ESP32

THE chip of the future

INTRODUCTION

- Instead of using a microcontroller and add-on WiFi, Bluetooth modules for building connected ***things*** , this is the only chip you might want to use.

WHY WE CHOOSE ESP32 ?!

WHY WE CHOOSE ESP32 ?!

Differences:

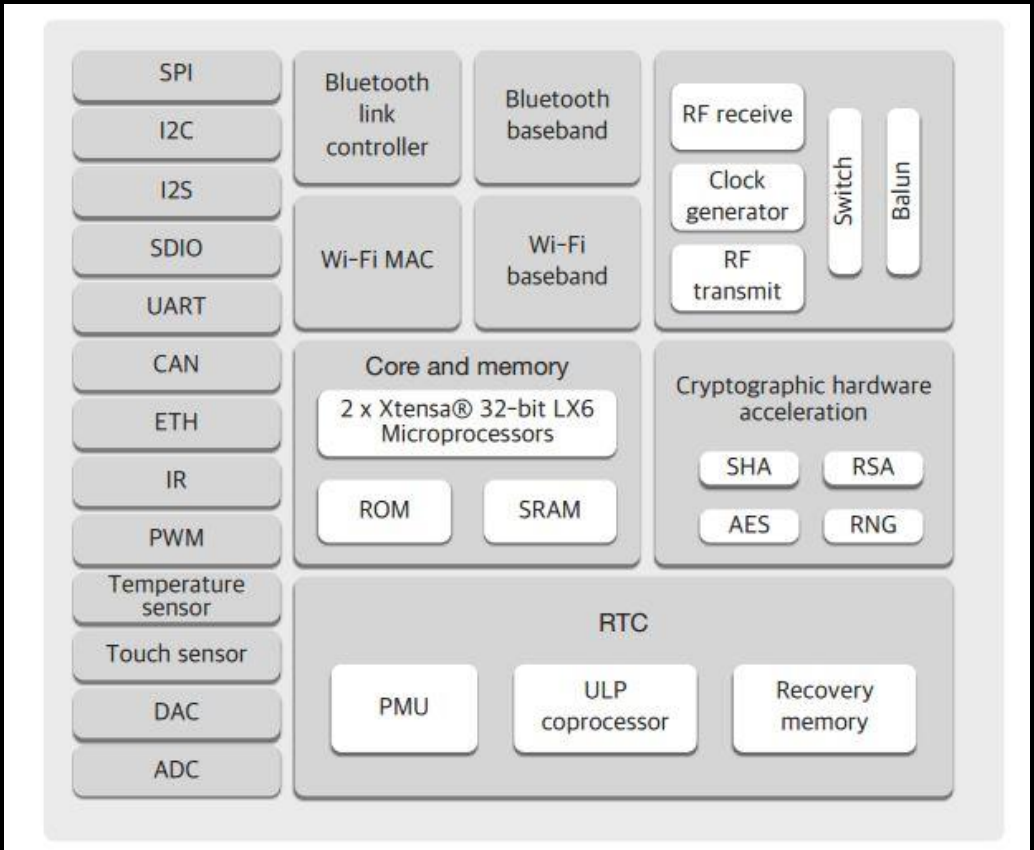
- Not only they look different, but their architecture is also totally different.
- They have different hardware architecture.
- Their built-in capabilities are very different.
- Almost as different as BLACK AND WHITE.
- The ESP32 dev kit is actually cheaper than Arduino Uno, which means that you get a more powerful board for a lower price.
- At the level where you use your existing Arduino skills to work with the ESP32, you can treat the ESP32 as a supercharged Arduino Uno: faster, better in many respects.

WHY WE CHOOSE ESP32 ?!

Similarities :

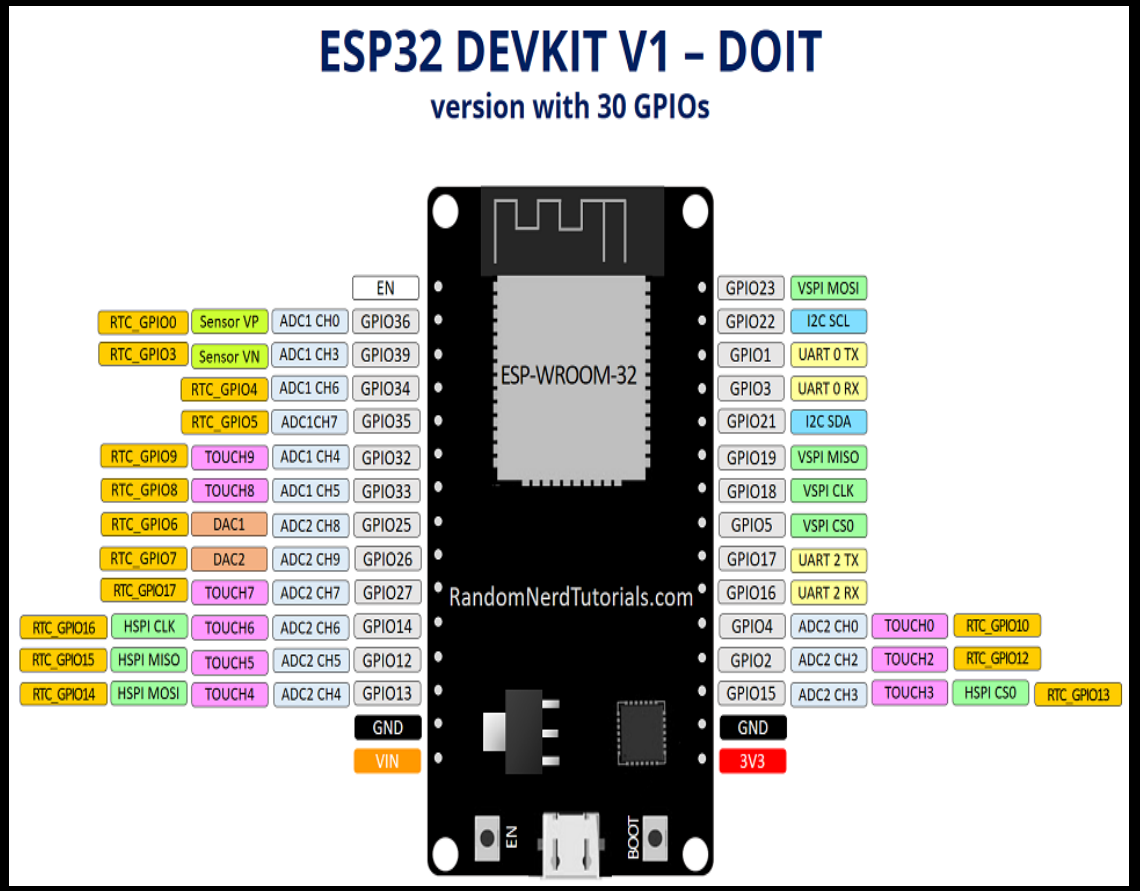
- We can use the Arduino IDE as the development environment.
- We can use a programming language that matches almost one-on-one with the language that we have learned for the Arduino.
- And, to a large extent, we can reuse almost 90 percent of the Arduino libraries in software that we write for the ESP32.

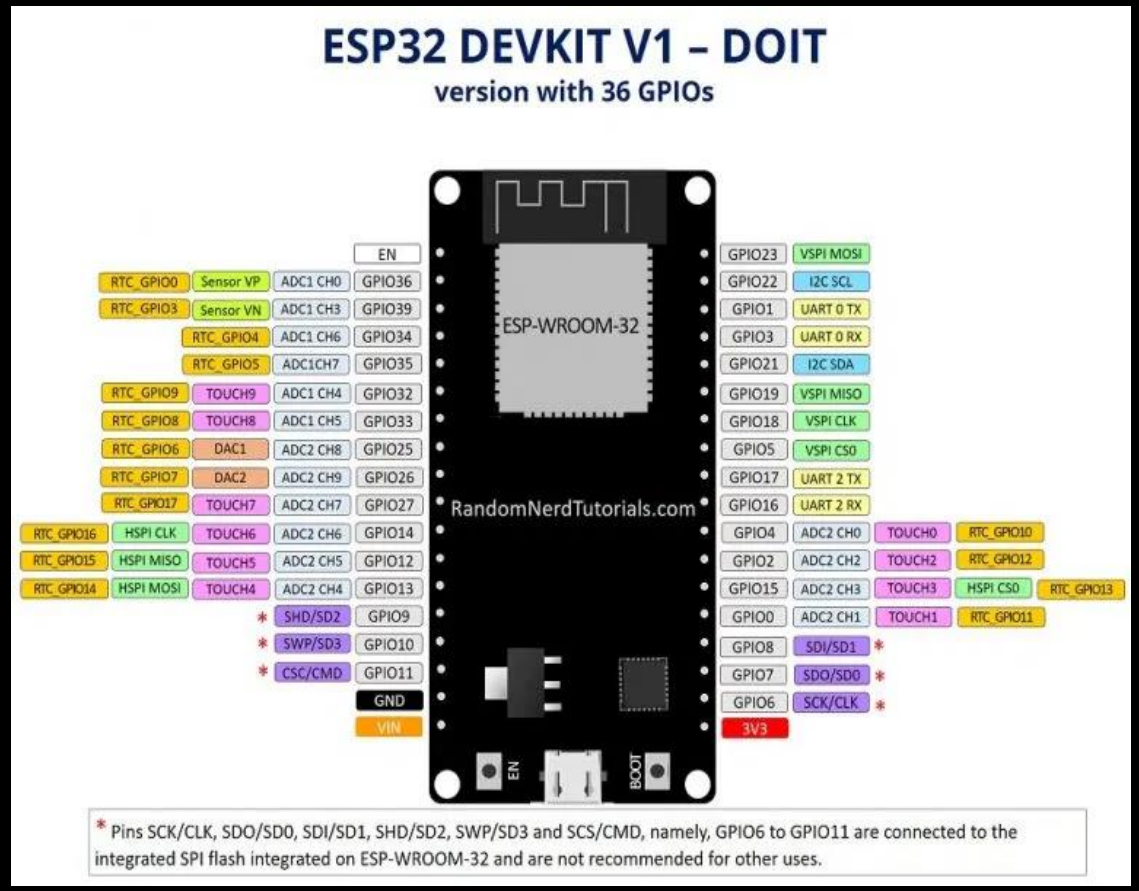
BLOCK DIAGRAM ESP32



- The block diagram on the left shows all that is in there!

ESP32 PINOUT

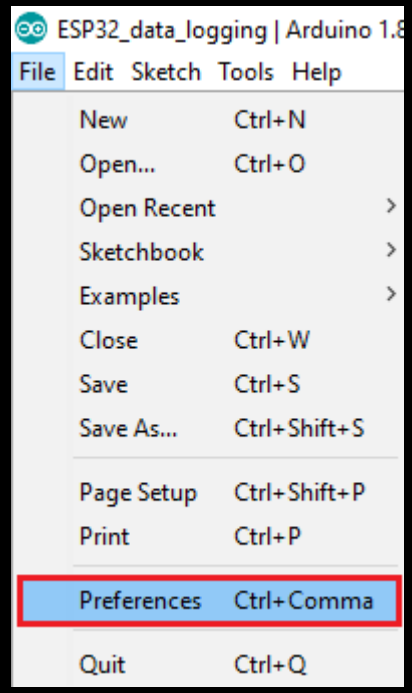




INSTALLING THE ESP32 BOARD IN ARDUINO IDE

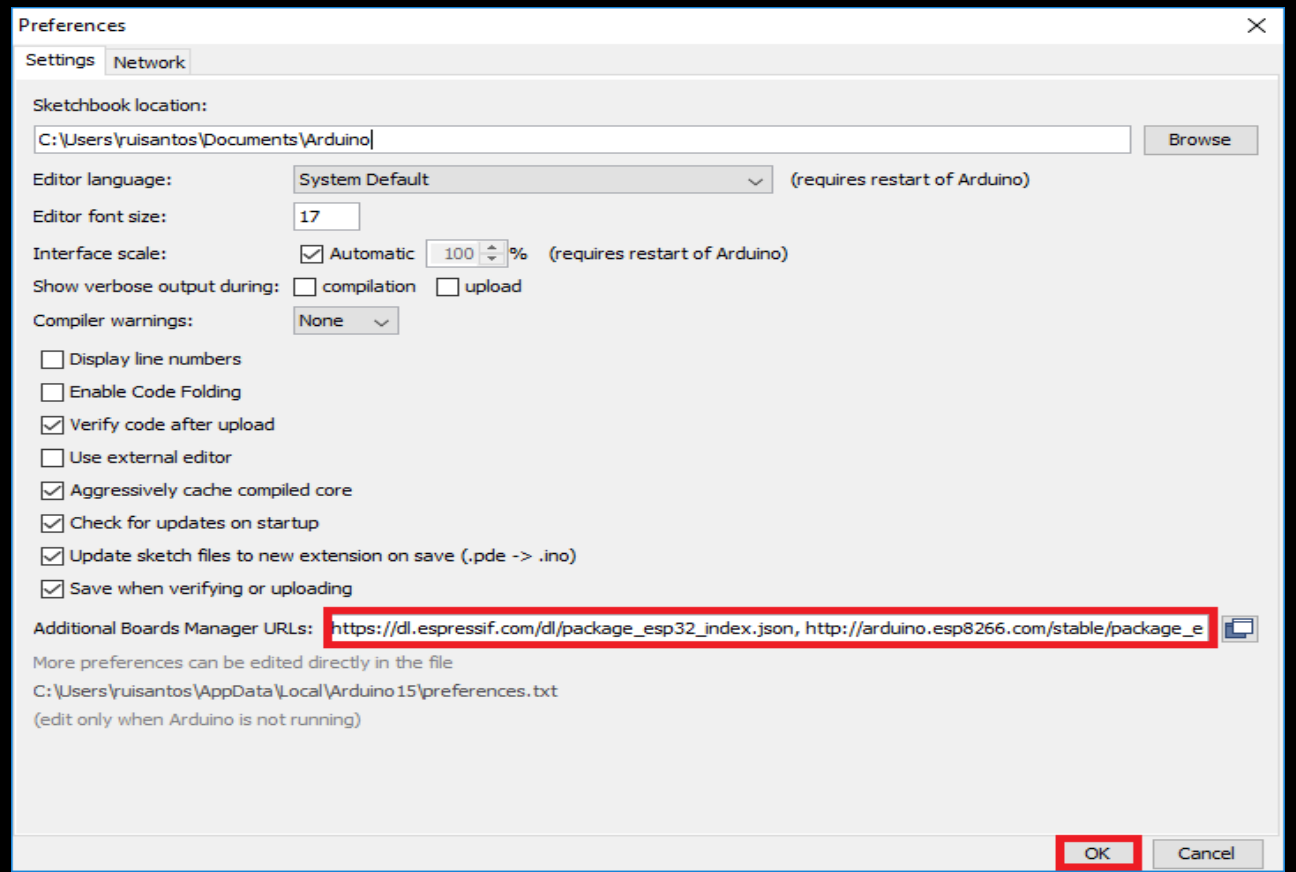
- There's an add-on for the Arduino IDE that allows you to program the ESP32 using the Arduino IDE and its programming language.

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



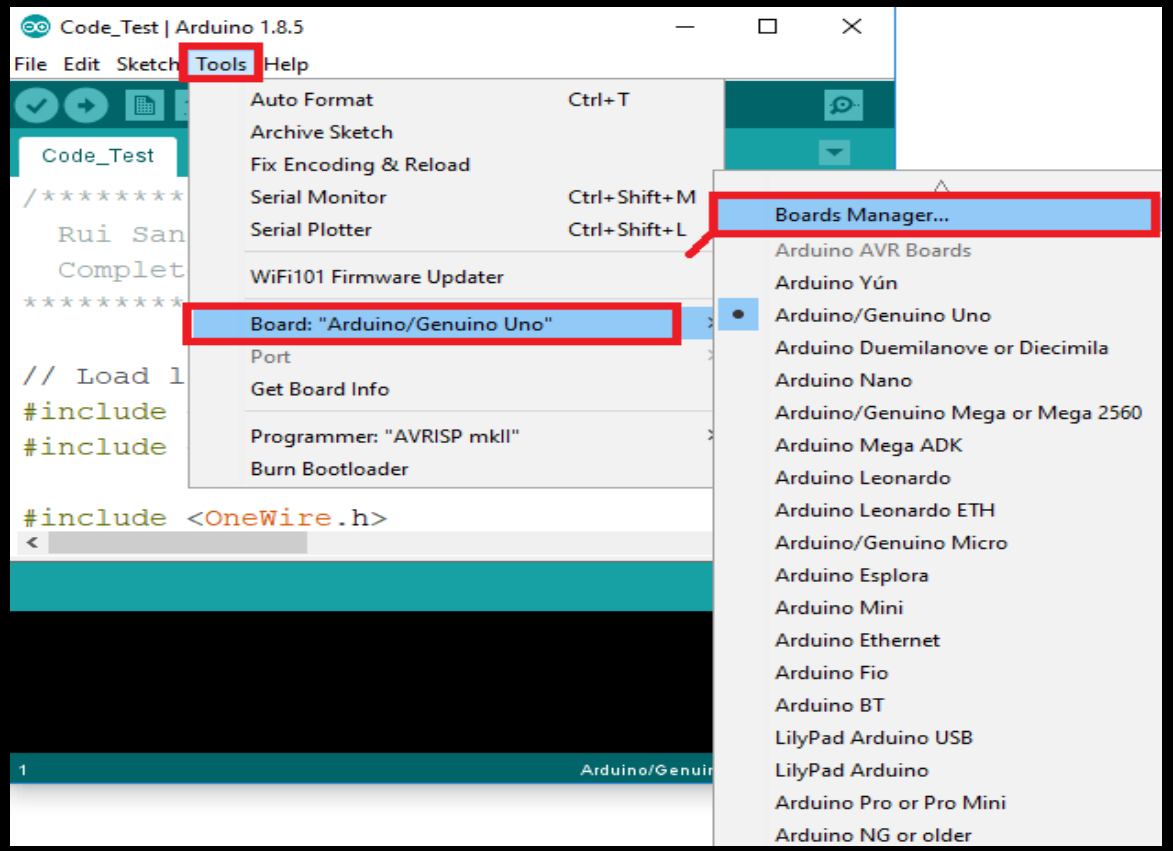
INSTALLING THE ESP32 BOARD IN ARDUINO IDE

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:



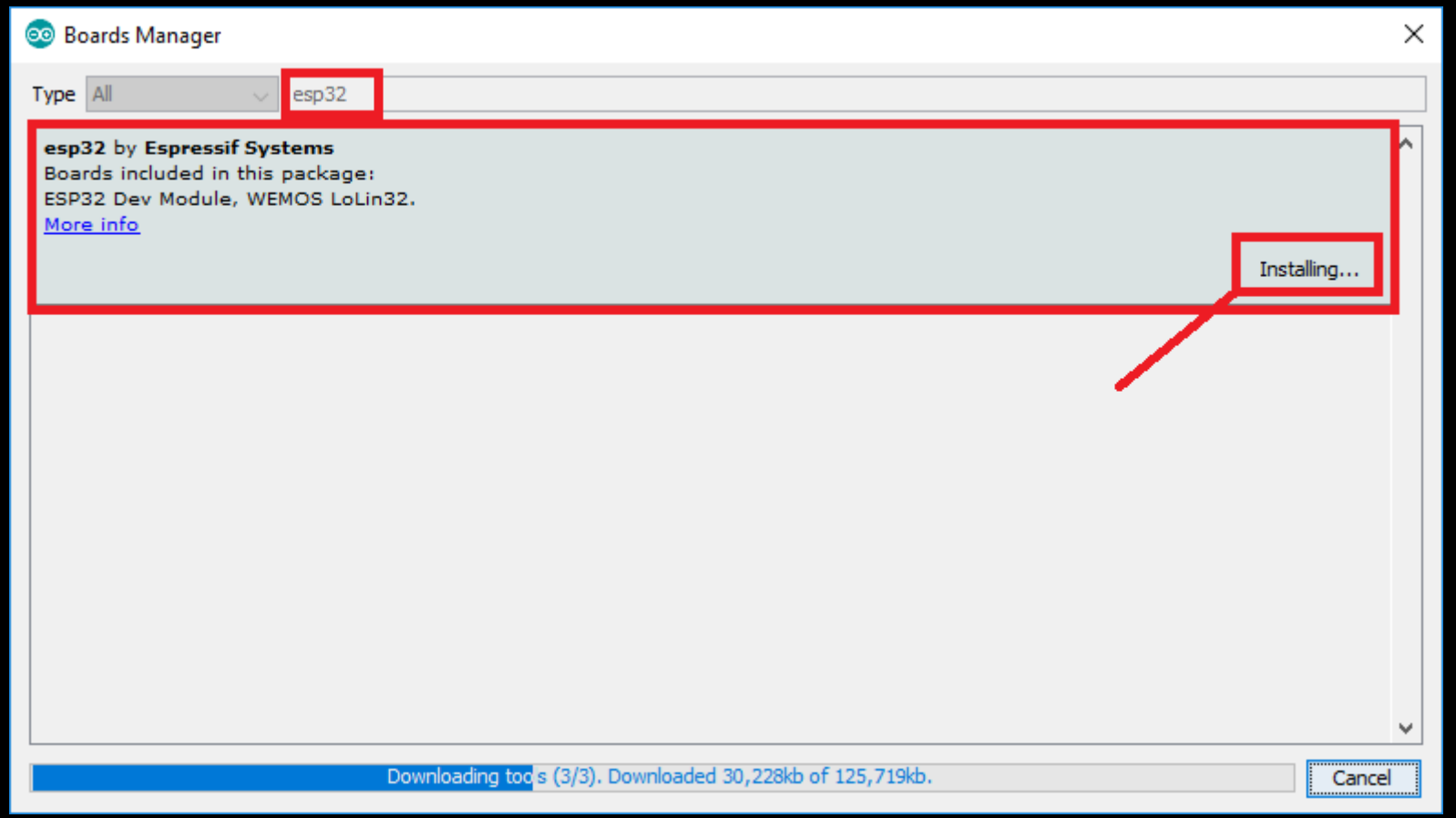
INSTALLING THE ESP32 BOARD IN ARDUINO IDE

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



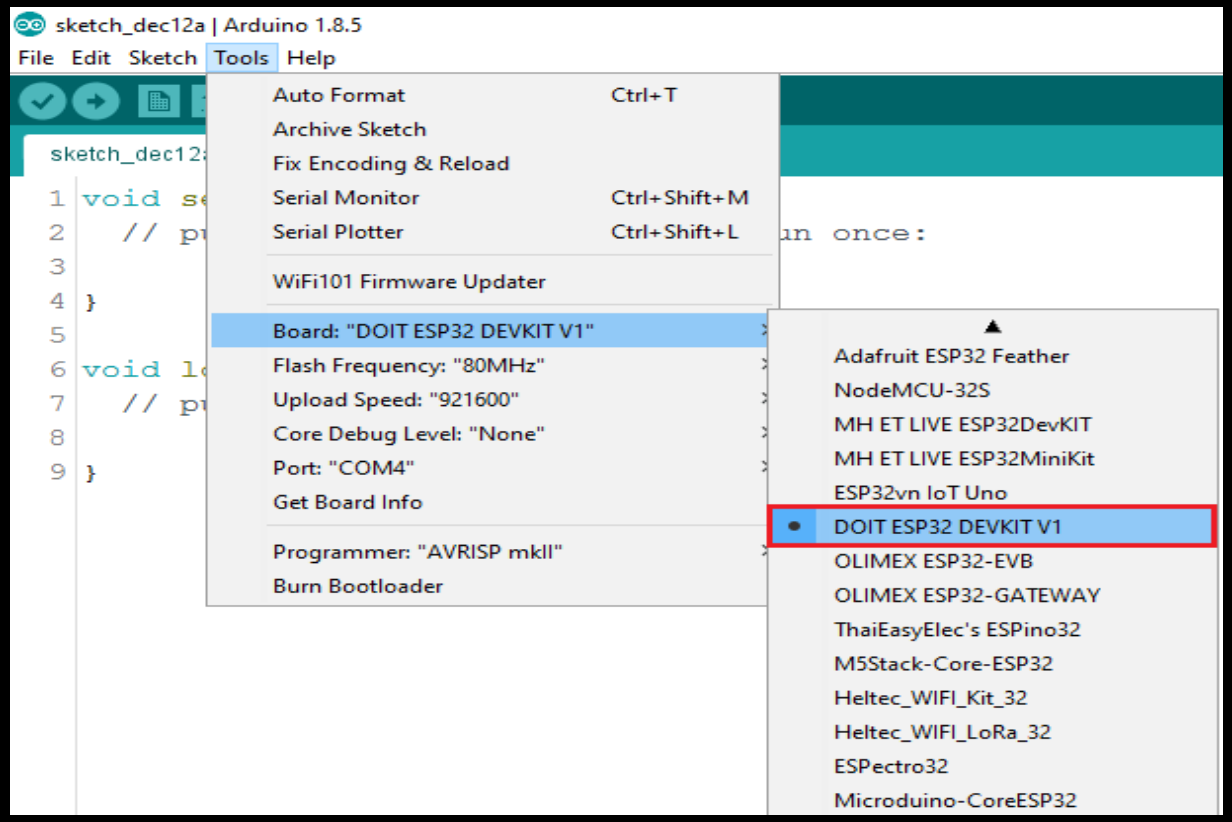
INSTALLING THE ESP32 BOARD IN ARDUINO IDE

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



INSTALLING THE ESP32 BOARD IN ARDUINO IDE

- That's it!
- Now we can choose ESP32 bord in Tools menu.



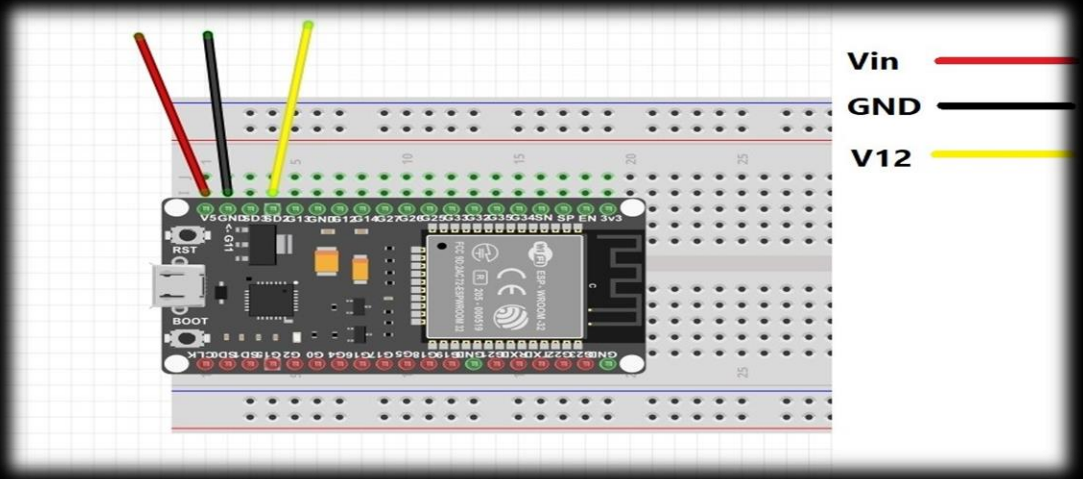
LED CLOCK

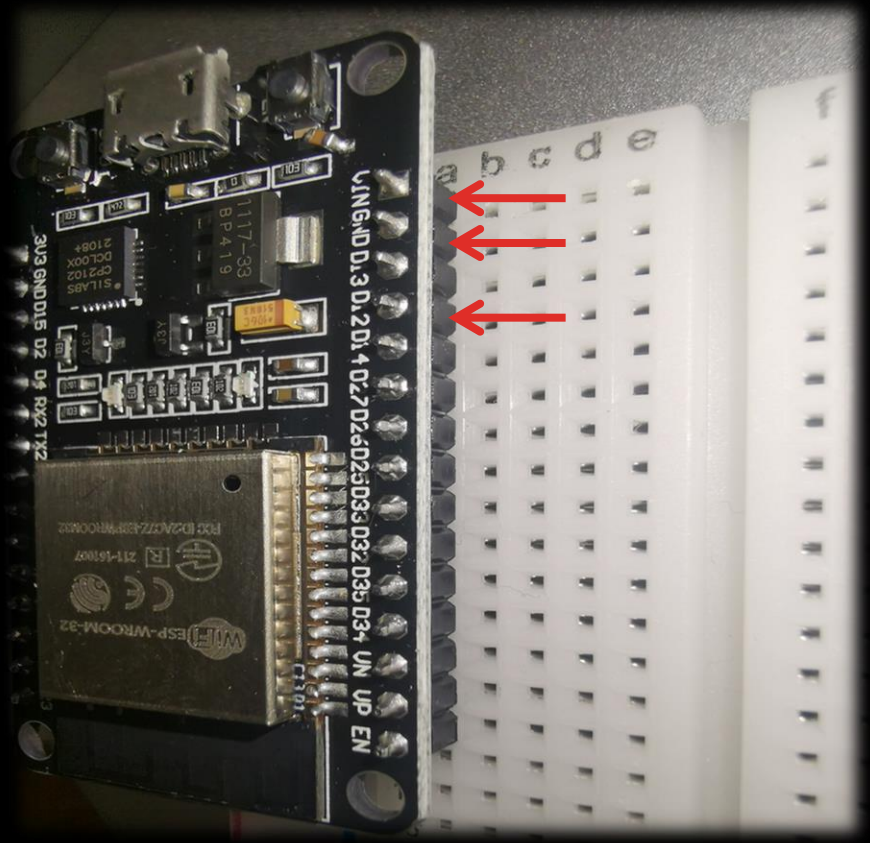
- Now we will try to make LED clock
- For this task we need:
  - ESP 32
  - Breadborad
  - Few cables
  - Led ring WS2812B

LED CLOCK

ESP32

- We need to use only 3 pins:
  - VIN for power supplay
  - GND for ground
  - And pin D12 for INPUT/OUTPUT

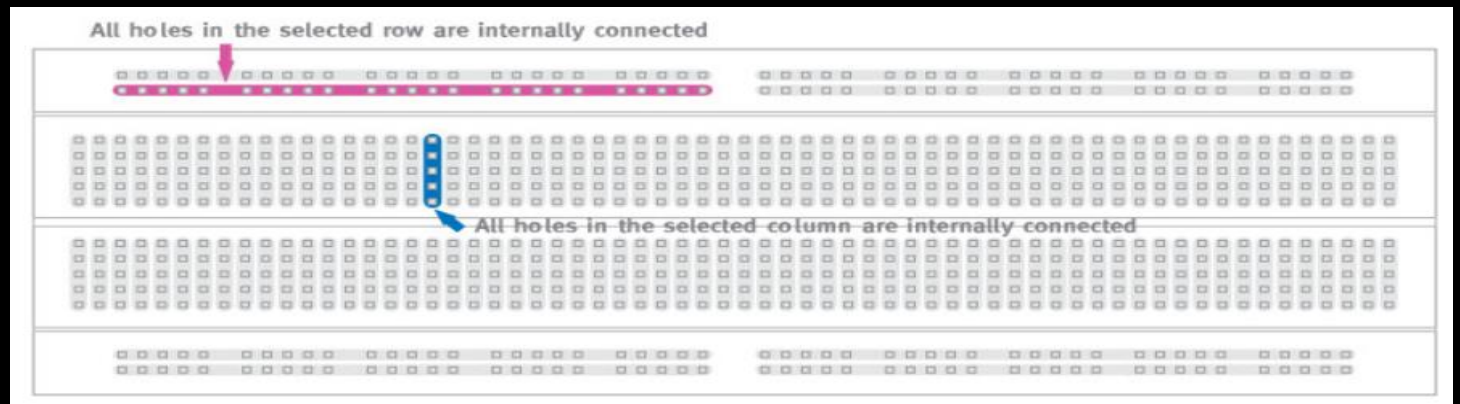


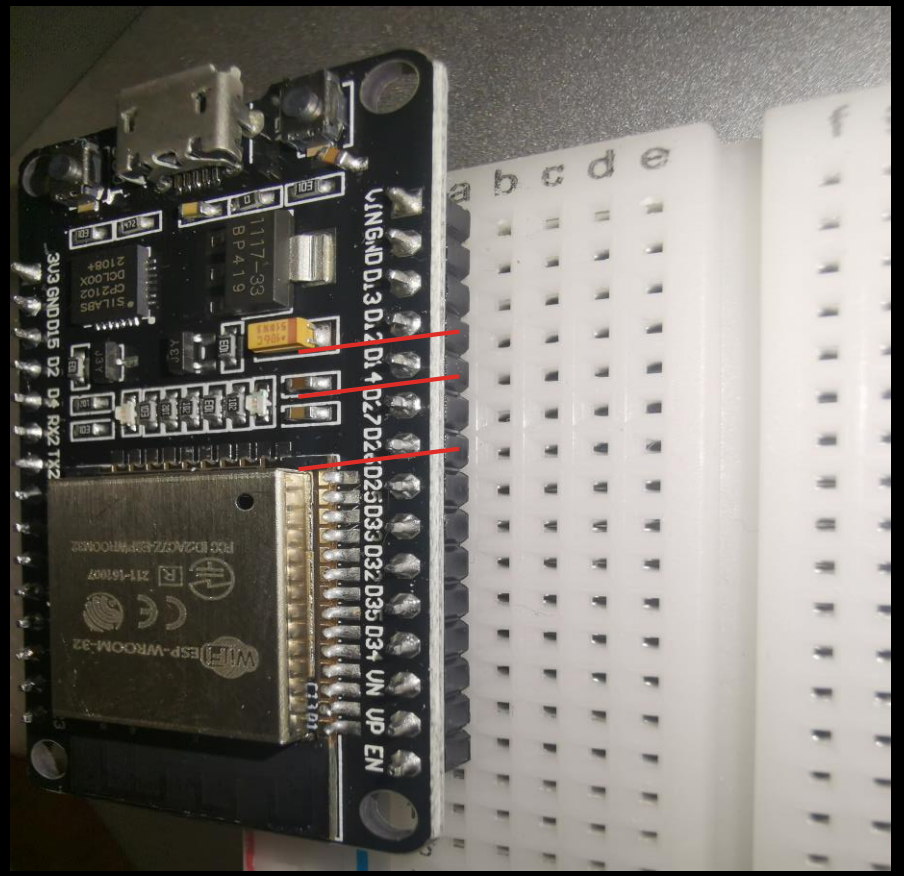


LED CLOCK

Breadboard

- We use it to connect ESP32 pins.
- First row is first pin, second row is second pin etc.
- It will help us to connect ESP32 with LED RING.
- All holes in the selected row are connected together, so the holes in the selected column. The set of connected holes can be called a node.

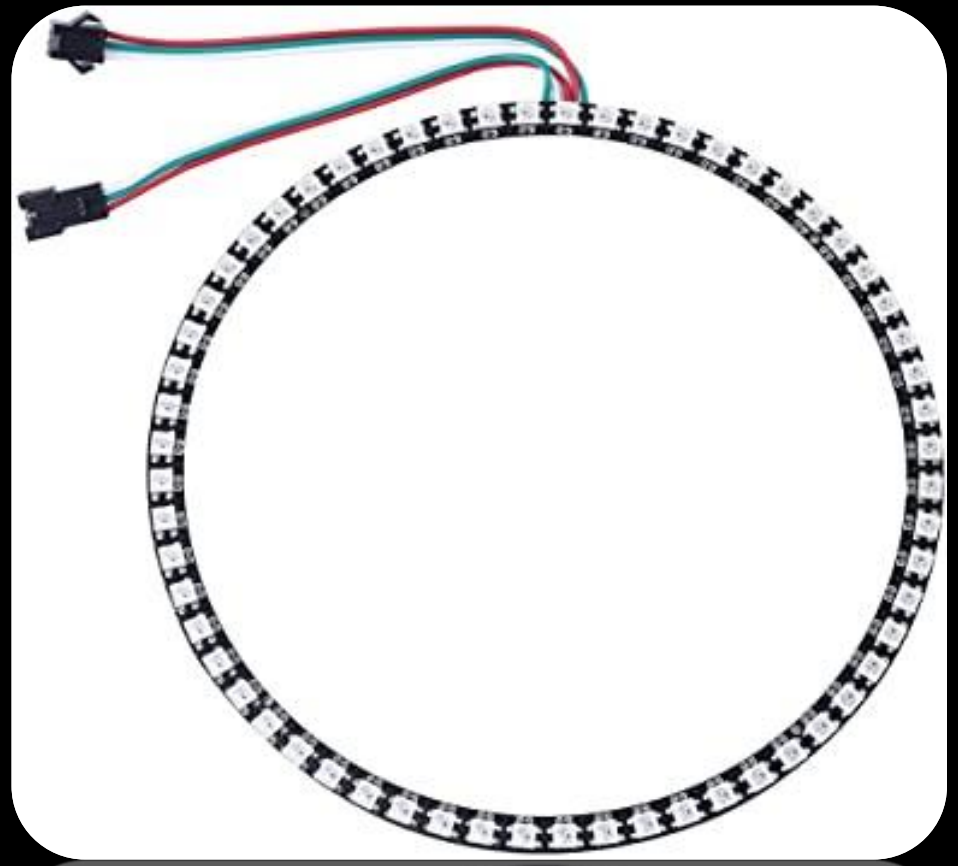




LED CLOCK

LED ring

- It will be used to show time – our a LED CLOCK.
- It has 60 LEDs
- LEDs are connected in series. If one of them fail down, ring doesn't work.
- Blue color – shows seconds
- Red color – shows minutes
- Green color – shows hours

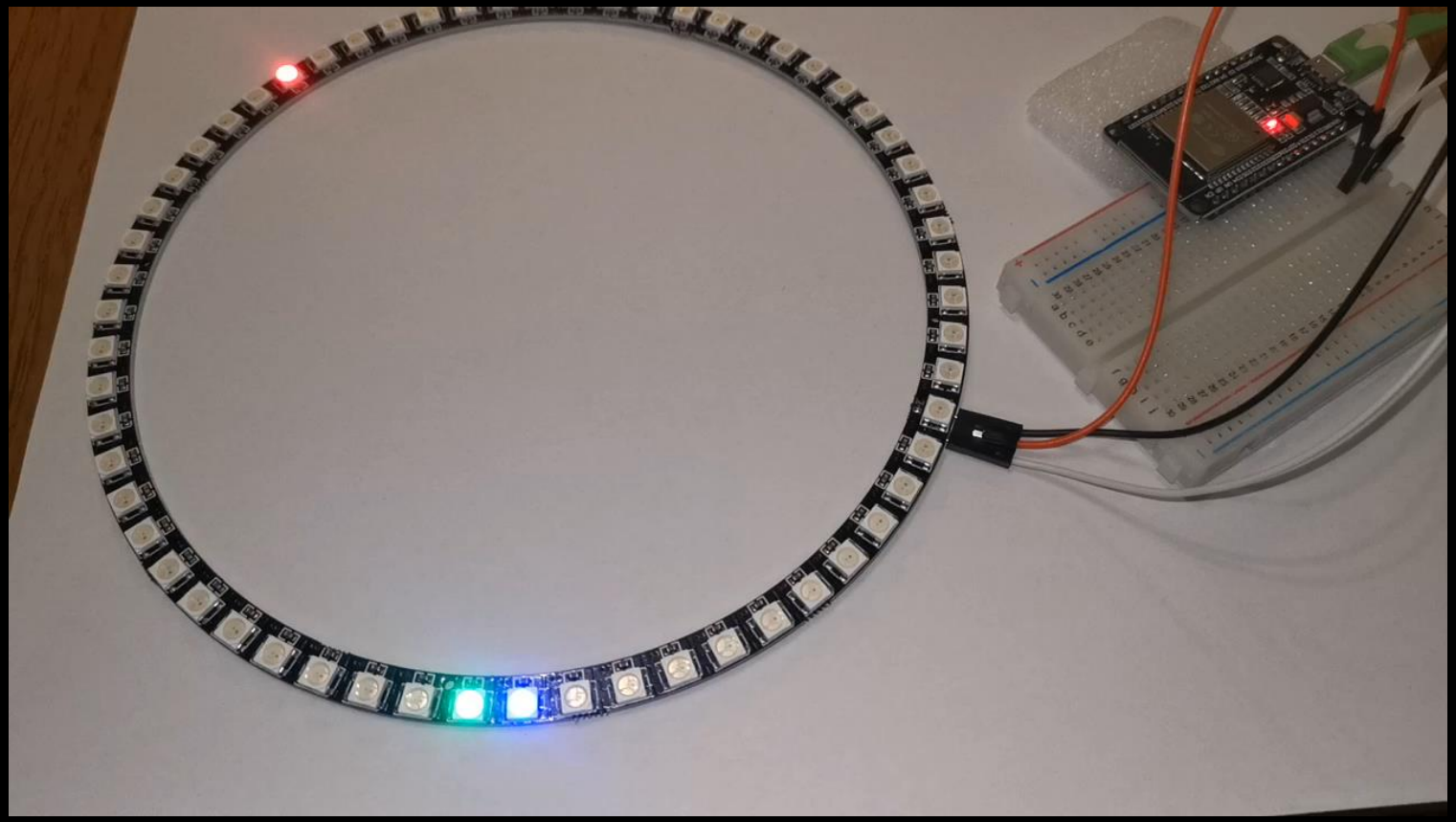


LED CLOCK

How to put it all togother

1. Connect ESP32 to breadboard
2. Connect LED RING to breadboard
3. Connect USB cable to computer
4. Open Arduino IDE
5. Create new File and now you are ready to programming

THE LED CLOCK – FINAL PRODUCT



COFFEE
Break
TIME