# Lab # 11

# Introduction to IoT using ESP32 Development Board

**Objectives**

- Create Hello world program
- Make ESP32 as web server to control data
- Get data from ESP32 on local network

**Tools**

- Arduino
- ESP32 Board
- 2 LEDs
- DHT11 sensor

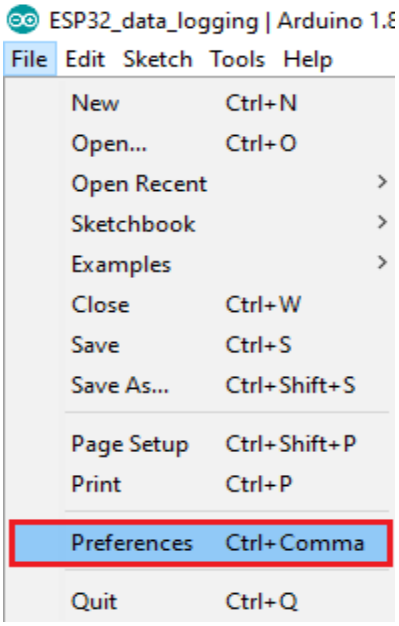
**Pre Lab**

Please go through the data sheet of Expressif ESP32 development board.

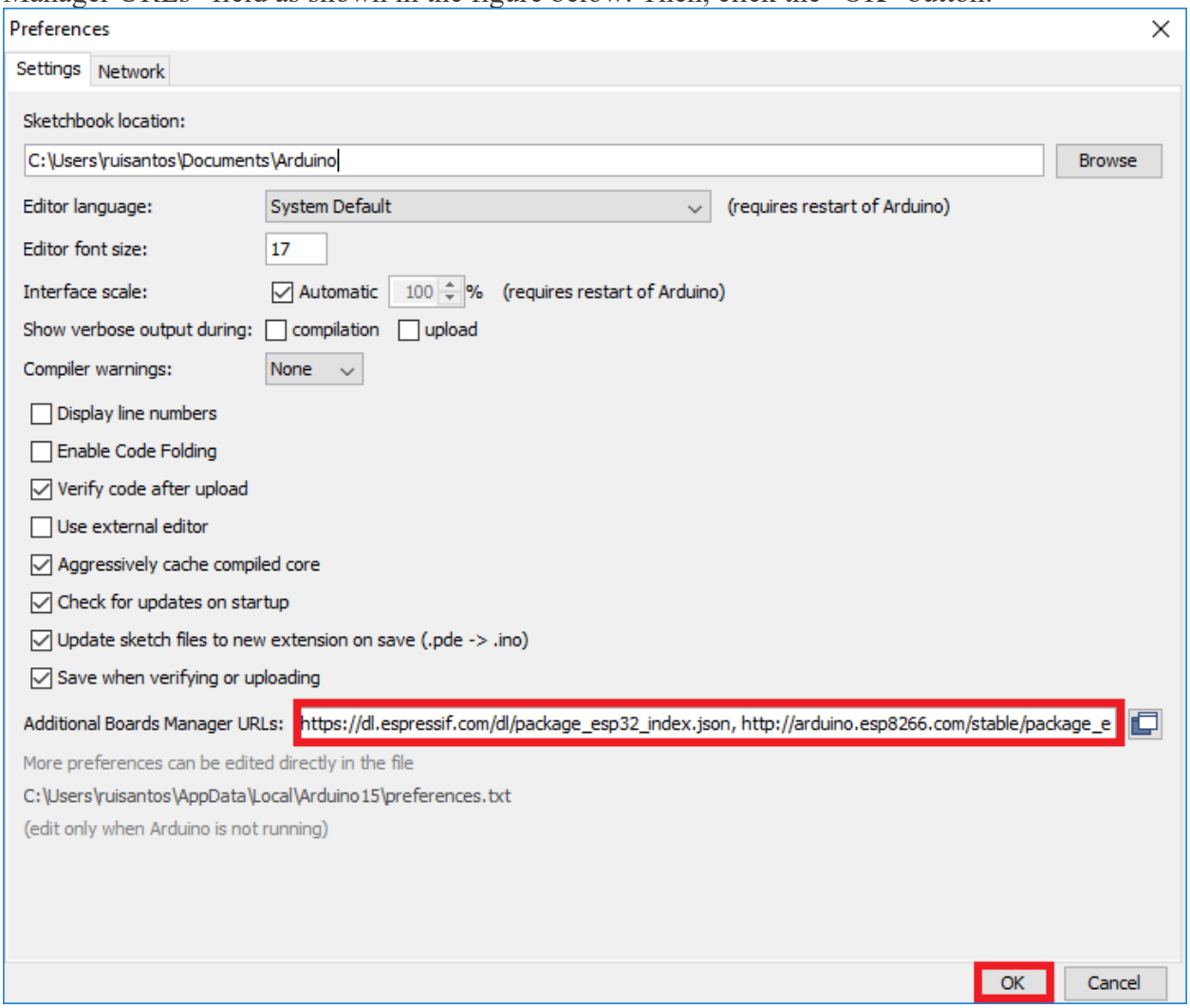
**Installing ESP32 Add-on in Arduino IDE**

To install the ESP32 board in your Arduino IDE, follow these next instructions:

1. In your Arduino IDE, go to **File**> **Preferences**

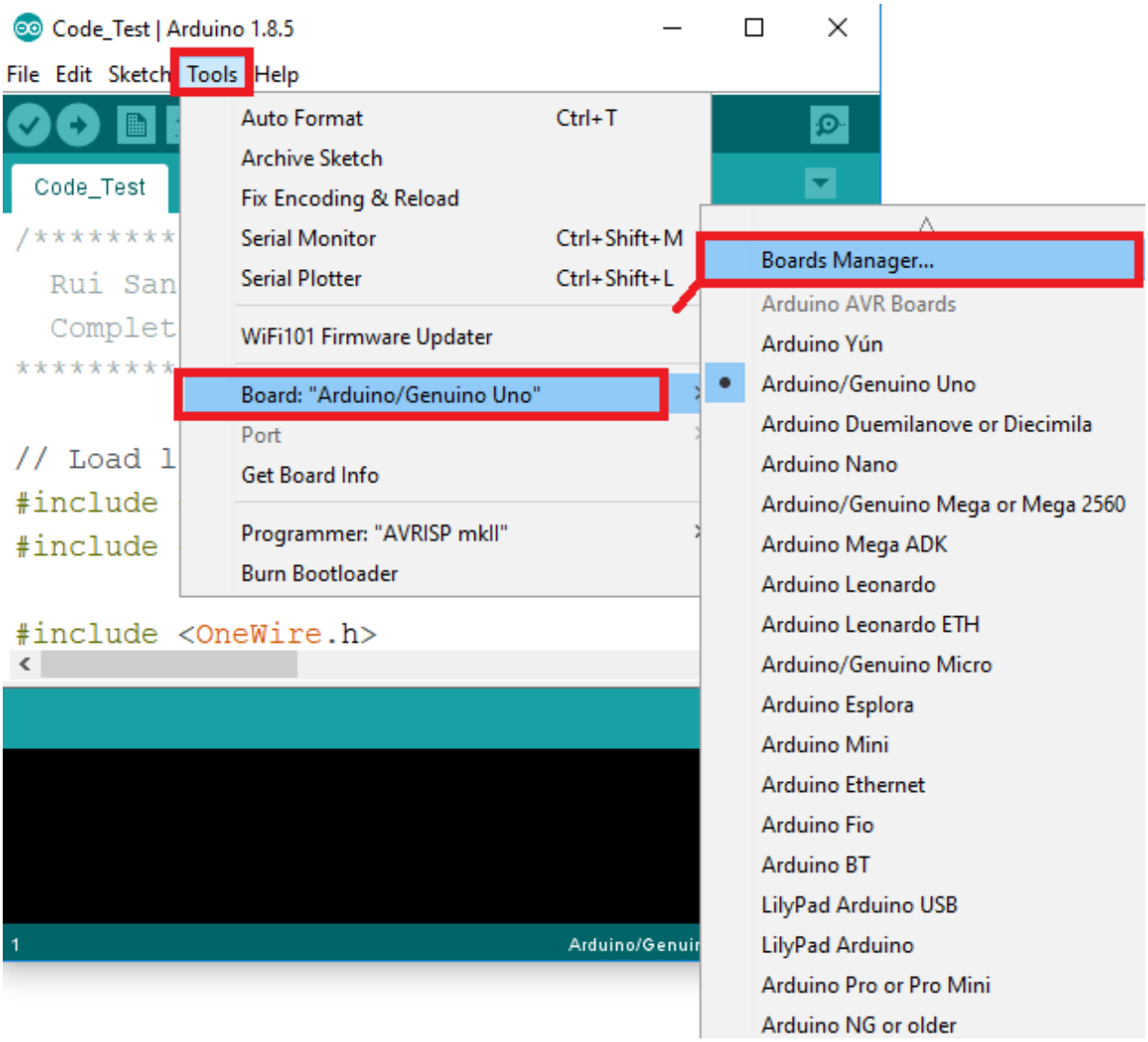


2. Enter **https://dl.espressif.com/dl/package_esp32_index.json** into the "Additional Board Manager URLs" field as shown in the figure below. Then, click the "OK" button:

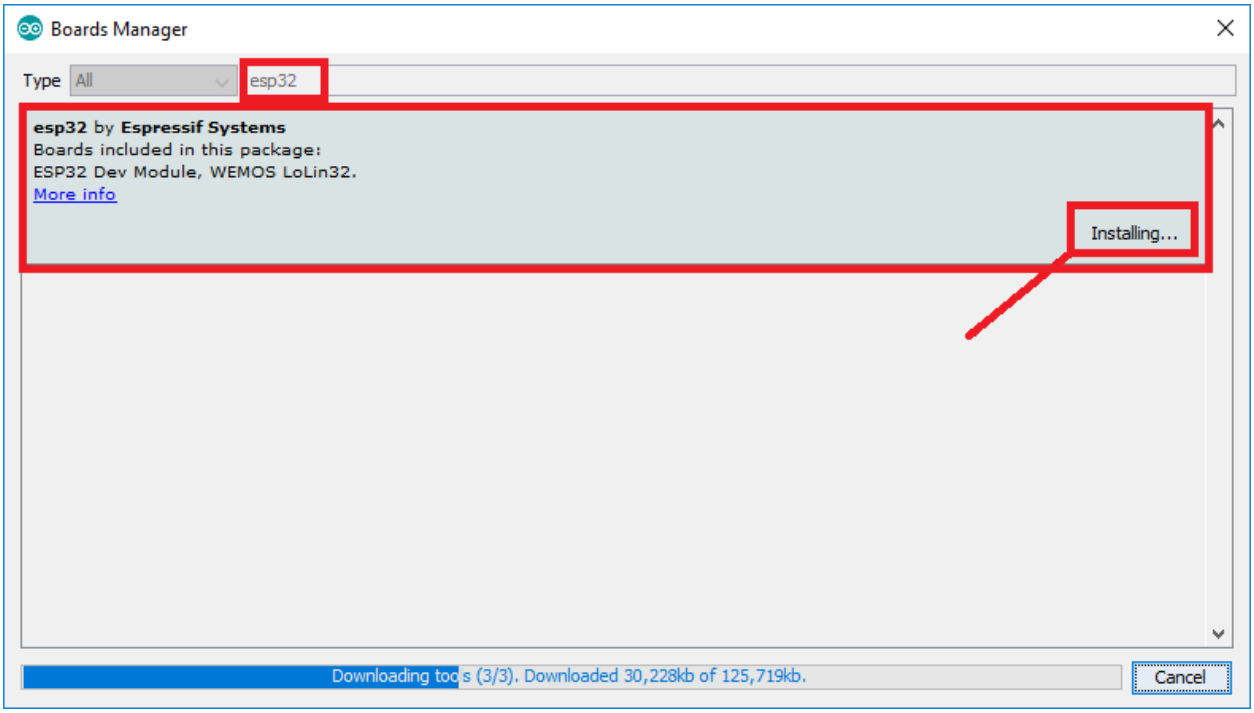



**Note:** if you already have the ESP8266 boards URL, you can separate the URLs with a comma as follows:
https://dl.espressif.com/dl/package_esp32_index.json,
http://arduino.esp8266.com/stable/package_esp8266com_index.json

3. Open the Boards Manager. Go to **Tools** > **Board** > **Boards Manager…**




4. Search for **ESP32** and press install button for the "**ESP32 by Espressif Systems**":




After board installation is complete, write your first led blinking code.

Code: Pin 2 of ESP32 board is connected to LED on Pin 2 by default.

```
int ledPin = 2;
void setup()
{
  pinMode(ledPin, OUTPUT);
}
void loop()
{
  digitalWrite(ledPin, HIGH);
  delay(500);
  digitalWrite(ledPin, LOW);
  delay(500);
}
```

**In-Lab Task 1:**

Please ESP32 board and run your first program of led blinking on it.

**In-Lab Task 2:**

**Post-Lab Task 3:**

**Critical Analysis / Conclusion**

(By Student about Learning from the Lab)

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