AIR QUALITY MONITORING USING NODEMCU ESP8266 AND MQ135

DR.B.NAGAJAYANTHI

ASSOCIATE PROFESSOR

SENSE

- Air Quality Index (AQI) will be monitored on Thingspeak Server using ESP8266 & MQ135 Air Quality Sensor.
- The AQI is an index that indicates how clean or polluted the air is, and what associated health effects might be a concern

MQ135 Air Quality Sensor

- The **MQ-135** gas sensor senses the gases like **ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke**.
- The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sensing material.
- In the atmosphere, we can find polluting gases, but the conductivity of the gas sensor increases as the concentration of polluting gas increases.
- MQ-135 gas sensor can be implemented to detect the **smoke, benzene, steam and other harmful gases**.
- It has the potential to detect different harmful gases. It is with low cost and particularly suitable for Air quality monitoring application.

- The **MQ135 sensor** is a signal output indicator instruction. It has two outputs: analog output and TTL output.
- The **TTL output** is low signal light which can be accessed through the IO ports on the Microcontroller.
- The **analog output** is an concentration, i.e. increasing voltage is directly proportional to increasing concentration. This sensor has a long life and reliable stability as well.
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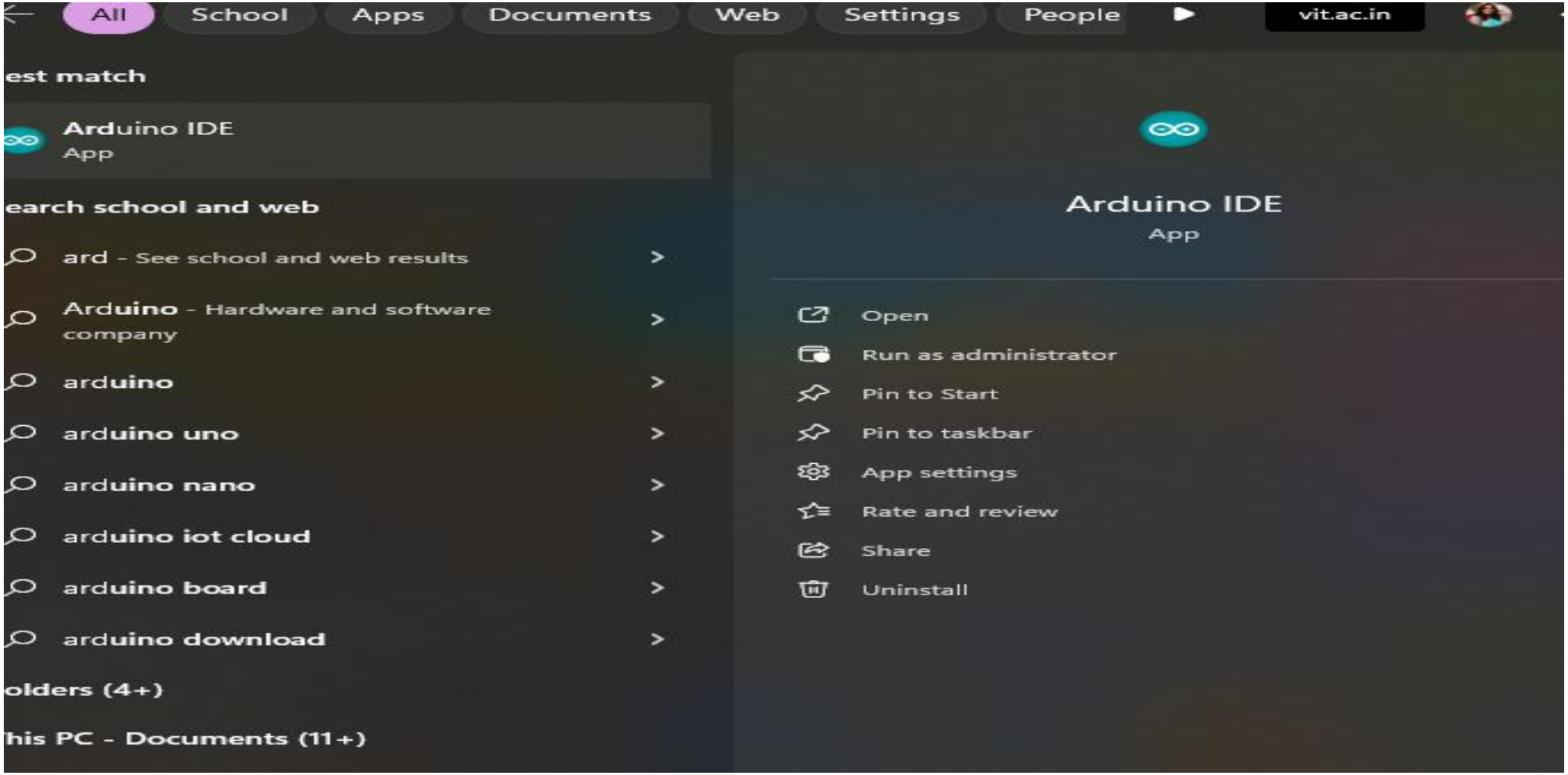
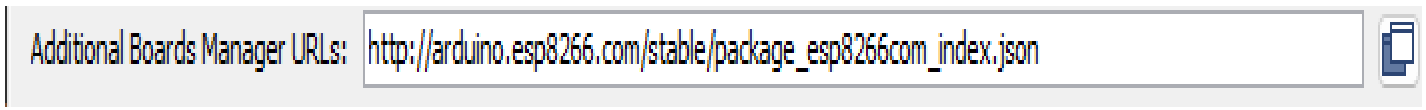
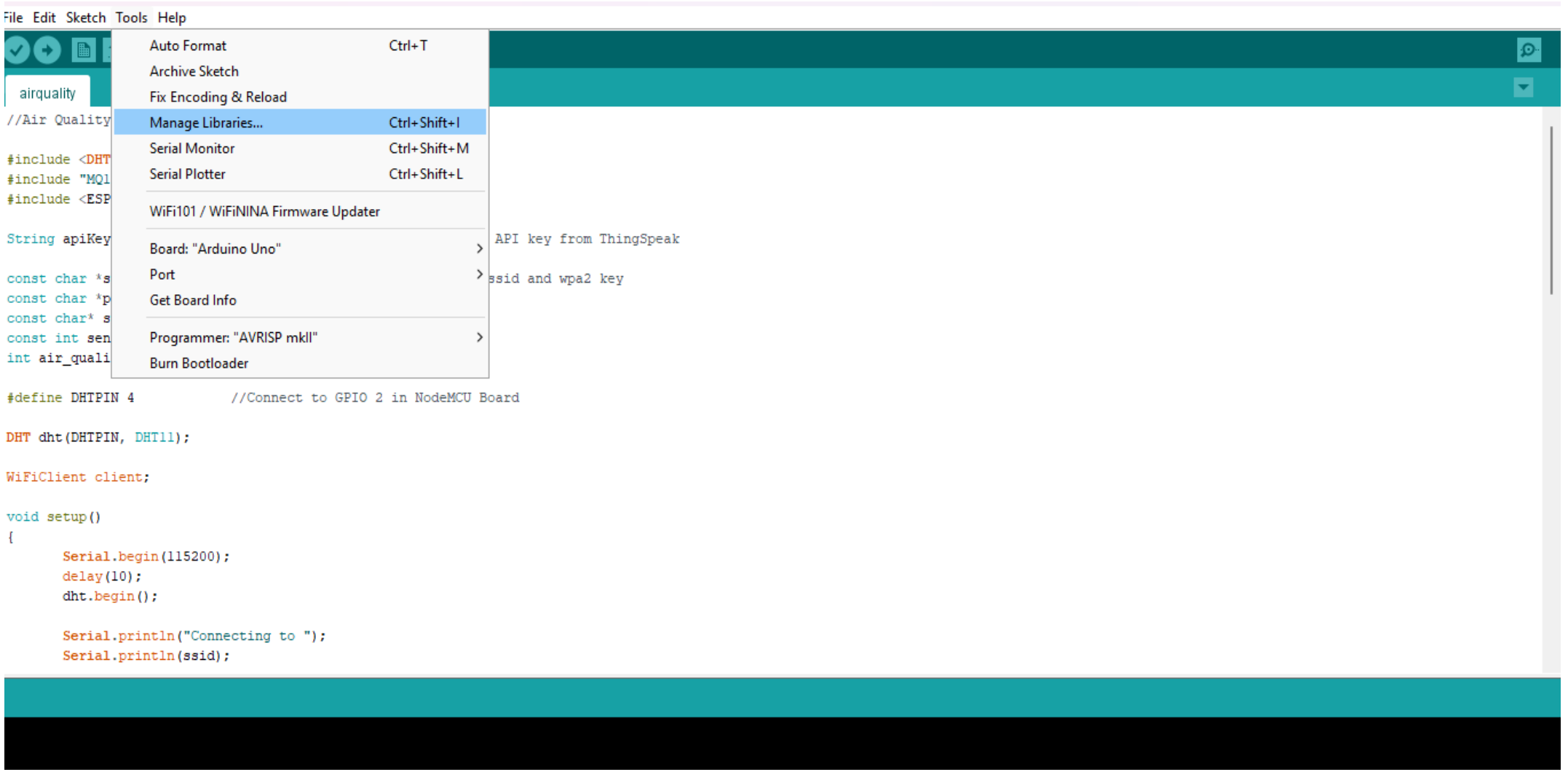
Open Arduino IDE in the System



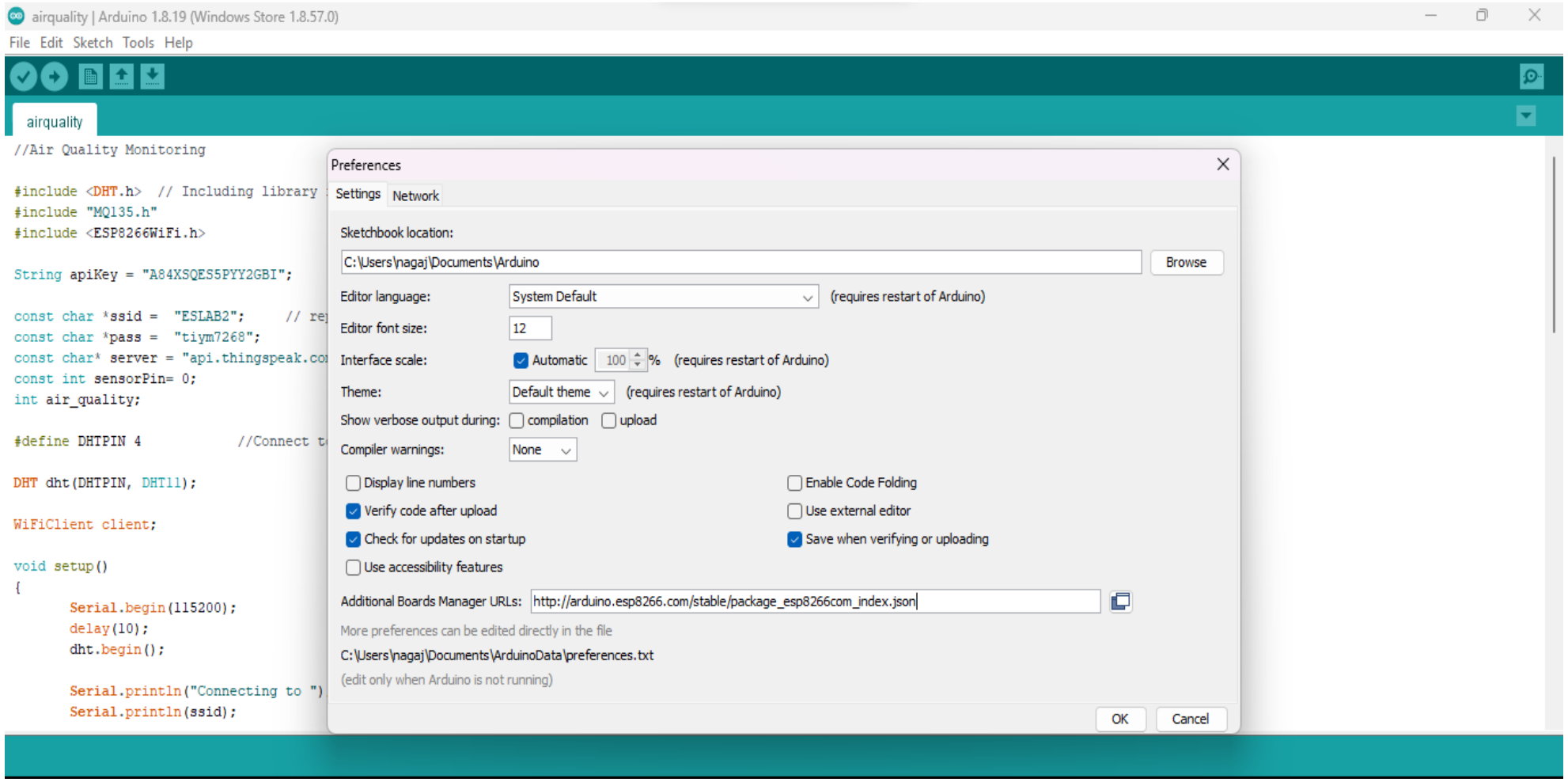
- Arduino -1.8.19
- File-New-Sketch-Code.
- Tools-Manage Libraries-Install MQ135, DHT and ESP8266
- For MQ135-Search –type MQ135-Version1.1.1-Install
- For DHT-DHT sensor library-Version 1.4.6-Install
- For ESP8266
- Preferences-



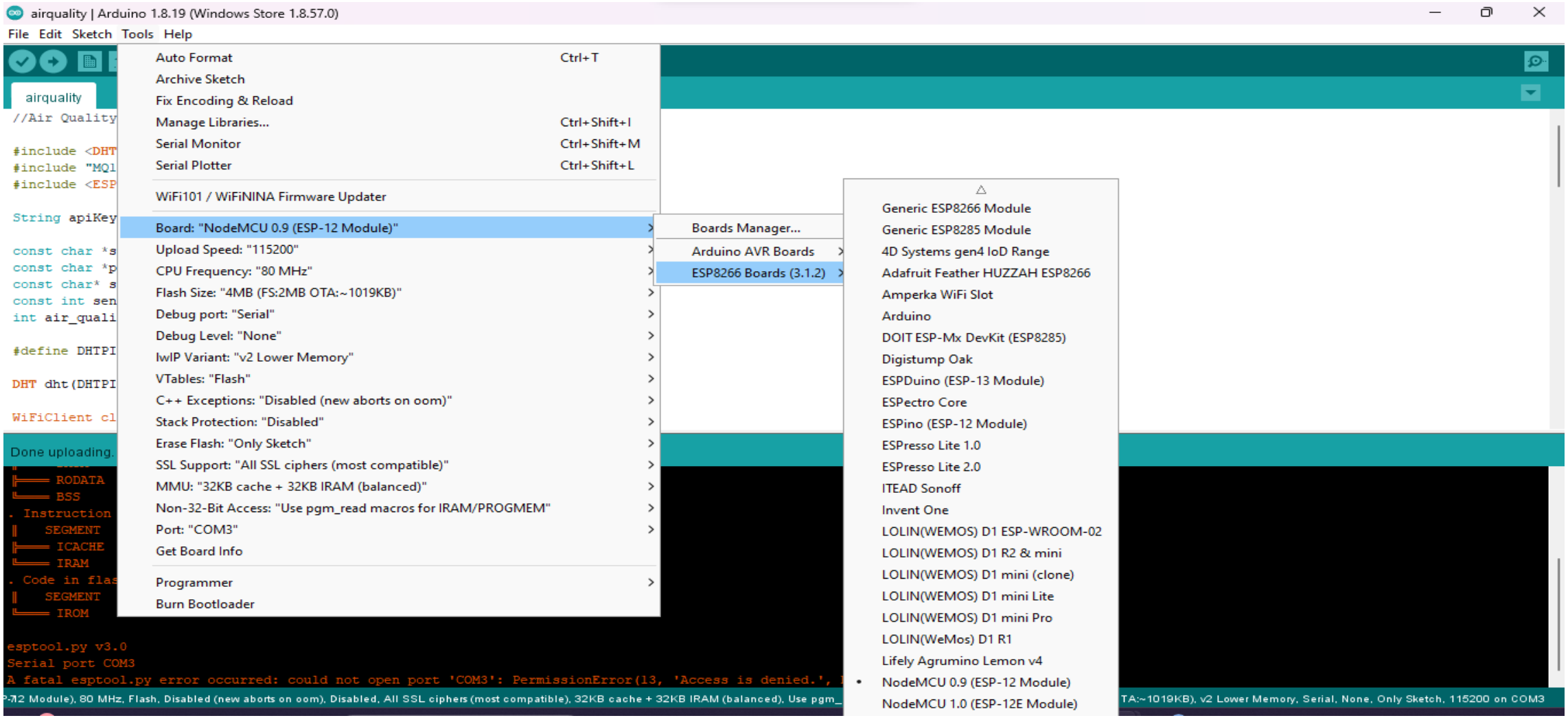
Tools-Manage Libraries

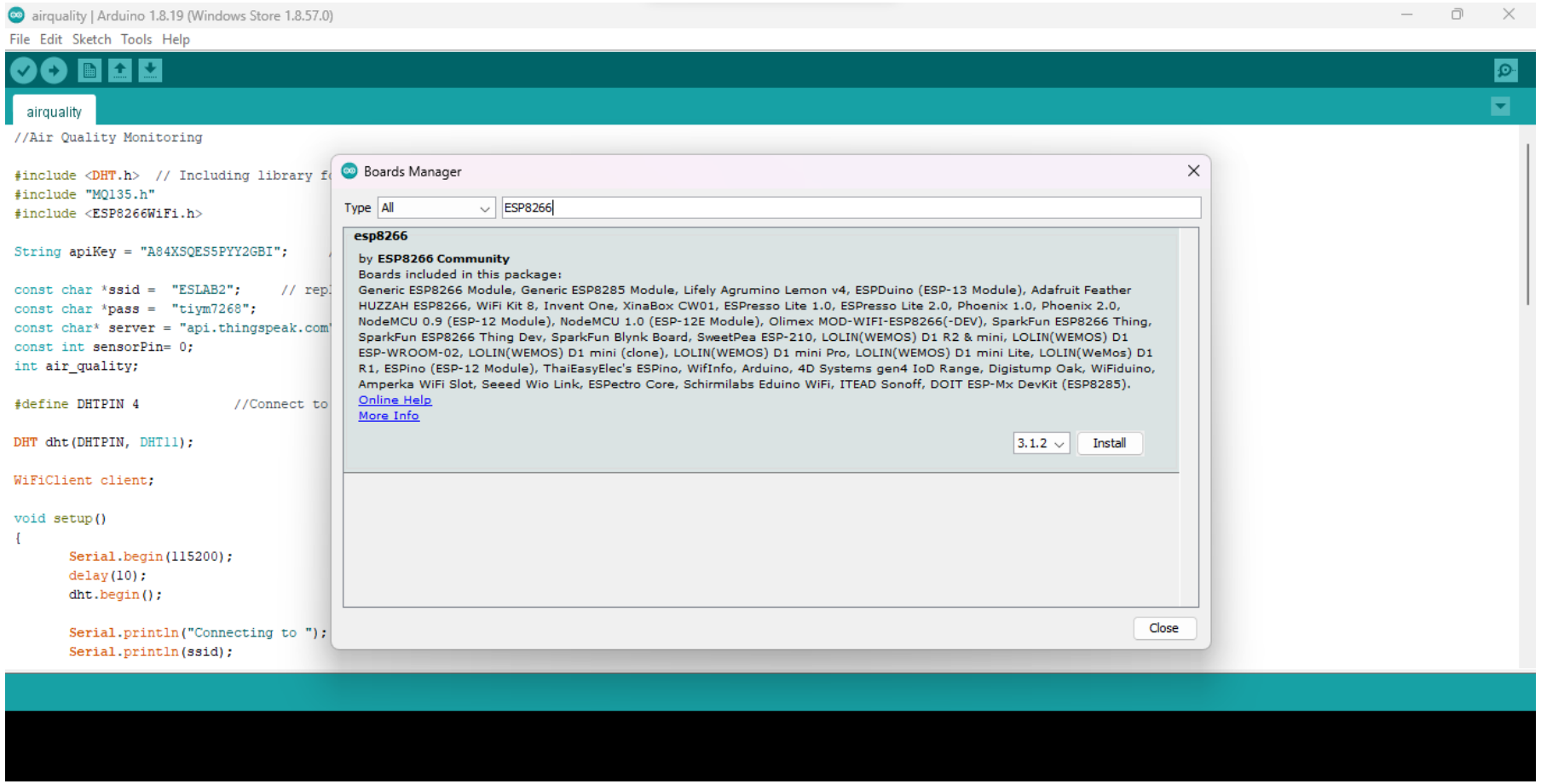


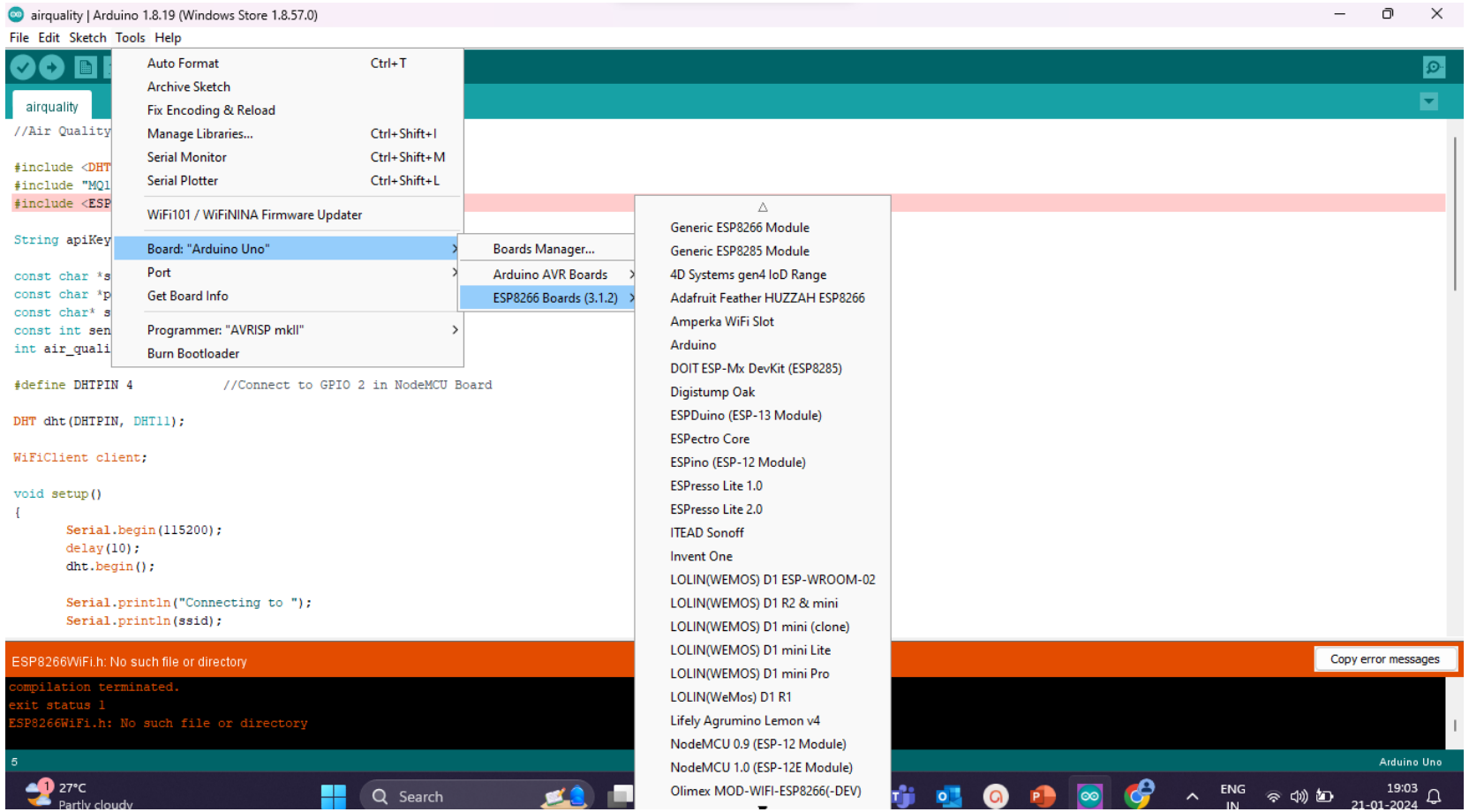
Enter **http://arduino.esp8266.com/stable/package_esp8266com_index.json** into the “Additional Boards Manager URLs” field as shown in the figure below. Then, click the “OK” button:



Tools-Board-Board Manager-ESPBoards-NodeMCU



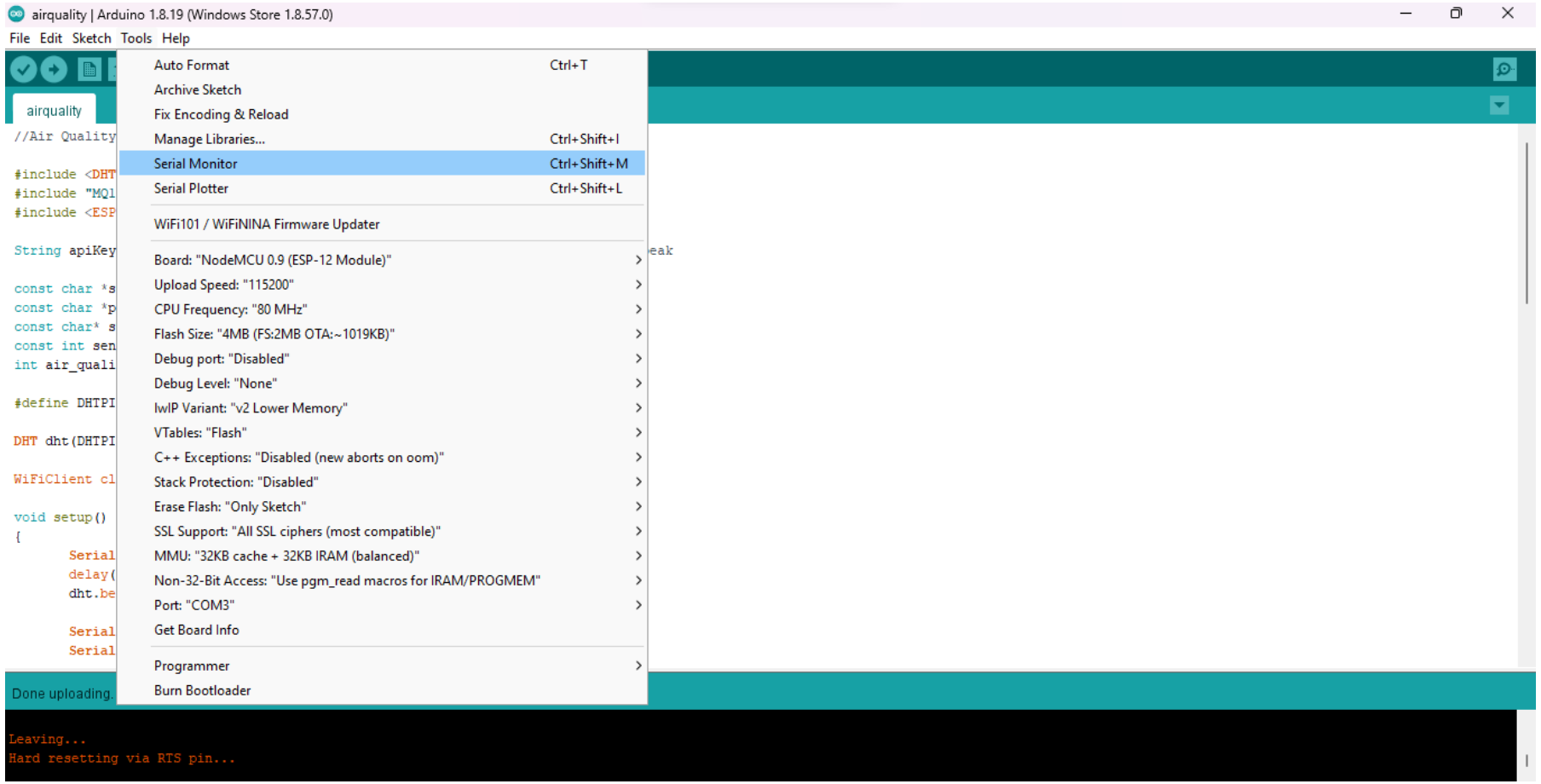

airquality | Arduino 1.8.19 (Windows Store 1.8.57.0)
File Edit Sketch Tools Help
airquality
//Air Quality Monitoring
#include <DHT.h> // Including library f
#include "MQ135.h"
#include <ESP8266WiFi.h>
String apiKey = "A84XSQES5PYY2GBI";
const char *ssid = "ESLAB2"; // rep
const char *pass = "tiym7268";
const char* server = "api.thingspeak.com
const int sensorPin= 0;
int air_quality;
#define DHTPIN 4 //Connect to
DHT dht(DHTPIN, DHT11);
WiFiClient client;
void setup()
{
Serial.begin(115200);
delay(10);
dht.begin();
Serial.println("Connecting to ");
Serial.println(ssid);
Boards Manager
Type All
ESP8266
esp8266
by ESP8266 Community
Boards included in this package:
Generic ESP8266 Module, Generic ESP8285 Module, Lifely Agrumino Lemon v4, ESPDuino (ESP-13 Module), Adafruit Feather HUZZAH ESP8266, WiFi Kit 8, Invent One, XinaBox CW01, ESPresso Lite 1.0, ESPresso Lite 2.0, Phoenix 1.0, Phoenix 2.0, NodeMCU 0.9 (ESP-12 Module), NodeMCU 1.0 (ESP-12E Module), Olimex MOD-WIFI-ESP8266(-DEV), SparkFun ESP8266 Thing, SparkFun ESP8266 Thing Dev, SparkFun Blynk Board, SweetPea ESP-210, LOLIN(WEMOS) D1 R2 & mini, LOLIN(WEMOS) D1 ESP-WROOM-02, LOLIN(WEMOS) D1 mini (clone), LOLIN(WEMOS) D1 mini Pro, LOLIN(WEMOS) D1 mini Lite, LOLIN(WeMos) D1 R1, ESPino (ESP-12 Module), ThaiEasyElec's ESPino, WifInfo, Arduino, 4D Systems gen4 IoD Range, Digistump Oak, WiFiduino, Amperka WiFi Slot, Seeed Wio Link, ESPectro Core, Schirmilabs Eduino WiFi, ITEAD Sonoff, DOIT ESP-Mx DevKit (ESP8285).
Online Help
More Info
3.1.2
Install
Close


airquality | Arduino 1.8.19 (Windows Store 1.8.57.0)
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino Uno"
Port
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Boards Manager...
Arduino AVR Boards
ESP8266 Boards (3.1.2)
Generic ESP8266 Module
Generic ESP8285 Module
4D Systems gen4 IoD Range
Adafruit Feather HUZZAH ESP8266
Amperka WiFi Slot
Arduino
DOIT ESP-Mx DevKit (ESP8285)
Digistump Oak
ESPDuino (ESP-13 Module)
ESPectro Core
ESPino (ESP-12 Module)
ESPresso Lite 1.0
ESPresso Lite 2.0
ITEAD Sonoff
Invent One
LOLIN(WEMOS) D1 ESP-WROOM-02
LOLIN(WEMOS) D1 R2 & mini
LOLIN(WEMOS) D1 mini (clone)
LOLIN(WEMOS) D1 mini Lite
LOLIN(WEMOS) D1 mini Pro
LOLIN(WeMos) D1 R1
Lifely Agrumino Lemon v4
NodeMCU 0.9 (ESP-12 Module)
NodeMCU 1.0 (ESP-12E Module)
Olimex MOD-WIFI-ESP8266(-DEV)
airquality
//Air Quality
#include <DHT
#include "MQ1
#include <ESP
String apiKey
const char *s
const char *p
const char* s
const int sen
int air_quali
#define DHTPIN 4 //Connect to GPIO 2 in NodeMCU Board
DHT dht(DHTPIN, DHT11);
WiFiClient client;
void setup()
{
Serial.begin(115200);
delay(10);
dht.begin();
Serial.println("Connecting to ");
Serial.println(ssid);
ESP8266WiFi.h: No such file or directory
Copy error messages
compilation terminated.
exit status 1
ESP8266WiFi.h: No such file or directory
Arduino Uno
27°C
Partly cloudy
Search
ENG
IN
19:03
21-01-2024

Arduino IDE

- Compile –Done Compile
- Upload-Done Upload
- Select port
- Output -Serial Monitor –Baud rate need to match with the coding and with the serial monitor.
- Pin need to match with the NodeMCU connection and with the Arduino IDE code.

Output –Serial Monitor

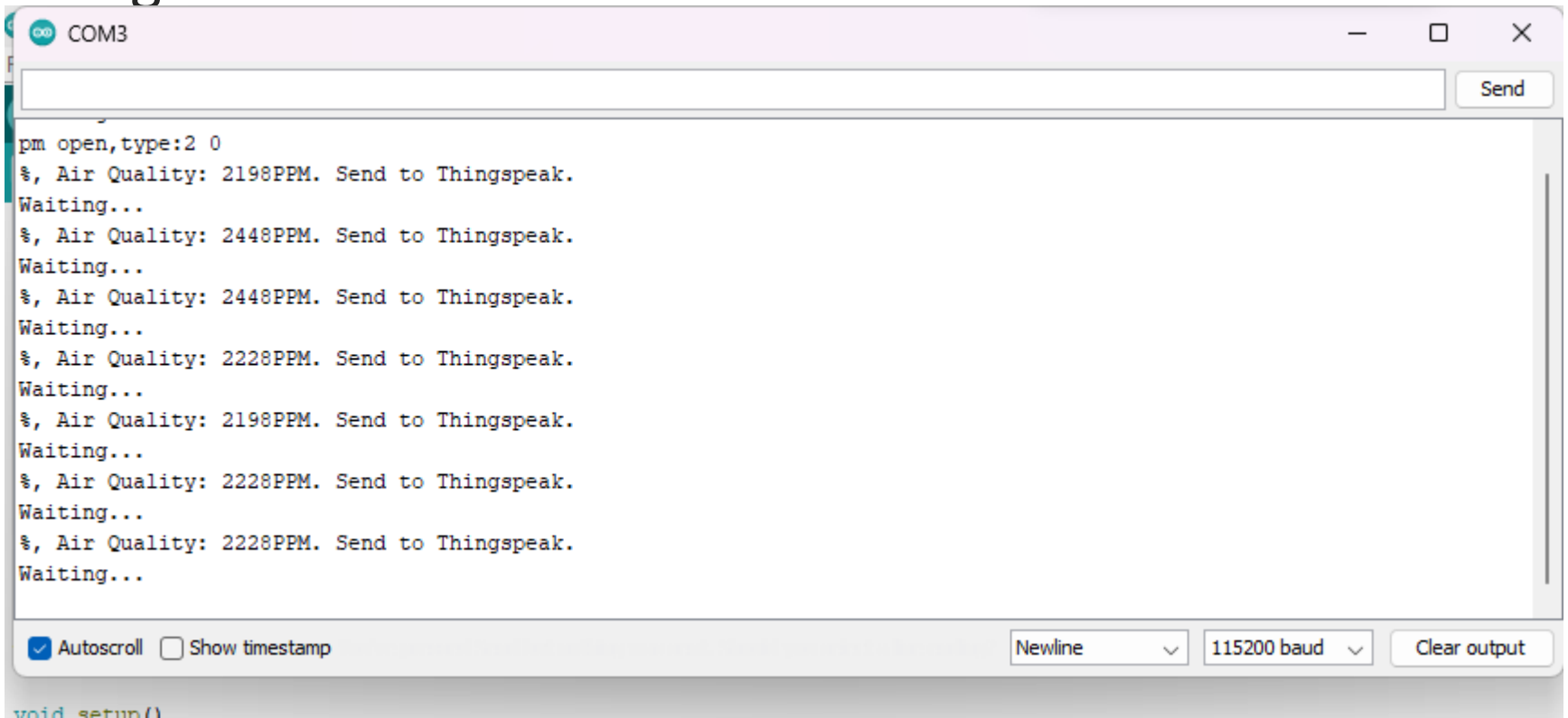


Setting up Thingspeak

- ThingSpeak is an open-source Internet of Things application .
- To setup the Thingspeak Server, visit https://thingspeak.com/.
- Create an account or simply sign in if you created the account earlier. Then create a new channel.

Serial Monitor Output

- Once the code is uploaded you can open serial monitor.
- The NodeMCU will first start connecting to wifi network. All the happening can be observed on the Serial Monitor.



- Similarly you can see the online data of Air Quality Index on Thingspeak Server.
- Just go to Thingspeak Private view and check the data being uploaded after the interval of 15 seconds.

Thingspeak Output