

- 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

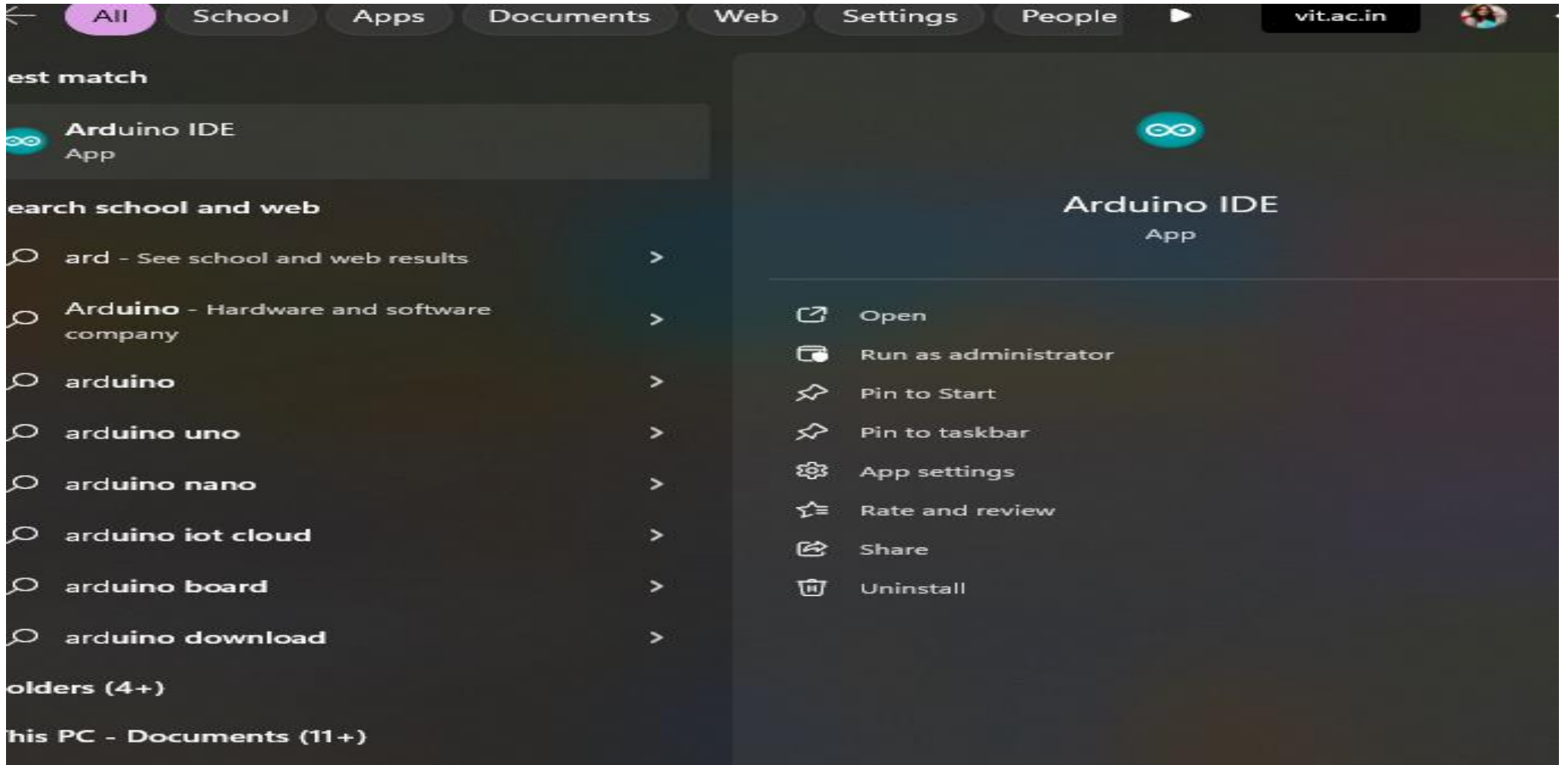


- The **MQ-135** gas sensor senses the gases like **ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke**.
- The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sensing material.
- In the atmosphere, we can find polluting gases, but the conductivity of the gas 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

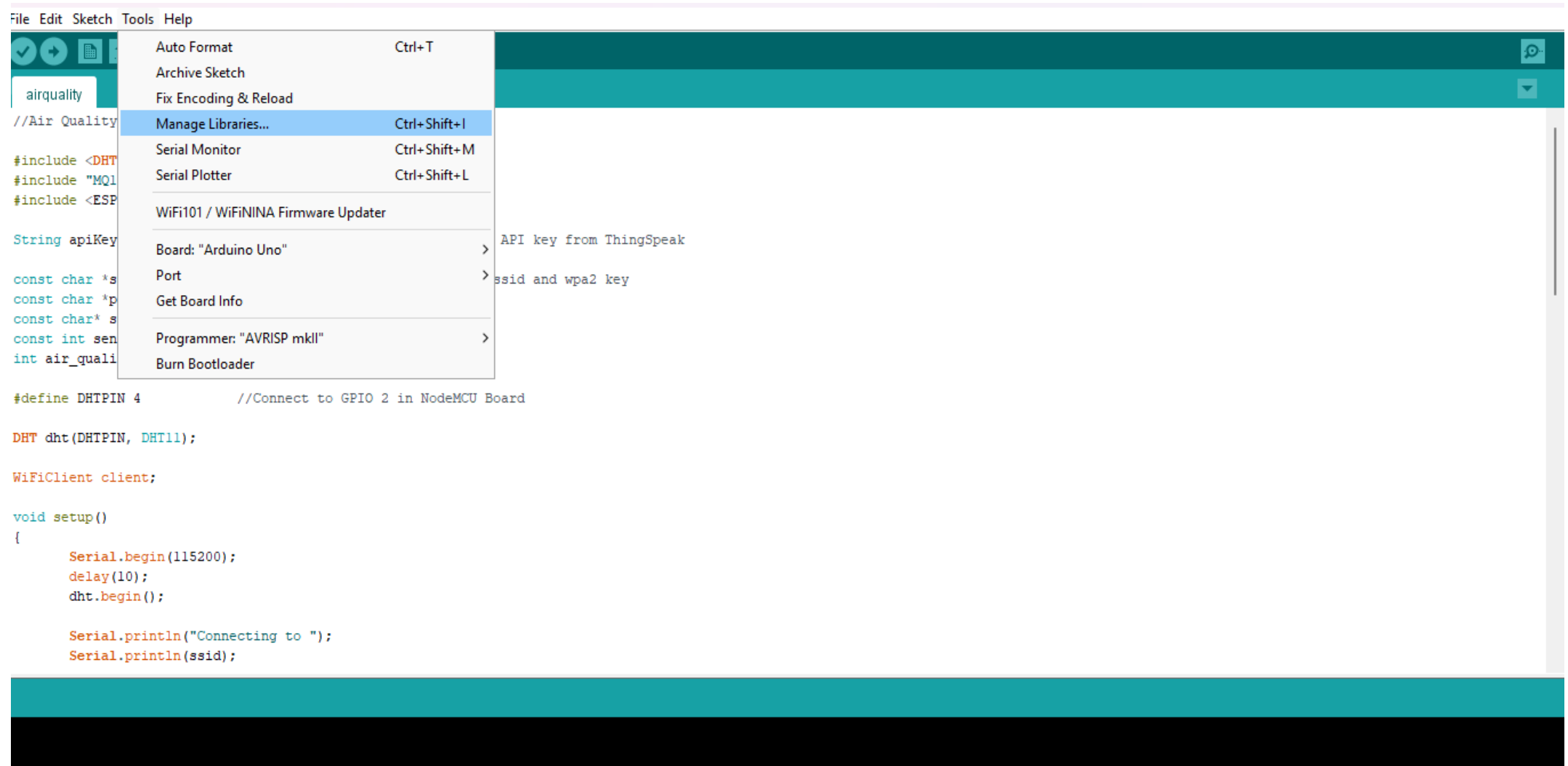


- Arduino -1.8.19
- File-New-Sketch-Code.
- Tools-Manage Libraries-Install MQ135, DHT and ESP8266
- For MQ135-Search –type MQ135-Version1.1.1-Install
- For DHT-DHT sensor library-Version 1.4.6-Install
- For ESP8266
- Preferences-

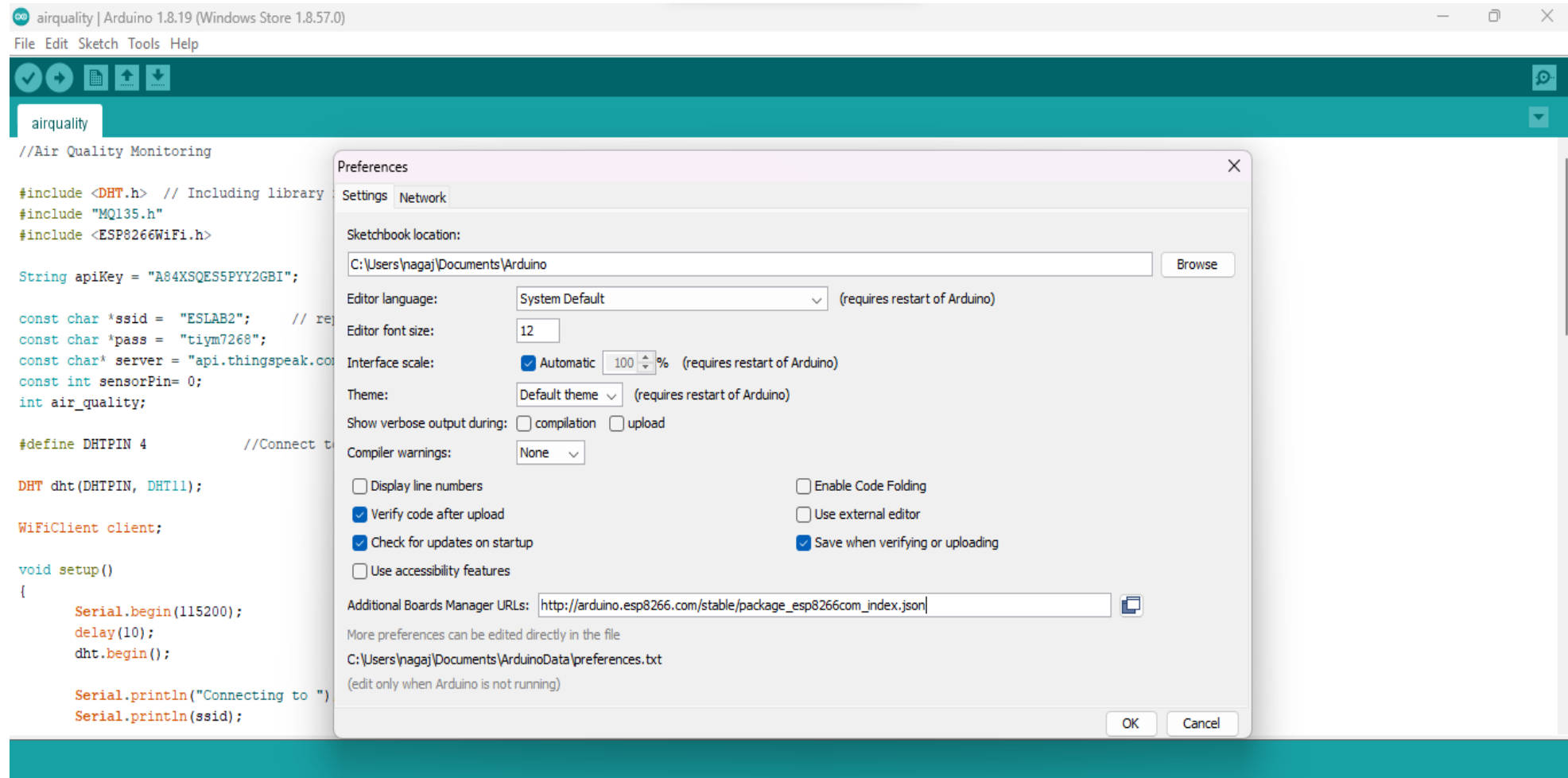
Additional Boards Manager URLs:



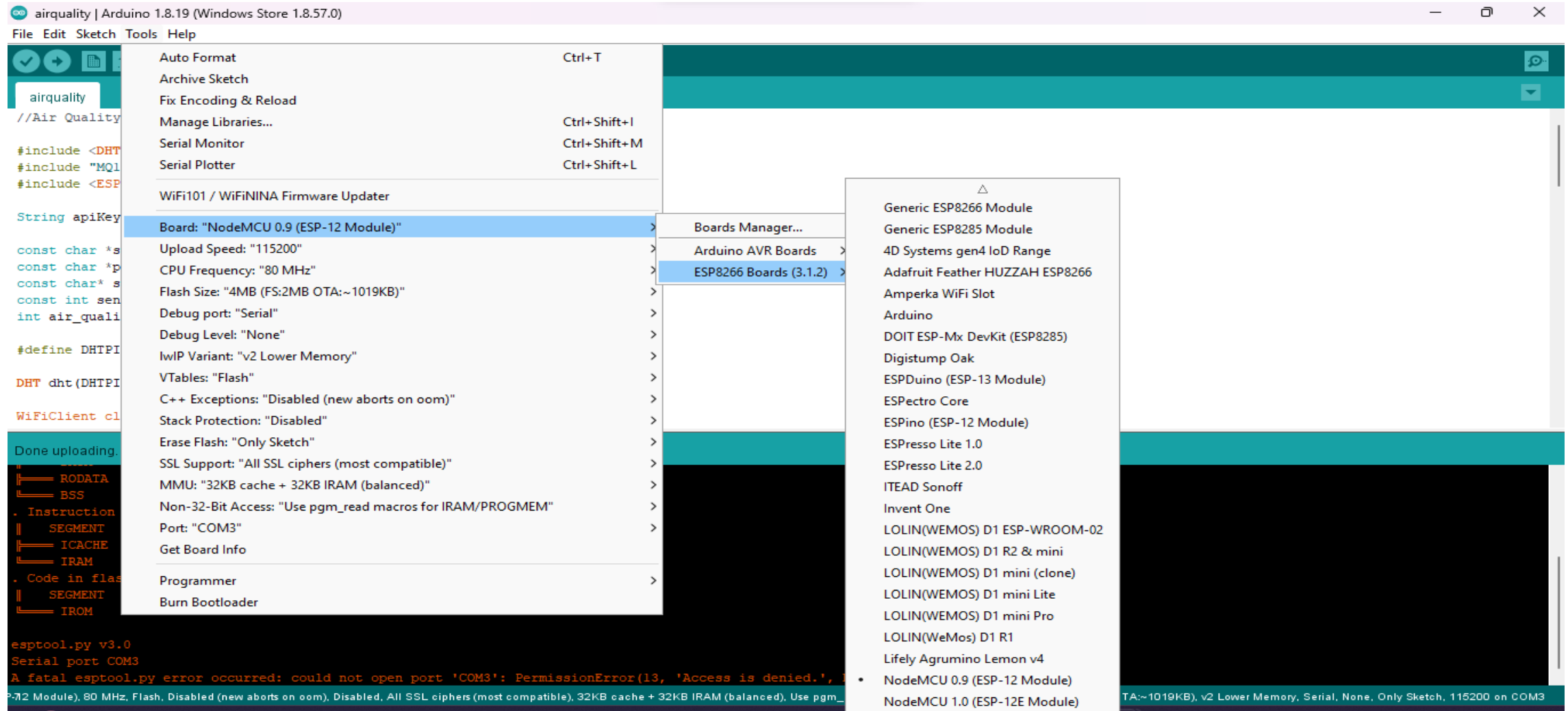
Tools-Manage Libraries

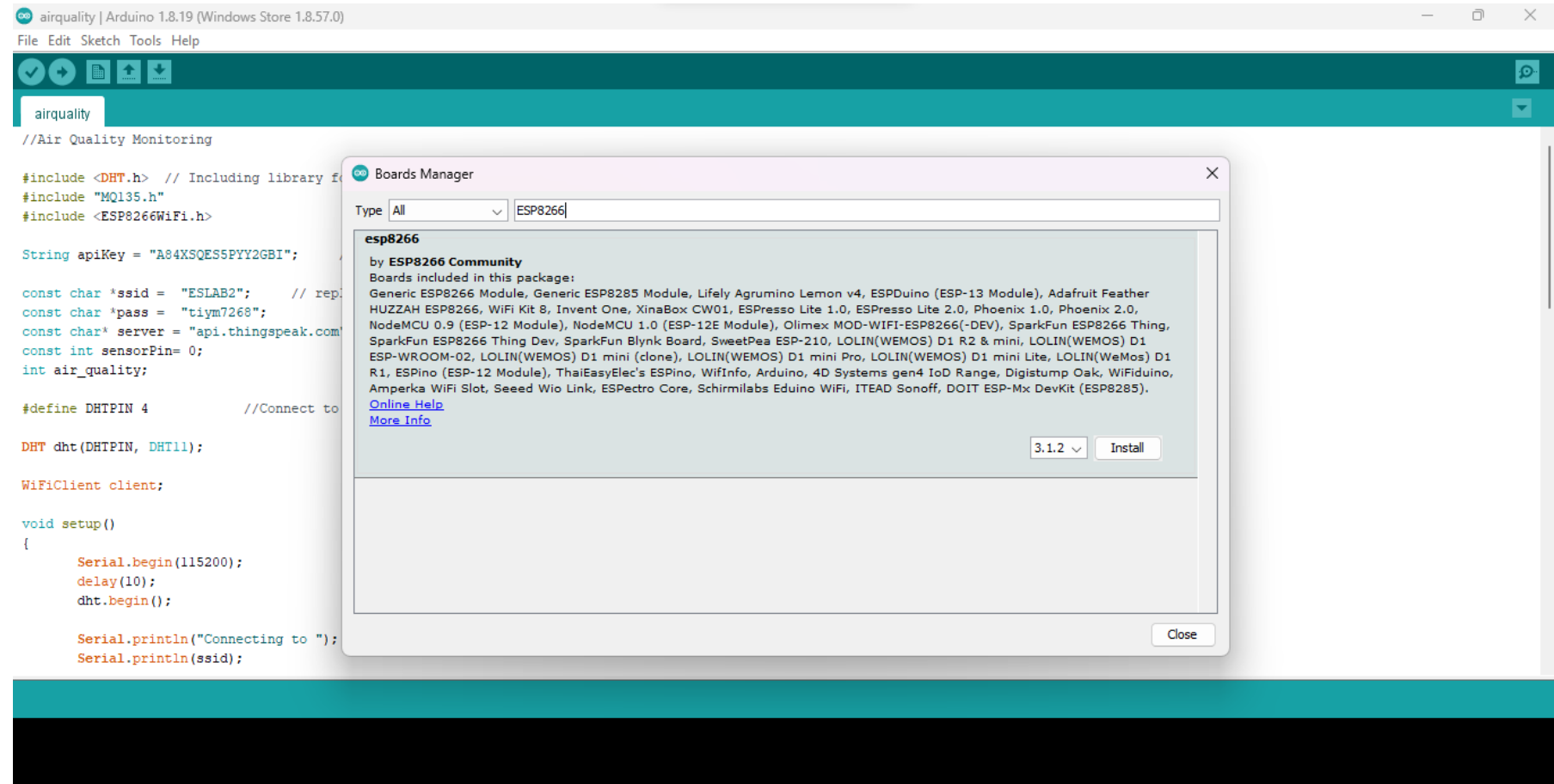


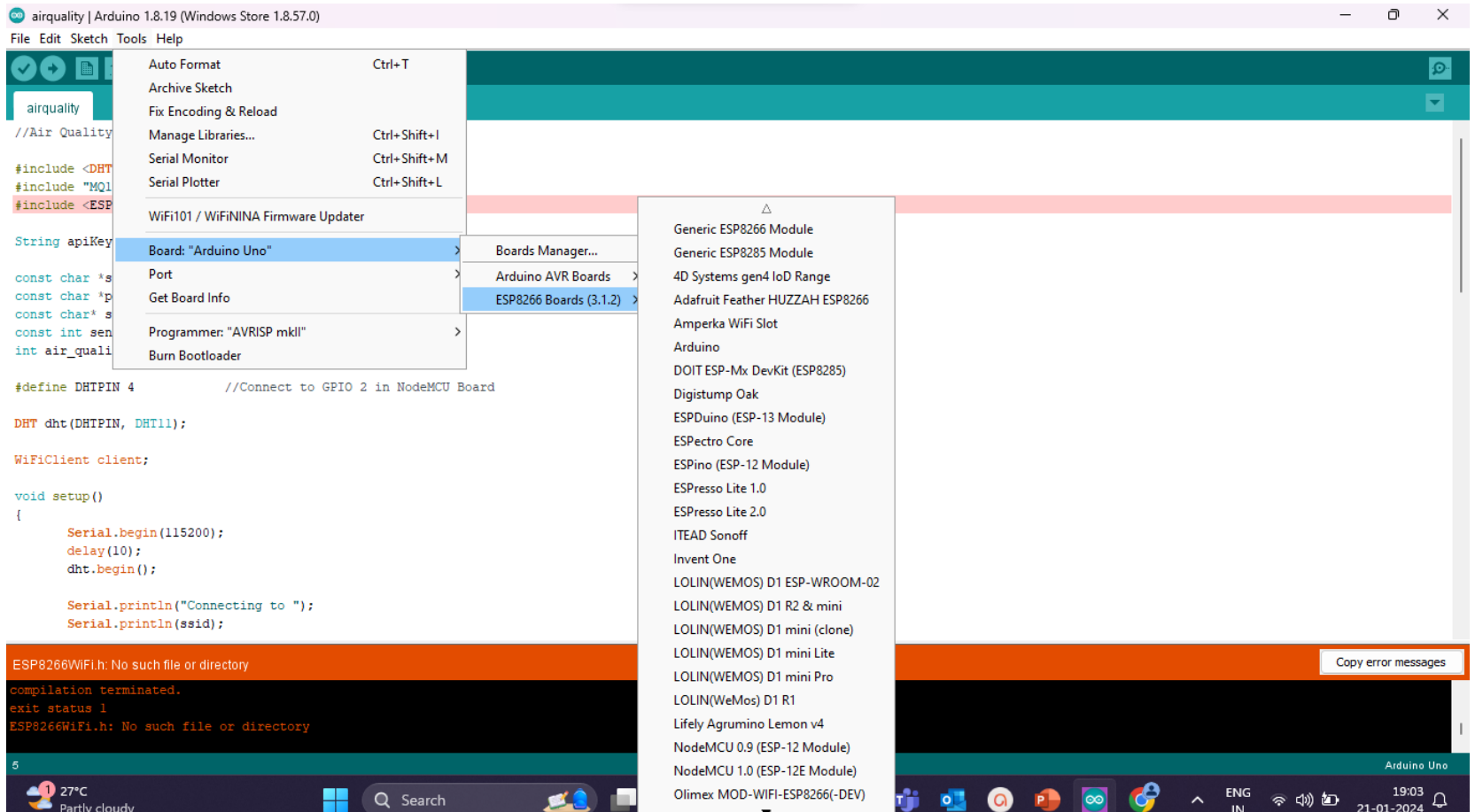
Enter **http://arduino.esp8266.com/stable/package_esp8266com_index.json** into the “Additional Boards Manager URLs” field as shown in the figure below. Then, click the “OK” button:



Tools-Board-Board Manager-ESPBoards-NodeMCU



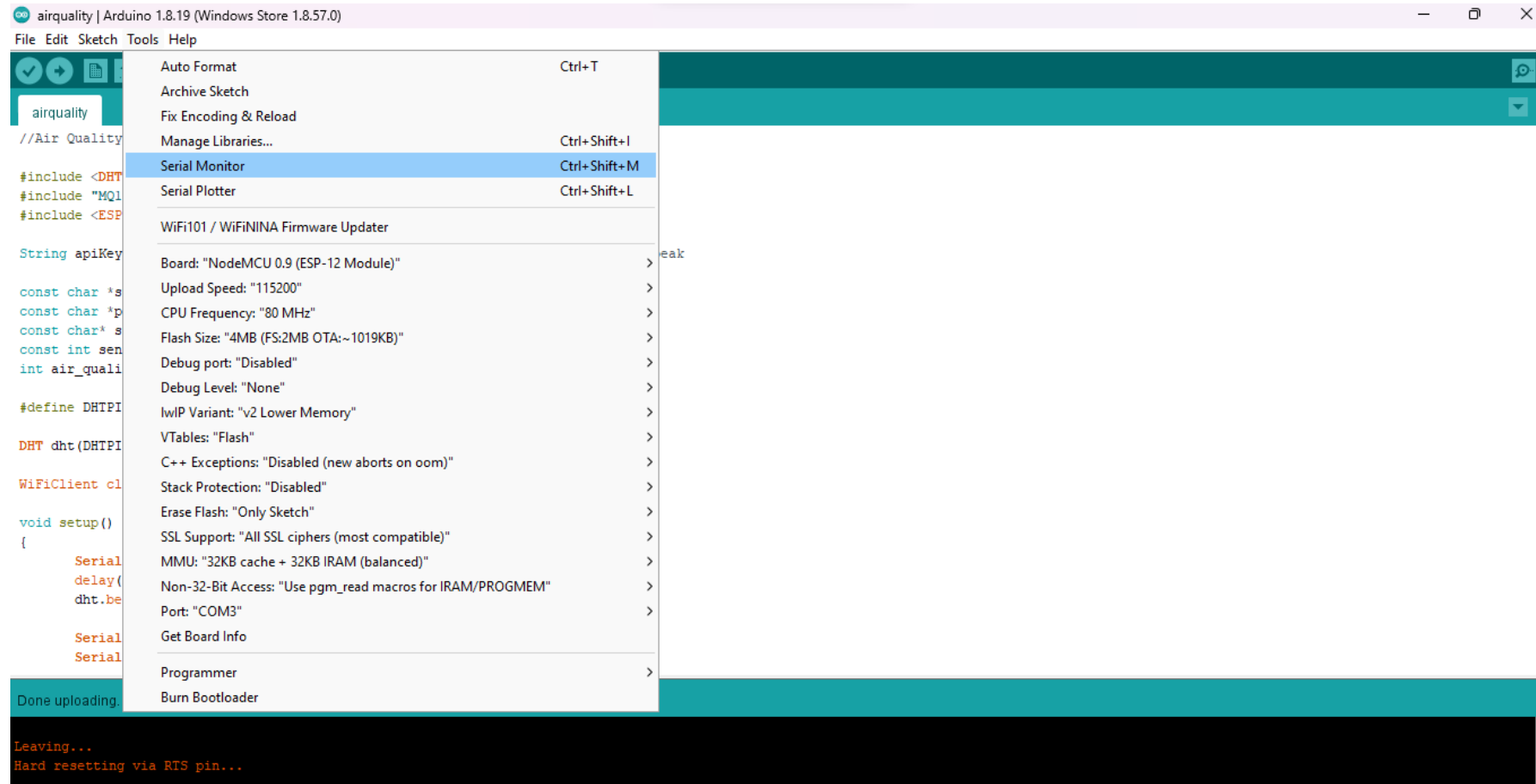




Arduino IDE

- 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

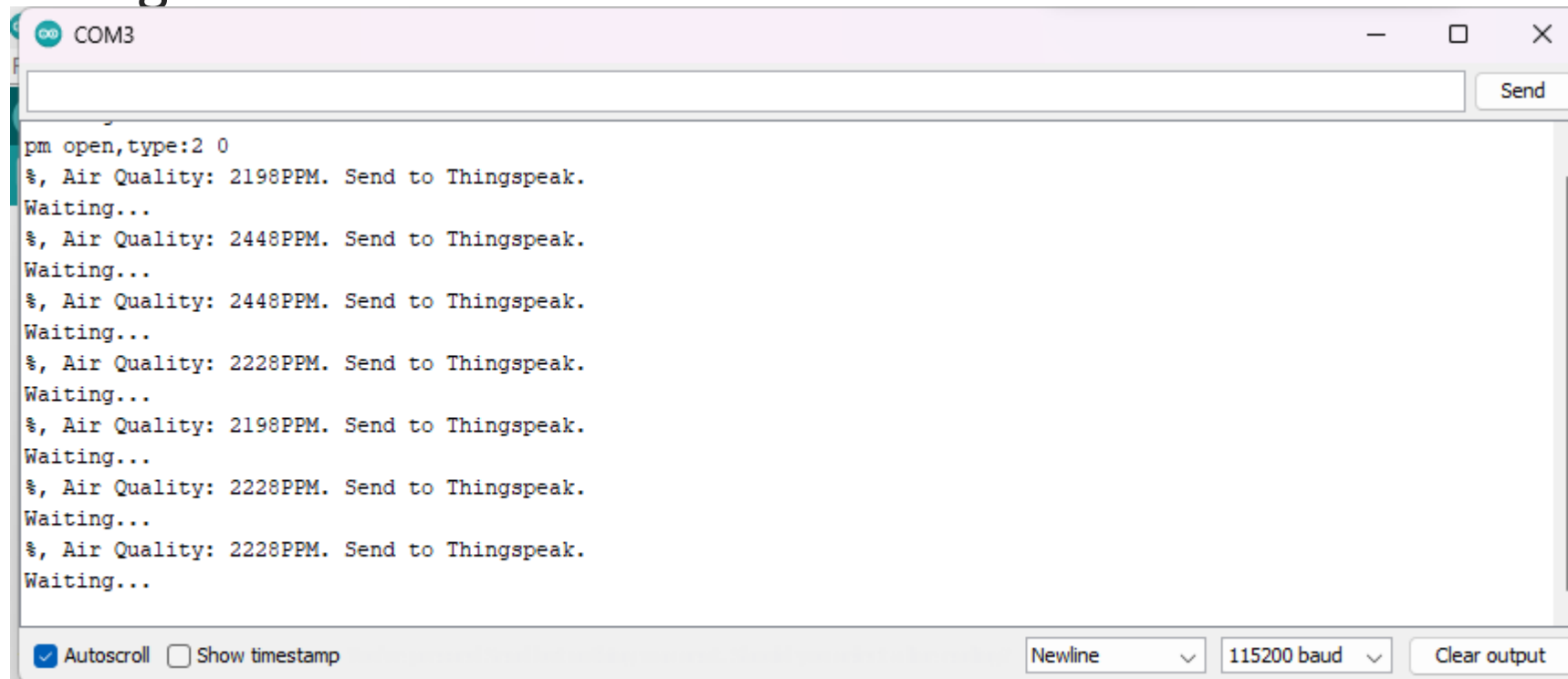


Setting up Thingspeak

- 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.



The screenshot shows a serial monitor window titled 'COM3'. The output text is as follows:

```
pm open,type:2 0
$, Air Quality: 2198PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2448PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2448PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2228PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2198PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2228PPM. Send to Thingspeak.
Waiting...
$, Air Quality: 2228PPM. Send to Thingspeak.
Waiting...
```

At the bottom of the window, there are controls: a checked 'Autoscroll' checkbox, an unchecked 'Show timestamp' checkbox, a 'Newline' dropdown menu, a '115200 baud' dropdown menu, and a 'Clear output' button.

- 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.

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Thingspeak Output

