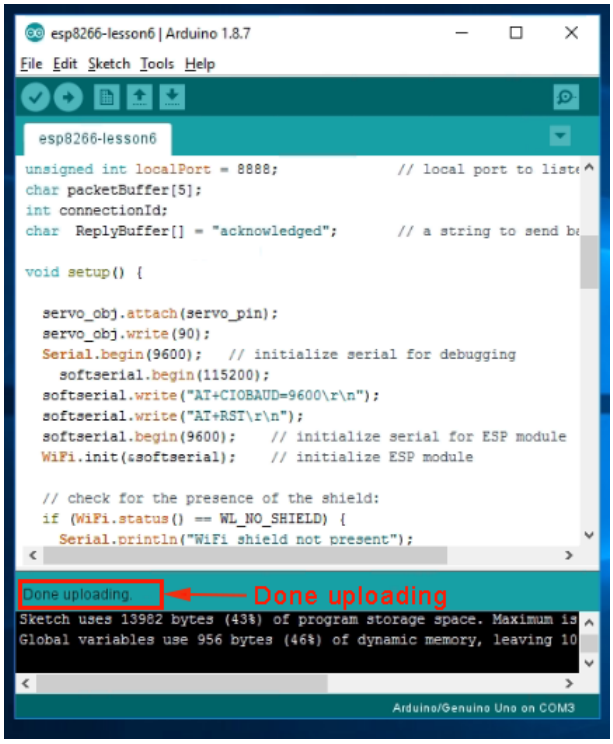
- Port: Choose your own Serial Port for your UNO board



Step E) Download sample code from
https://osoyoo.com/driver/wifi-iot/lesson6/esp8266-lesson6B.zip
Unzip the file and double click the esp8266-lesson6B.ino file, 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 cannot connect to Internet.

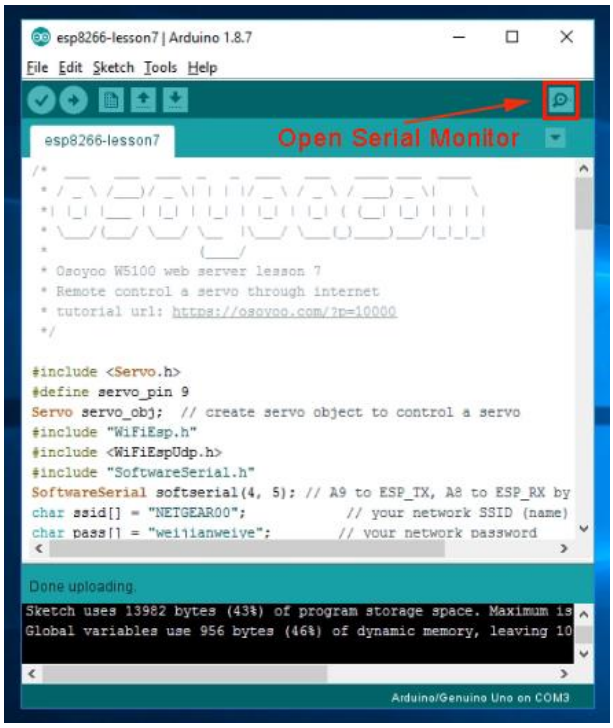


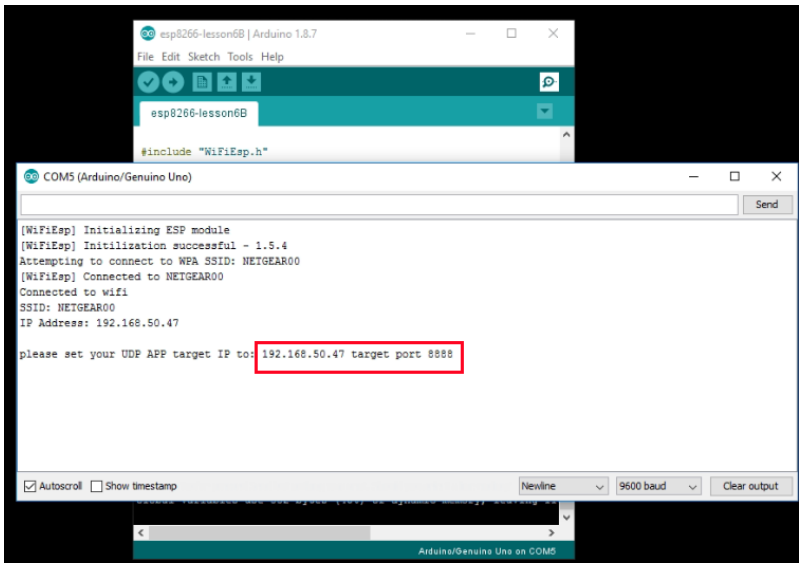
Step F) After change above lines, load the sketch into Arduino IDE



HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above result, you can see my Arduino IP address is ***192.168.50.47***, UDP port ***8888***, we will put this IP in Cell Phone APP Setting in next step.

Step G) Install UDP send Mobile APP, if you have already installed OSOYOO WiFi UDP Robot Car APP, please skip this step.

You can use any UDP send APP to run this lesson. In this lesson, we use **OSOYOO Wifi UDP Robot Car APP** to make test.

Now in APP UI screen,

Click ▲ button, servo will rotate about 5 degree counterclockwise (left side)

Click ▼ button, servo will rotate about 5 degree clockwise (right side)

Click **>** button, servo will rotate to right end (0 degree position)

Click **<** button, servo will rotate to left end (180 degree position)

Click **Square** button, servo will rotate to central position (90 degree position)

FAQ about the Wifi UDP APP and sketch Code:

Q 1) What happened when you press buttons in OSOYOO Wi-Fi UDP Robot Car APP ?

A: When you press a button of the APP, APP will send a single-letter message through UDP protocol to target device (in this example, our Arduino Wifi Shield)

Button	UDP message
F1	F
F2	G
F3	H
F4	I
F5	J
F6	K
▲	A
▼	B
>	R
<	L
square	E

Q2: How do Arduino react to App command?

A: Our sample code (esp8266-lesson6B.ino) line 75 to line 89 switch statement handle the remote UDP command:

```
switch (c)      //serial control instructions
{

  case 'A': angle=angle+5 ;break; //▲ button pressed, rotate 5 degree counterclockwise
  case 'B': angle=angle-5 ;break; //▼ button pressed, rotate 5 degree clockwise
  case 'L': angle=180 ;break; //< button pressed, rotate to 180 degree position case 'R': angle=0 ;break; //> button pressed, rotate to 0 degree position
  case 'E': angle=90 ;break; //SQUARE button pressed, rotate to 90 degree position

  default:break;
}
```

```
    if (angle<0) angle=0; if (angle>180) angle=180;
      servo_obj.write(angle);
}
```

You can see the comments in above code and understand the control logic.

Lesson 7: Smart Home Water Leak Alert

OBJECTIVE

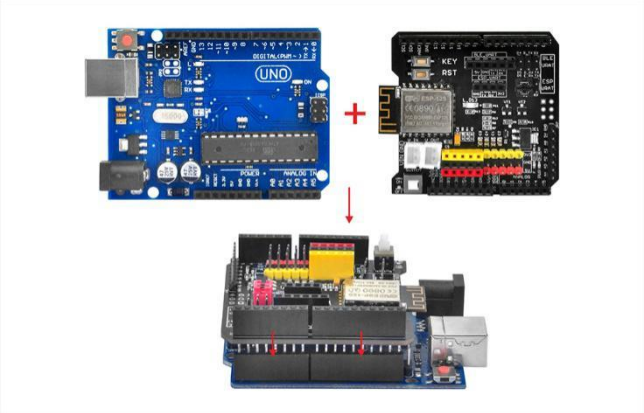
Water level data detection is very commonly used in agriculture and manufacturing industry. In this lesson, we'll learn how to read the water sensor to web browser.

PARTS&DEVICES

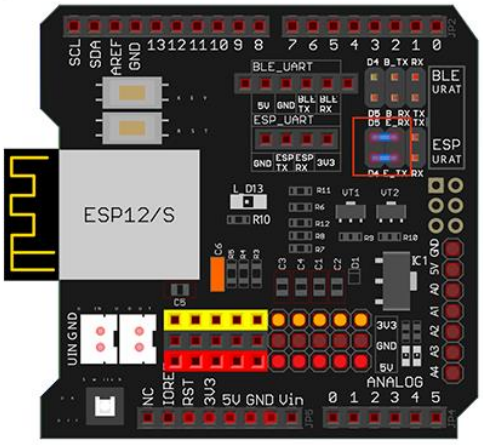
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Water detector sensor x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

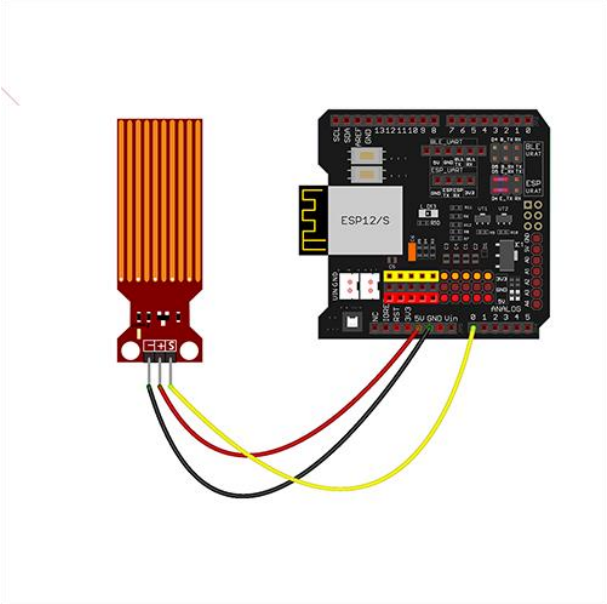


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect the water sensor module with UNO as following diagram.



UNO Board	Water sensor
A0	S
GND	–
5V	+

HOW TO CODE

Software Installation:

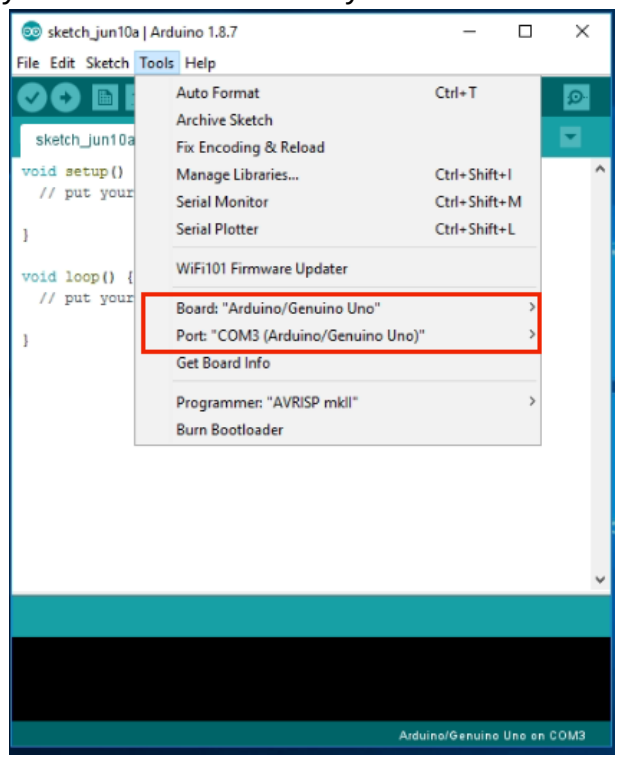
Step A）Install latest Arduino IDE (If you have Arduino IDE version after

1.1.16, please skip this step).Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software

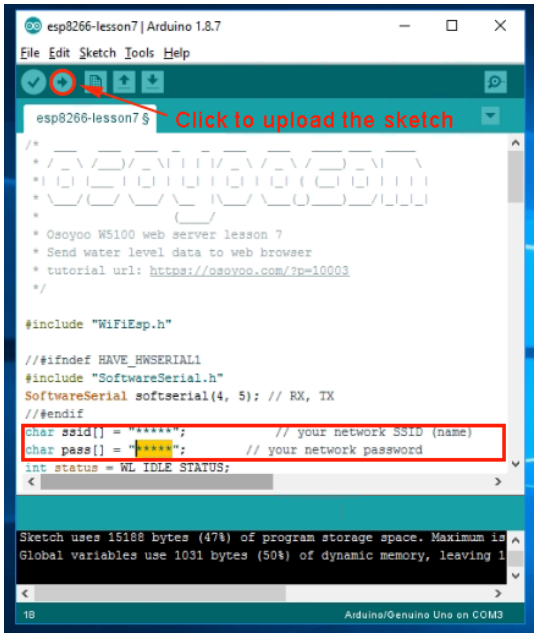
.

Step B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

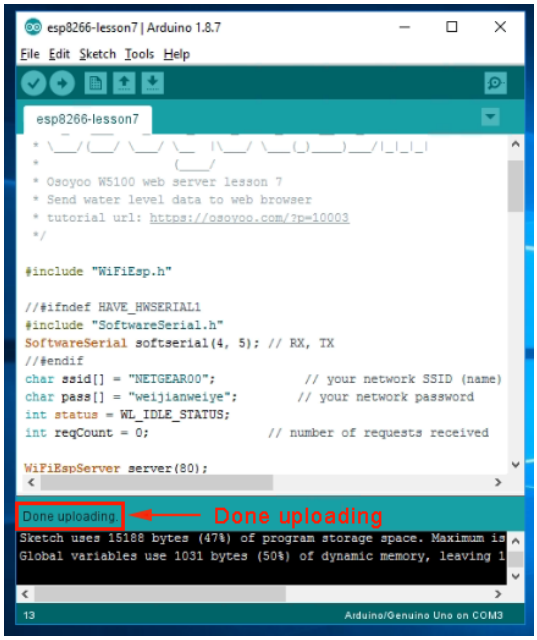
- Board: Arduino/Genuino UNO
- Port: Choose your own Serial Port for your UNO board



Step D) Download the sketch file from:
https://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson7/esp8266-lesson7.zip
Unzip the file and double click the esp8266-lesson7new.ino file, 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 cannot connect to Internet.

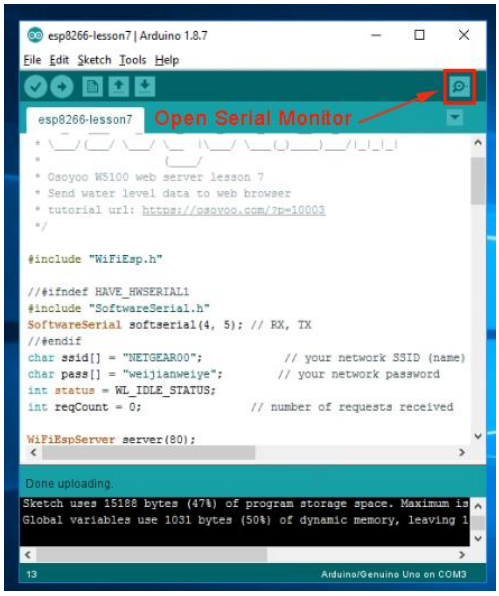


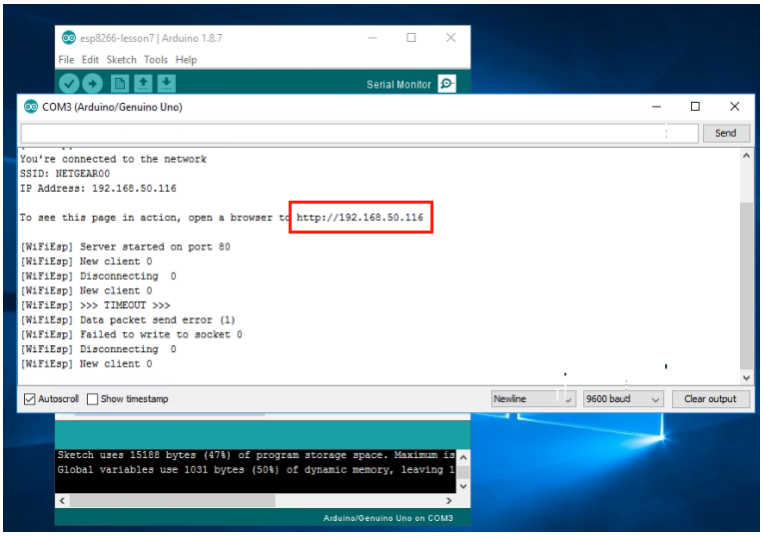
Step E) After change above lines, load the sketch into Arduino IDE.



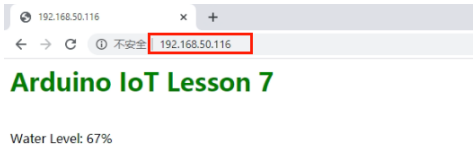
HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.116 is the IP address of my Arduino.
Now use another computer or your cell phone's browser to visit url: http://192.168.50.116
Your browser will show following result:



Lesson 8: Gas Detection

OBJECTIVE

Smoke Detectors are very useful in detecting smoke or fire in buildings, and so are the important safety parameters. It sensible to flammable gas: Alcohol, and Methane etc. The voltage that the sensor outputs change according to the smoke/gas level that exists in the atmosphere. The sensor outputs a voltage that is proportional to the concentration of smoke/gas. In other words, the relationship between voltage and gas concentration is as following:

- **The greater** the gas concentration, **the greater** the output voltage
- **The lower** the gas concentration, **the lower** the output voltage

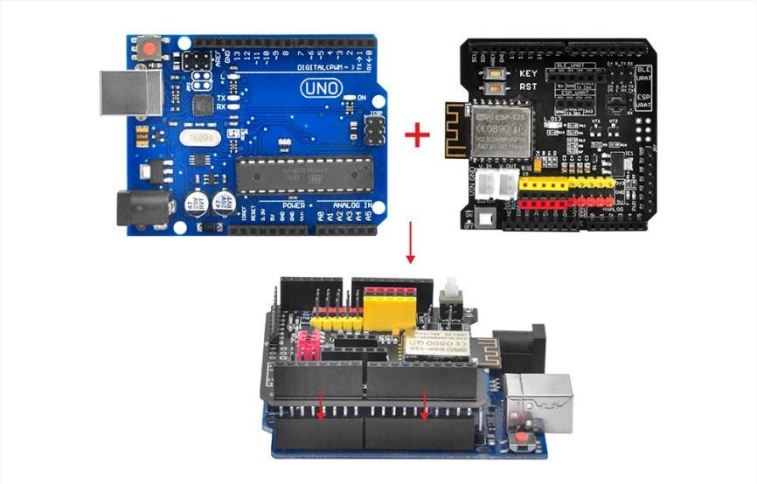
In this DIY Lesson, we'll learn how to monitor the smoke detector from remote browser

PARTS&DEVICES

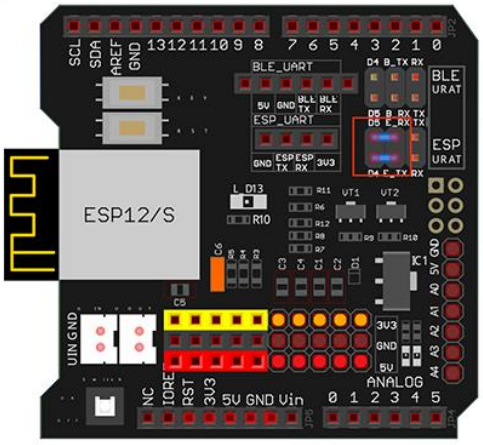
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Gas sensor module x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

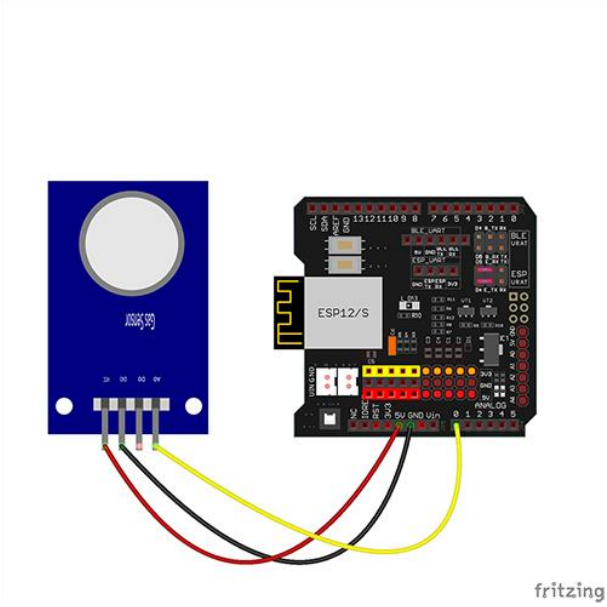


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect the Gas detector sensor with UNO as following diagram:



UNO Board	Gas detector sensor
A0	AO
GND	GND
5V	VCC

HOW TO CODE

Software Installation:

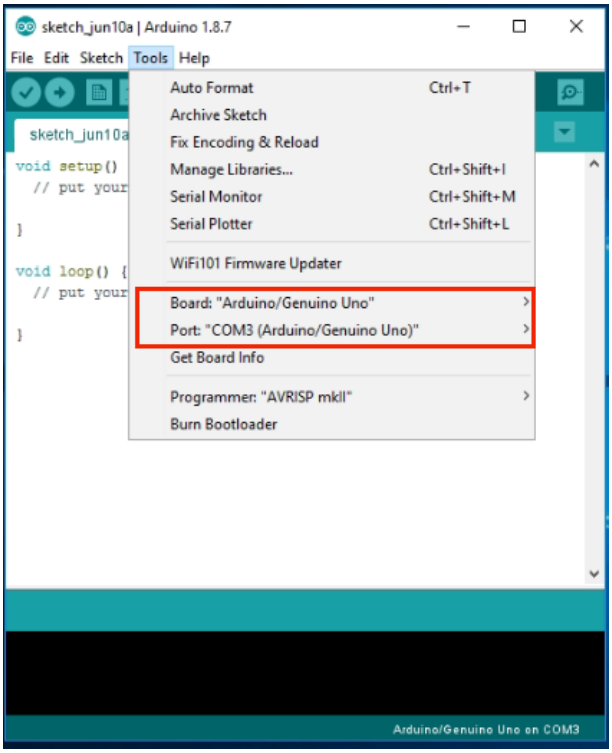
Step A）Install latest Arduino IDE (If you have Arduino IDE version after

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 B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

Board: Arduino/Genuino UNO"

Port: Choose your own Serial Port for your UNO board



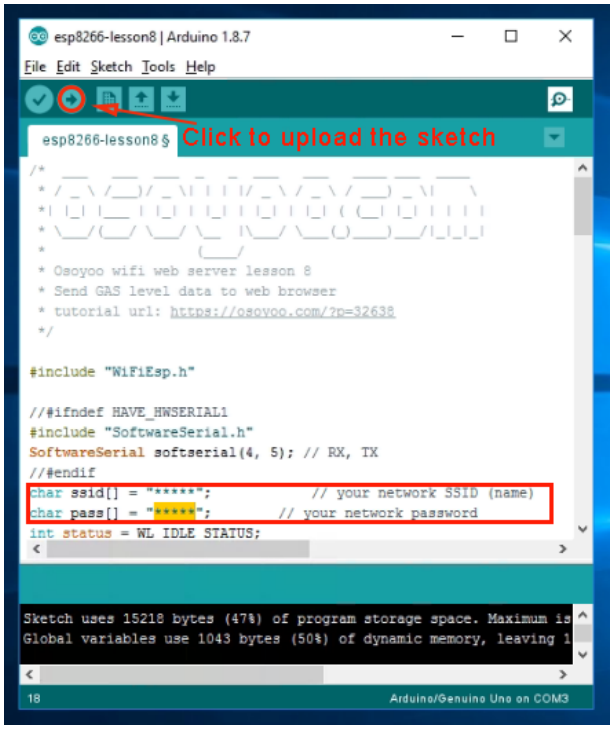
Step D) Download the sketch file from https://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson8/esp8266-lesson8.zip

Unzip the file and double click the esp8266-lesson8.ino file, find following lines:

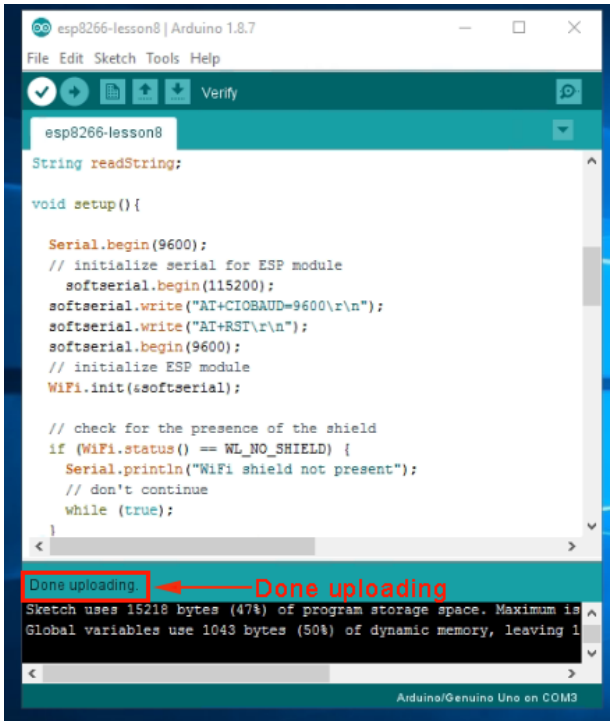
*char ssid[] = "******"; // your network SSID (name)*

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

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

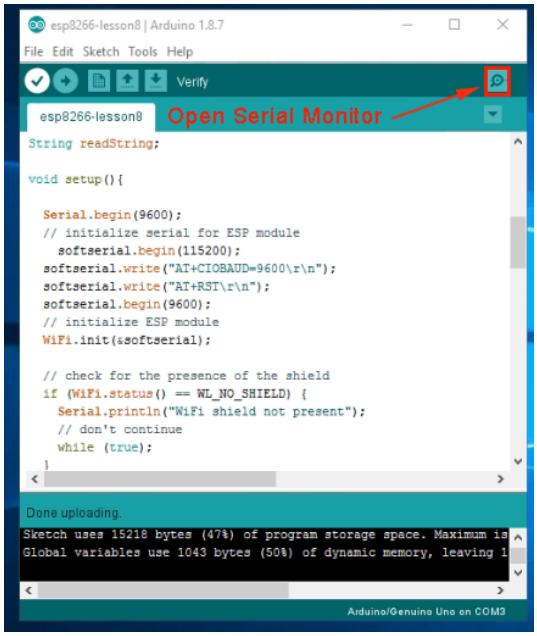


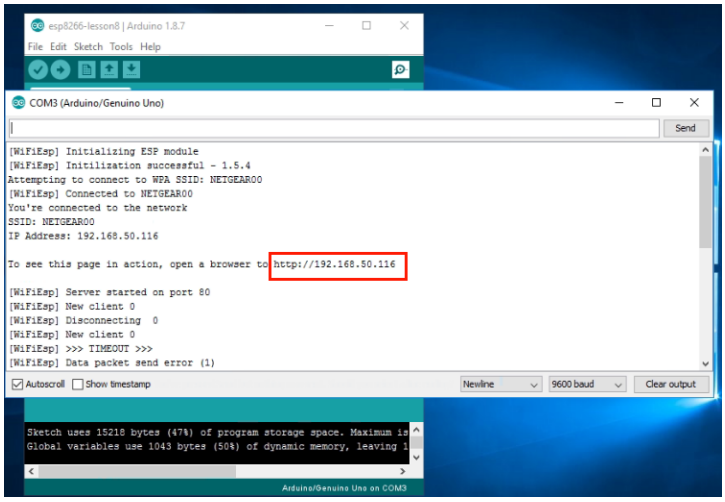
Step E) After change above lines, load the sketch into Arduino IDE.



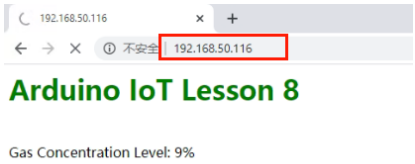
HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.116 is the IP address of my Arduino.
Now use another computer or your cell phone's browser to visit url:
http://192.168.50.116
Your browser will show following result:



Lesson 9: Home Security

OBJECTIVE

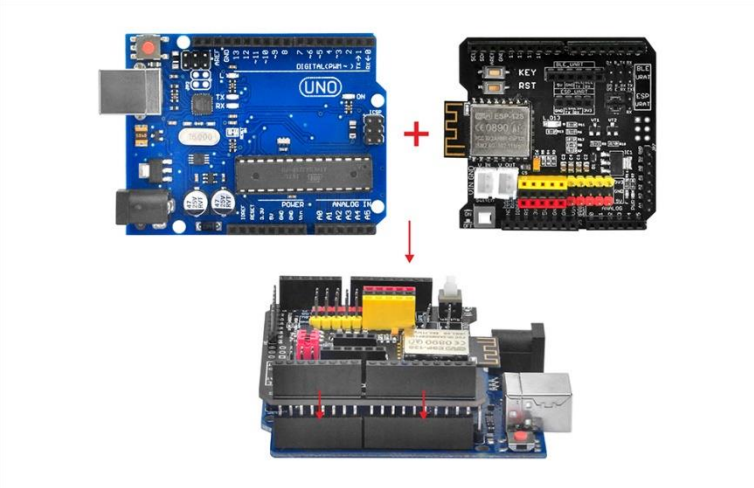
In this lesson, we'll learn how to use HC-SR04 Ultrasonic sensor to measure distances and send data to remote browser.

PARTS&DEVICES

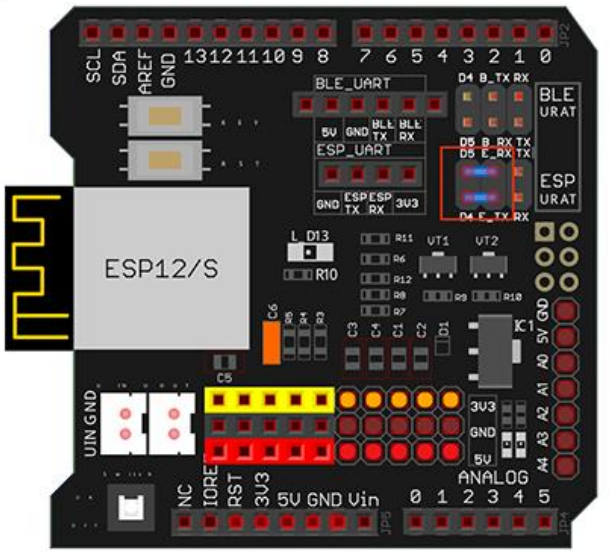
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
HC-SR04 Ultrasonic sensor module x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

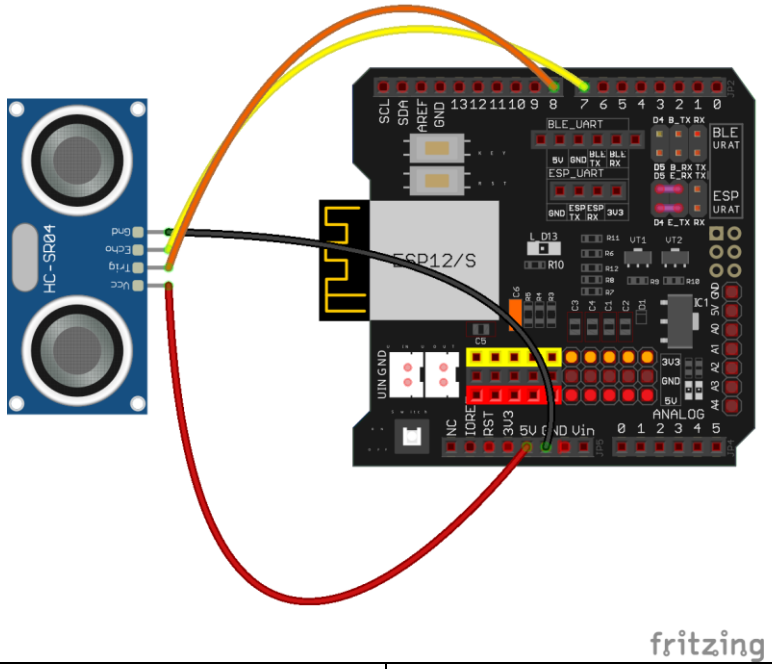


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect the HC-SR04 with UNO as following diagram:



UNO Board	HC-SR04
5v	VCC
GND	GND
D8	Trig
D7	Echo

HOW TO CODE

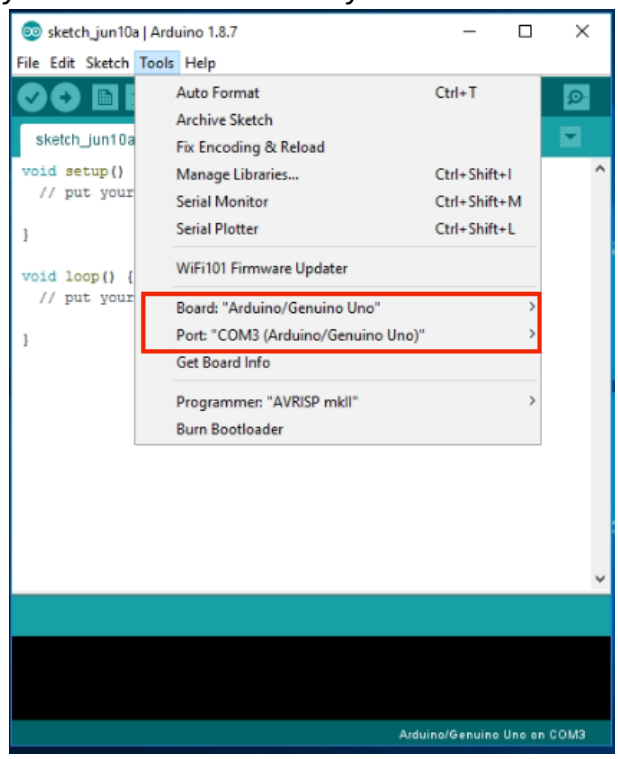
Software Installation

Step A）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 B) Connect the Arduino UNO board to computer via USB cable,

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

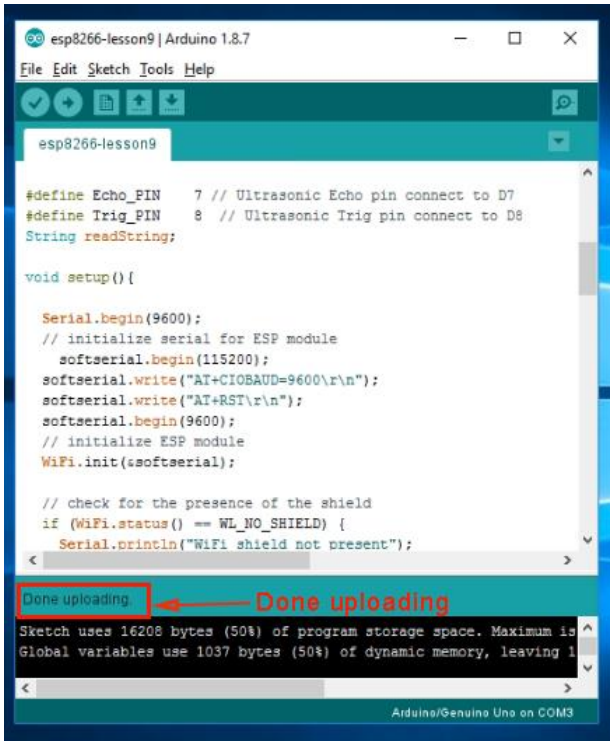
- Board: Arduino/Genuino UNO”
- Port: Choose your own Serial Port for your UNO board



Step D) Download the sketch file fromhttps://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson9/esp8266-lesson9.zip

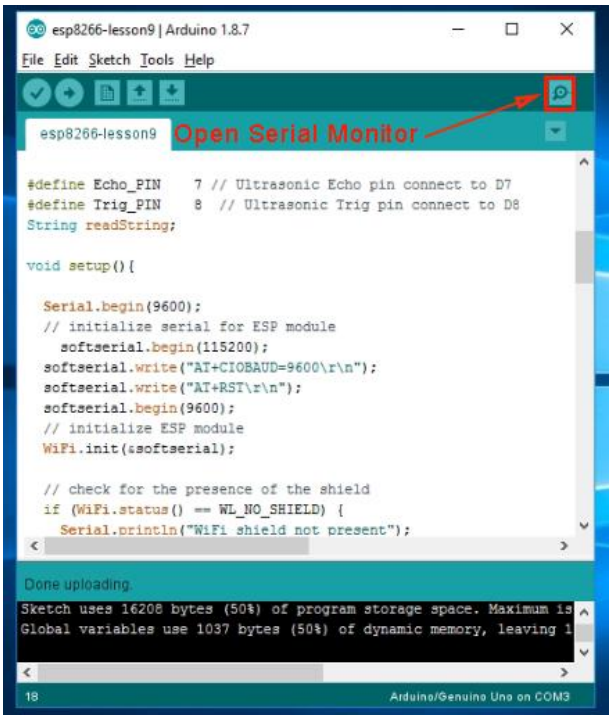
Unzip the file and double click the esp8266-lesson9.ino file, load the sketch into Arduino IDE, find following lines:
*char ssid[] = "******"; // your network SSID (name)*
*char pass[] = "******"; // your network password*
Please replace the ****** with your correct wifi SSID and password, otherwise your project cannot connect to Internet.

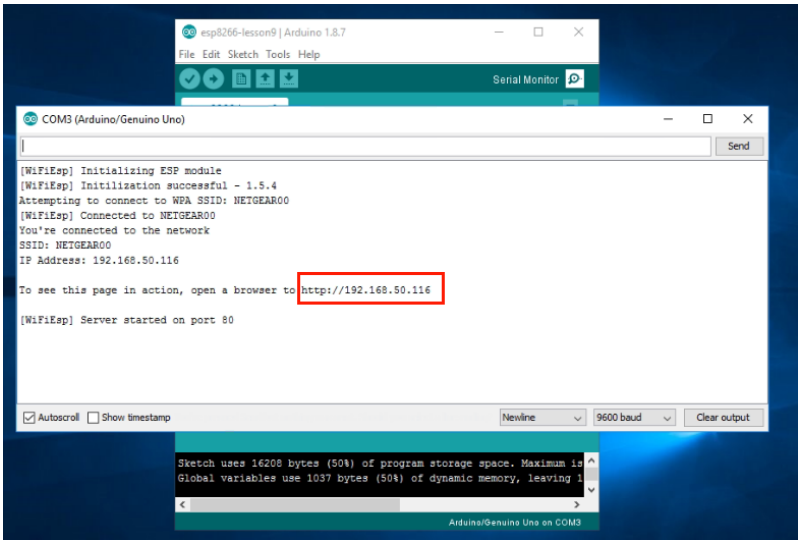
Step E) After change above lines, load the sketch into Arduino IDE.



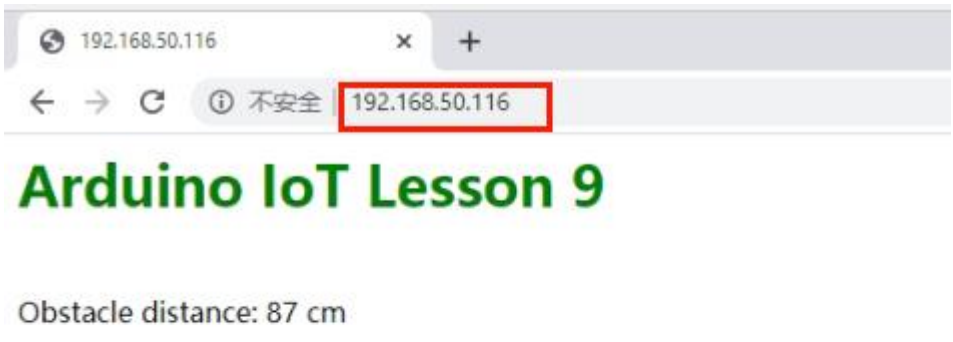
HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.116 is the IP address of my Arduino.
Now put an obstacle in front of the sensor and use another computer or your cell phone's browser to visit url: http://192.168.50.116 Your browser will show following result which tells you the distance between sensor and obstacle:


192.168.50.116
不安全
192.168.50.116
Arduino IoT Lesson 9
Obstacle distance: 87 cm

Lesson 10: Sound Monitor IoT project

OBJECTIVE

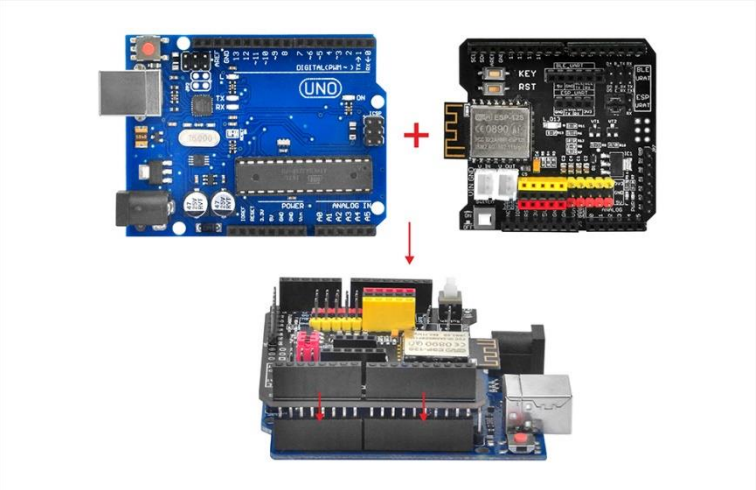
In the lesson, we'll show how to use sound Sensor detect the sound intensity of the environment and use browser to monitor the data. This sound sensor is used to detect whether there's sound surround or not, please don't use the module to collect sound signal. The sound sensor module has a built-in capacitive electric microphone which is highly sensitive to sound. Sound waves cause the thin film of the electric to vibrate and then the capacitance changes, thus producing the corresponding changed voltage, so it can detect the sound intensity in ambient environment. You can adjust the sensitivity with by adjusting the Potentiometer.

PARTS&DEVICES

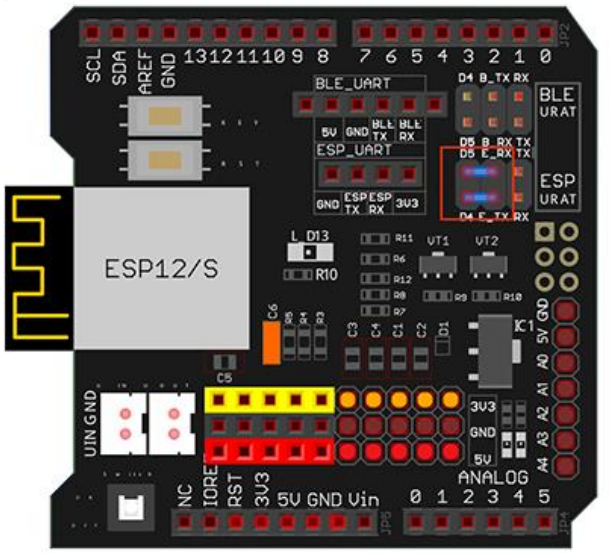
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Sound detector sensor module x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

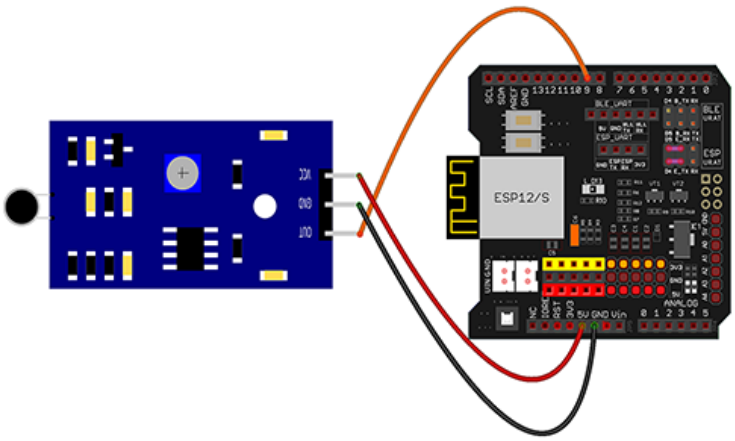


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect sound sensor with UNO as followed diagram:



UNO Board	Sound sensor
D9	OUT
GND	GND
5V	VCC

HOW TO CODE

Software Installation

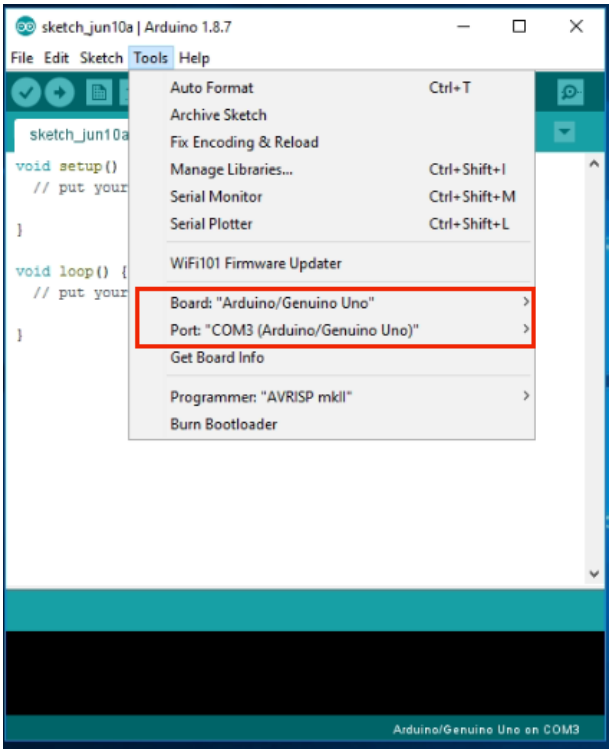
Step A）Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step).Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software.

Step B) Connect the Arduino UNO board to computer via USB cable,

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

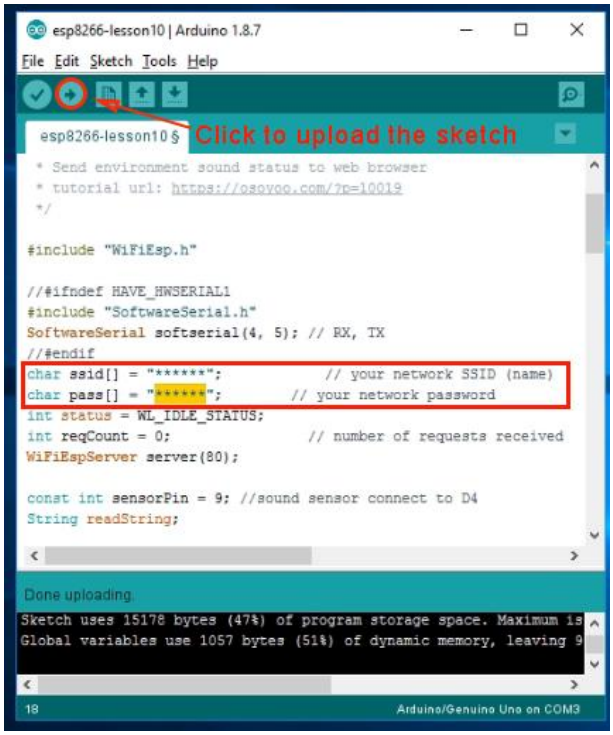
Board: Arduino/Genuino UNO"

Port: Choose your own Serial Port for your UNO board

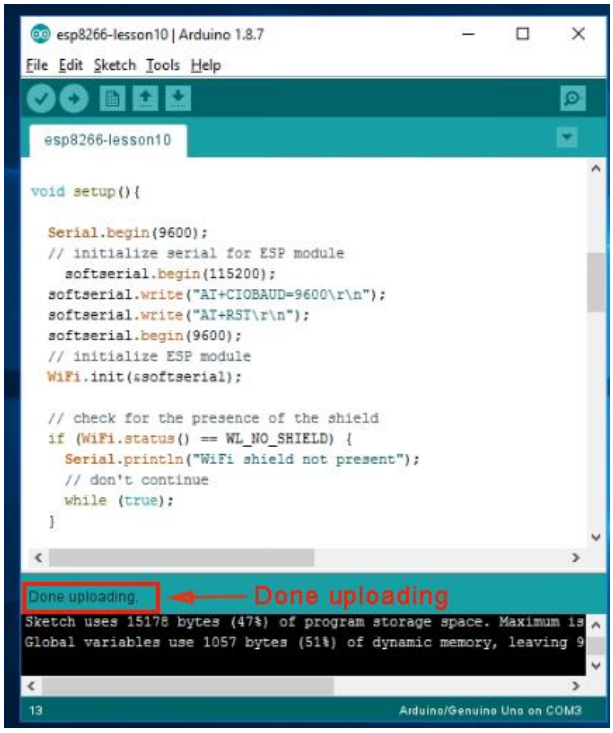


Step D) Download the sketch file from https://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson10/esp8266-lesson10.zip

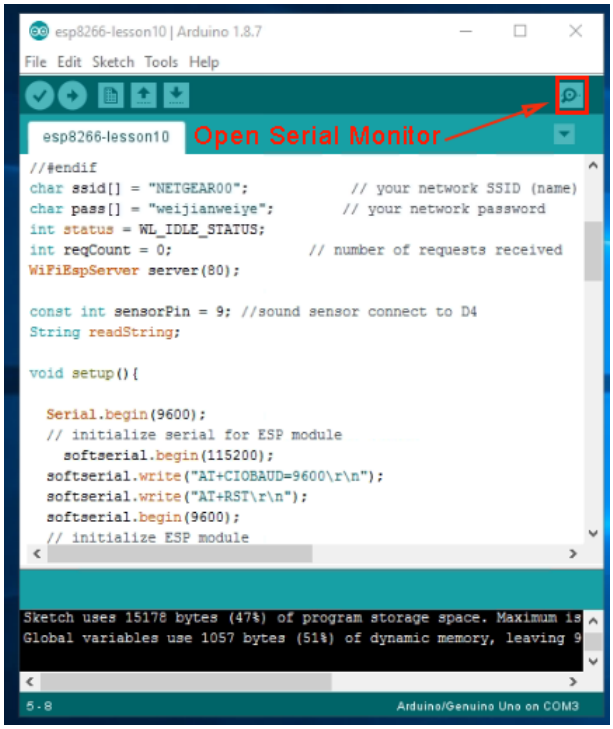
Unzip the file and double click the esp8266-lesson10.ino file, load the sketch into Arduino IDE, find following lines:
*char ssid[] = "******"; // your network SSID (name)*
*char pass[] = "******"; // your network password*
Please replace the ****** with your correct wifi SSID and password, otherwise your project cannot connect to Internet.

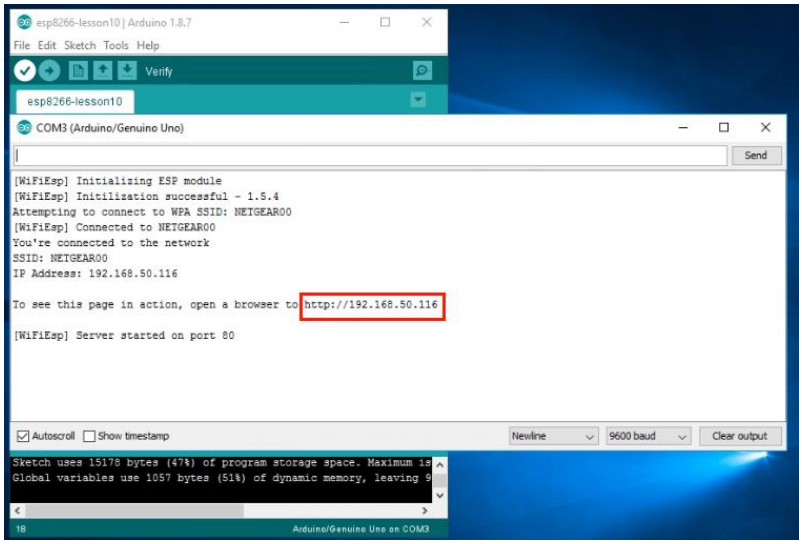


Step E) After change above lines, load the sketch into Arduino IDE.



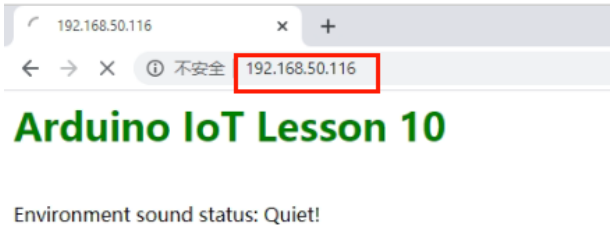
Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





In above example, 192.168.50.116 is the IP address of my Arduino. Now use another computer or your cell phone's browser to visit url: http://192.168.50.116

Your browser will show following result:



Above result shows no sound detected by sensor. If there is some sound signal, then result will show as:
Environment sound status: Noisy!

Lesson 11: Channel Relay

OBJECTIVE

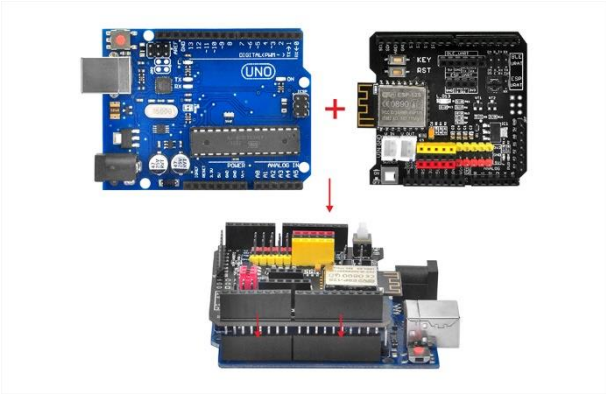
In this lesson, we'll learn how use Cell Phone APP to control a relay switch to turn on/off an LED.
Relay is switch which is turn on/off a high voltage circuit with low voltage signal. We often use relay to control 110V or 220 V devices in home and office.

PARTS&DEVICES

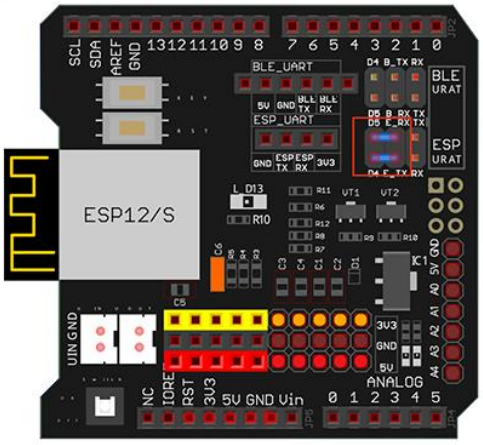
Arduino UNO board x 1
OSOYOO ESP8266 Wifi Shield x 1
Relay module x 1
LED x 1
1K resistor x 1
Breadboard x 1
USB cable x 1
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

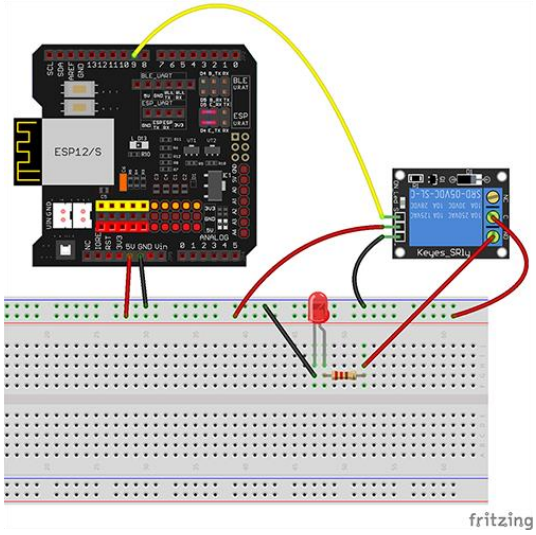


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



E_TX Default jumper connect D4
E_RX Default jumper connect D5

Connect Relay module with UNO as followed diagram:



UNO Board	Relay
D9	S
GND	GND
5V	VCC

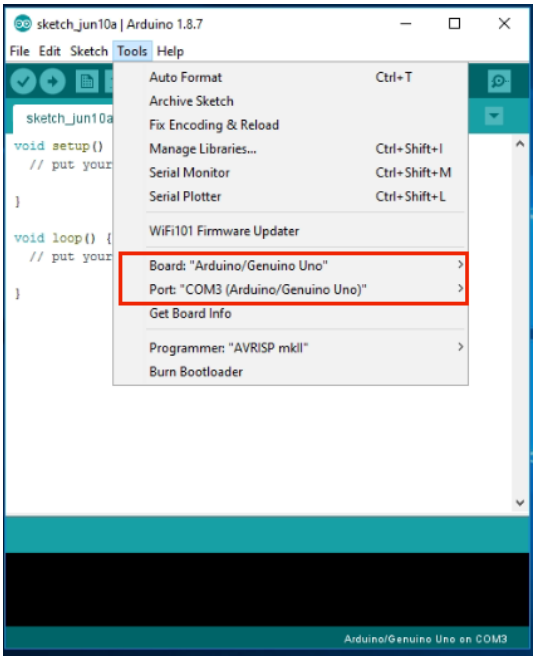
HOW TO CODE

Software Installation

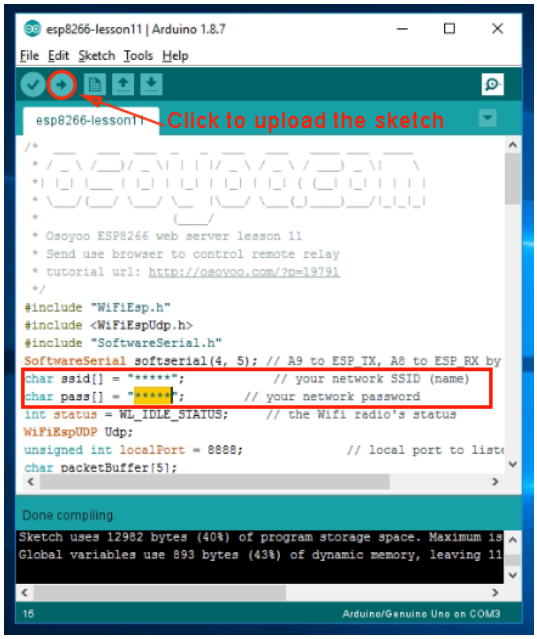
Step A) Install latest Arduino IDE (If you have Arduino IDE version after 1.1.16, please skip this step). Download Arduino IDE from https://www.arduino.cc/en/Main/Software?setlang=en, then install the software.

Step B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

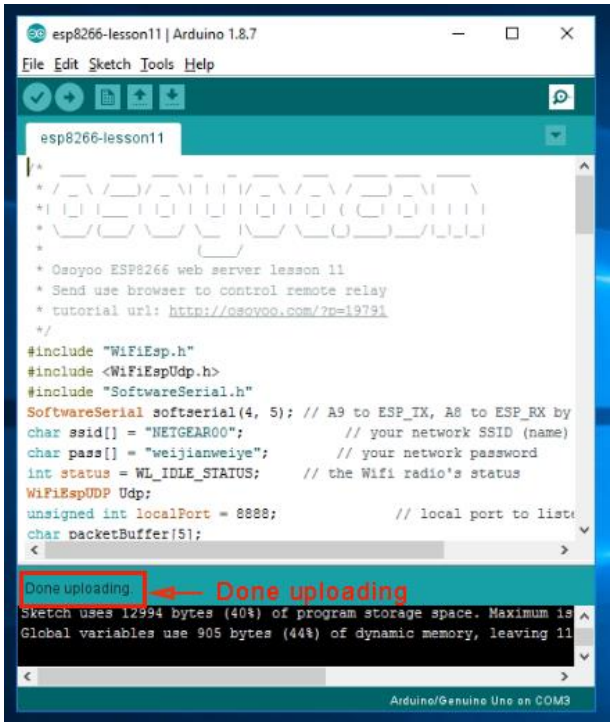
- Board: Arduino/Genuino UNO
- Port: Choose your own Serial Port for your UNO board



Step D) Download the sketch file from: https://osoyoo.com/driver/wifi-iot/lesson11/esp8266-lesson11B.zip
Unzip the file and double click the esp8266-lesson11B.ino file, load the sketch into Arduino IDE, 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 cannot connect to Internet.

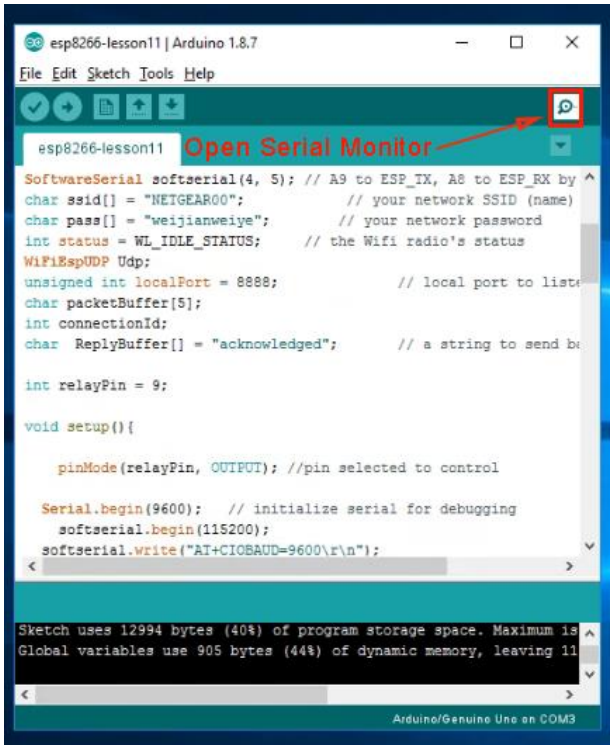


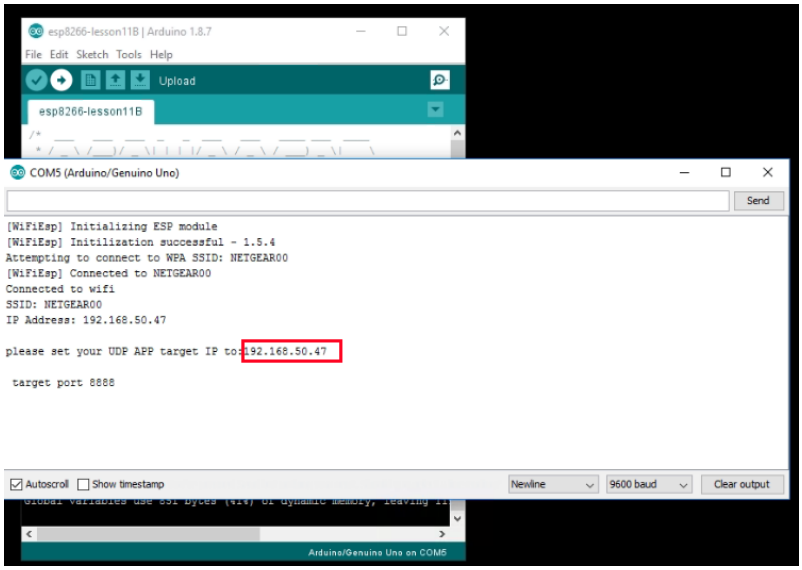
Step E) After change above lines, load the sketch into Arduino IDE.



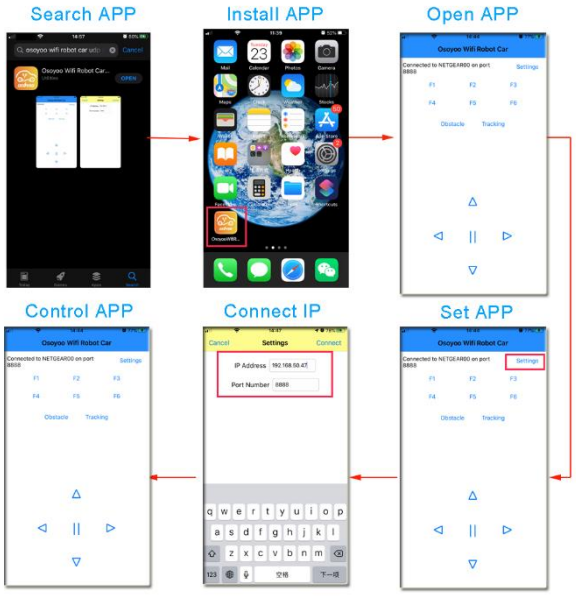
HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





Please set your UDP APP target IP to: 192.168.50.47 target port 8888
In above example, 192.168.50.47 is the IP address of my Arduino and 8888 is the UDP port number which will be set into our cell phone APP in next step.
Step G) Install UDP send Mobile APP, If you have already installed OSOYOO Wi-Fi UDP Robot Car APP, please skip this step.
You can use any UDP send APP to run this lesson. In this lesson, we use OSOYOO Wifi UDP Robot Car APP to make test.
In Google Play or Apple Store, please search key words "**OSOYOO Wifi UDP Robot Car**", you will find an orange icon APP as following:



Notes: When the phone is operating the APP，Please keep the phone on the same LAN with UNO board .

Now click Save and go back to your APP Home Screen:

Press F1, Your Relay will open and LED will on. Press F2, Your relay and LED will turn off

Lesson 12: Arduino IOT Home Alarm system

OBJECTIVE

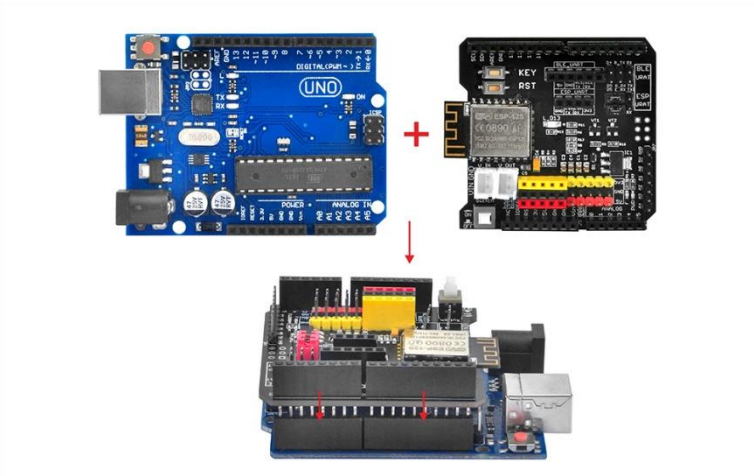
This lesson is our final project which is a little bit complicated and more exciting. In previous lesson, we only use browser or cell phone to make human-Arduino talk. In this lesson, we will one Arduino to talk with another Arduino through Internet UDP protocol. You need to buy two set of our Arduino IoT learning kits.
We will use first OSOYOO Uno board (call UNO A) to connect PIR motion sensor and another UNO board (UNO B) to connect buzzer. When an intruder is detected by PIR motion sensor in UNO A, an Alarm signal will be sent from UNO A to UNO B and make the buzzer beep.

PARTS&DEVICES

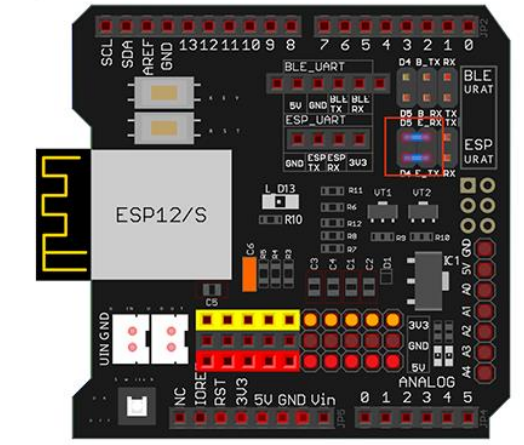
Arduino UNO board x 2
OSOYOO ESP8266 Wifi Shield x 2
HC-SR501 PIR motion sensor x 1
Buzzer sensor module x 1
USB cable x 2
Jumper wires several

HOW TO MAKE

First, please insert the ESP8266 wifi Shield into your UNO board,

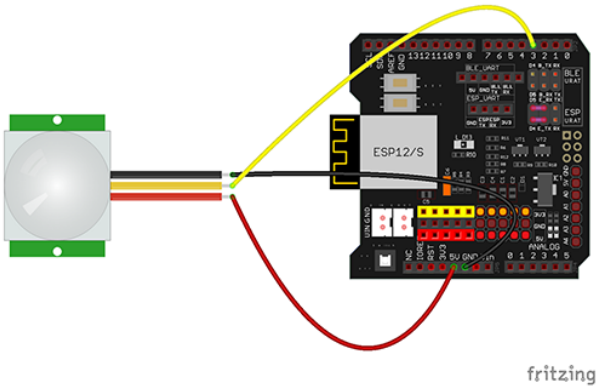


Make sure jumper cap connected E_TX to D4 and E_RX to D5.



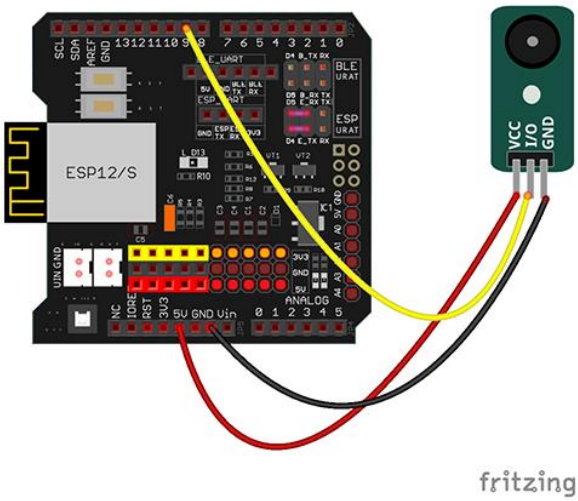
E_TX Default jumper connect D4
E_RX Default jumper connect D5

Hardware A) Arduino UNO Board+ESP8266 WIFI shield connects to PIR motion sensor
Motion Sensor Central OUT pin connect to D3 as per following graph:



UNO Board	PIR
D3	OUT
GND	GND
5V	VCC

Hardware B) Arduino UNO B+ESP8266 WIFI shield connects to buzzer
Buzzer I/O pin connect to D9 as per following picture:



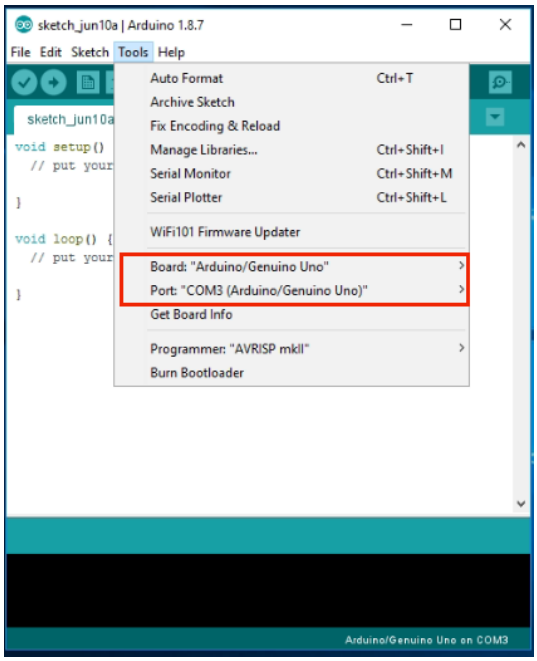
UNO Board	Buzzer
D9	I/O
GND	GND
5V	VCC

HOW TO CODE

Step A) 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 B) Connect the Arduino UNO board to computer via USB cable,
Step C) Open the Arduino IDE and choose corresponding board type and port type for you project.

- Board: Arduino/Genuino UNO
- Port: Choose your own Serial Port for your UNO board

- 

Step D) Download the sketch file from:https://osoyoo.com/driver/Esp8266_Arduino_IOT/lesson12/esp8266-lesson12.zip

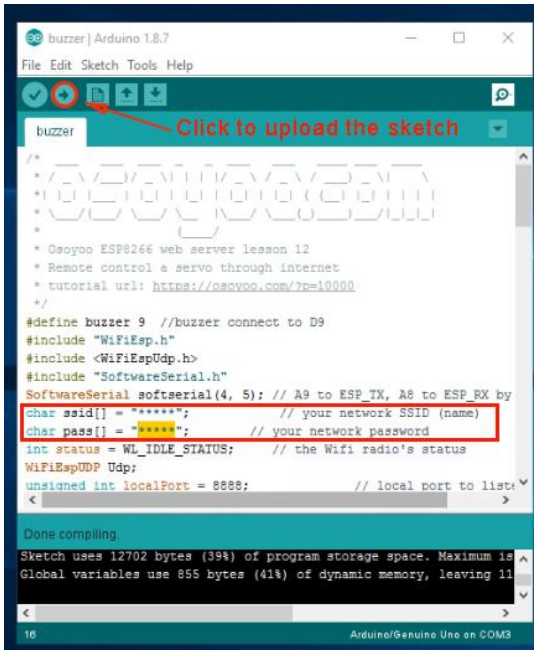
After unzip above file, you will see a folder "**esp8266-lesson12**" , enter this folder, you will see two sub-folders(buzzer and motionsensor).

Enter buzzer folder and double click the **buzzer.ino** file, find following lines:

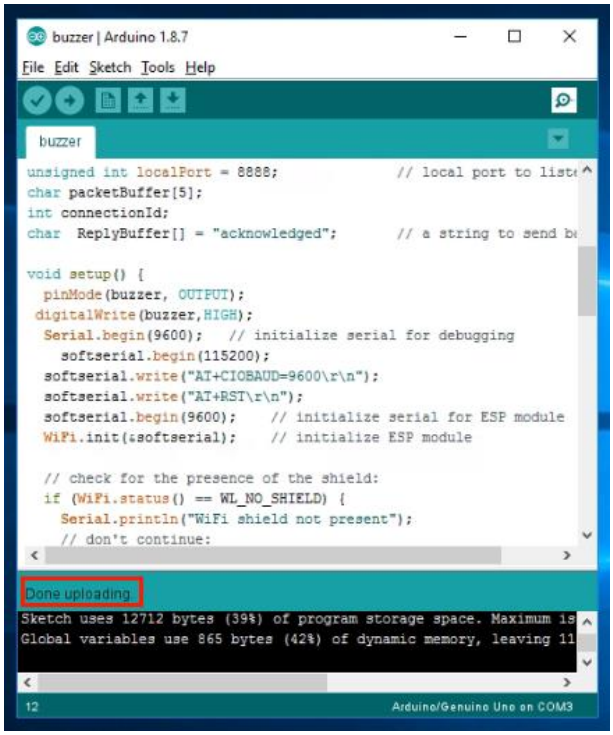
*char ssid[] = "******"; // your network SSID (name)*

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

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

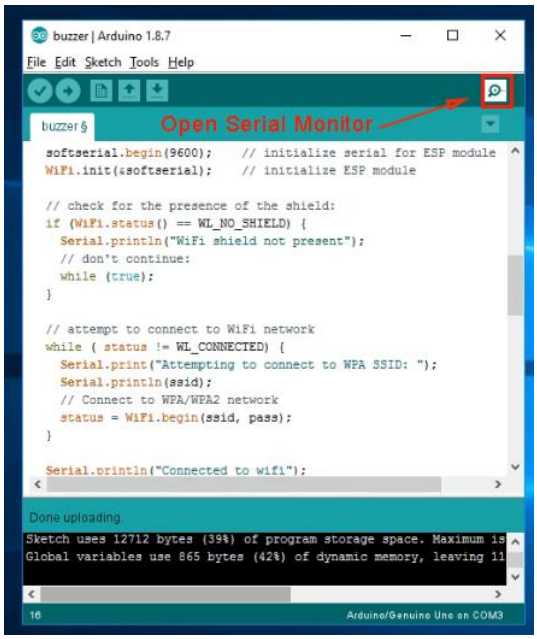


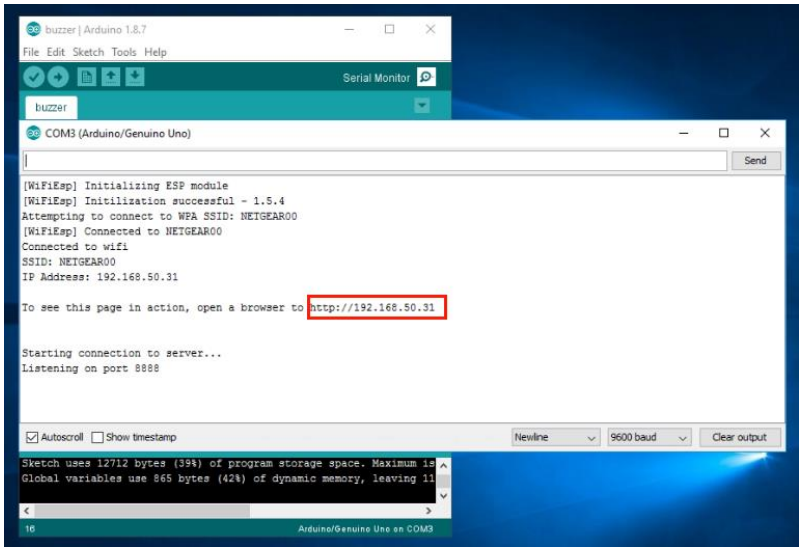
Step E) After change above lines, load the sketch into Arduino IDE.



HOW TO PLAY

Open your Serial Monitor, you can see your router will assign an IP address to your Arduino as following:





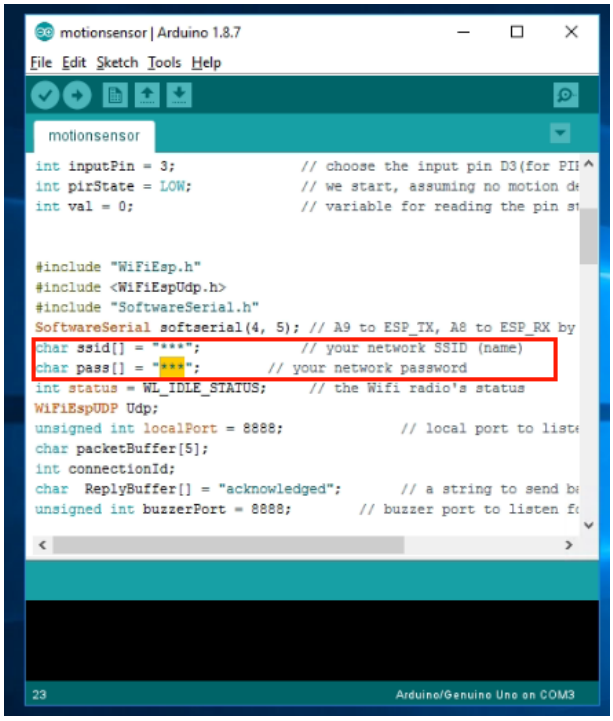
In above example, **192.168.50.31** is the IP address assigned by router to your buzzer Arduino. You have to write down this IP address in a paper. We need to use this IP address to change the sketch code in **motionsensor.ino** file. You can unplug this Arduino from PC and use some other USB adapter to power this buzzer Arduino.

Step F) Now connect your PIR motion sensor Arduino to your PC, open the folder **motionsensor** and open the **motionsensor.ino** file, find following links:

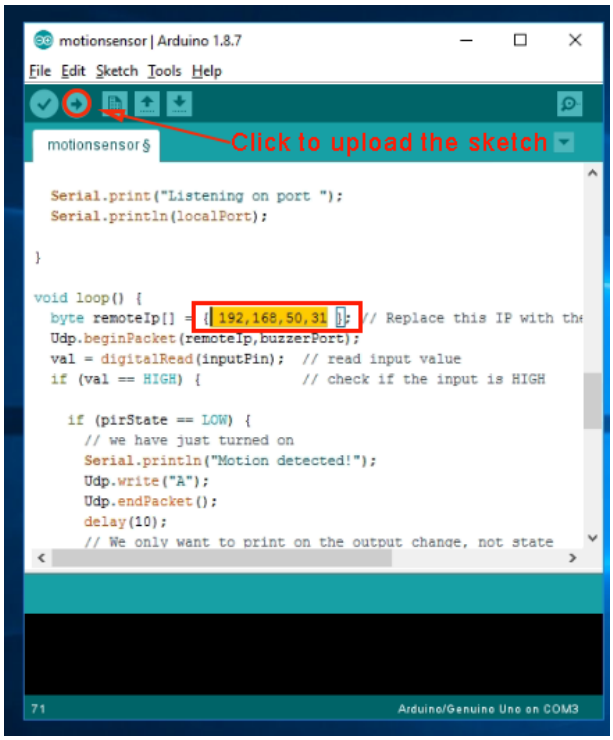
char ssid[] = "****"; // your network SSID (name)**

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

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



Step 5) Then search following line:
byte remoteIp[] = { 10,0,0,244 }; //...
You need to change the line remoteIp[] variable , replace the IP address 10.0.0.244 with the one your recorded from **Step A.** In our example, Step A shows buzzer arduino IP is 192.168.50.13, so we make the line to:
byte remoteIp[] = { 192,168,50,31 }; //…
Then you can compile and upload the **motionsensor.ino** file to Arduino.



Test result:
Turn on power of both ESP8266 shield and Arduino boards. When you move your hand in front of the motion sensor, the remote buzzer will beep.