

# PSI3542 - 2023

## SISTEMAS EMBARCADOS PARA IOT

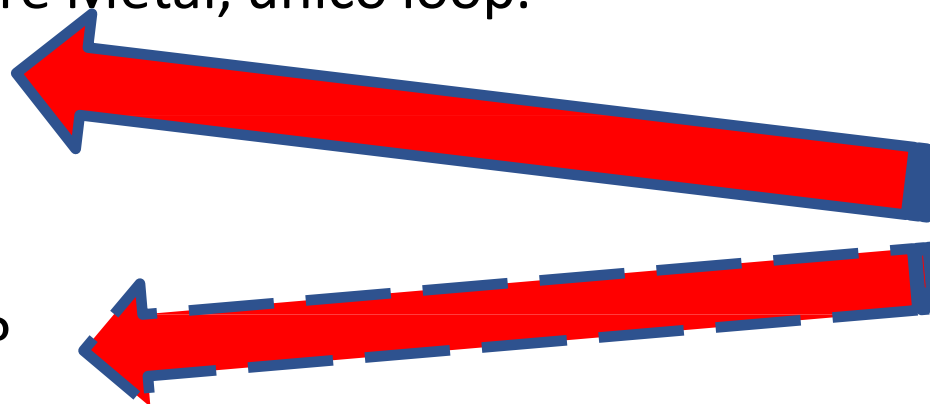
AULA 08: ATIVIDADE 8 DISPOSITIVO IOT MQTT COM MICROPYTHON

SERGIO TAKEO KOFUJI

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# Software para Dispositivos IOT

- Opção 1:
  - Arduino-like. Bare Metal, único loop.
  - **MicroPython**
- Opção 2:
  - RTOS
  - MicroPython???
- Opção 3:
  - LINUX, ANDROID, etc.

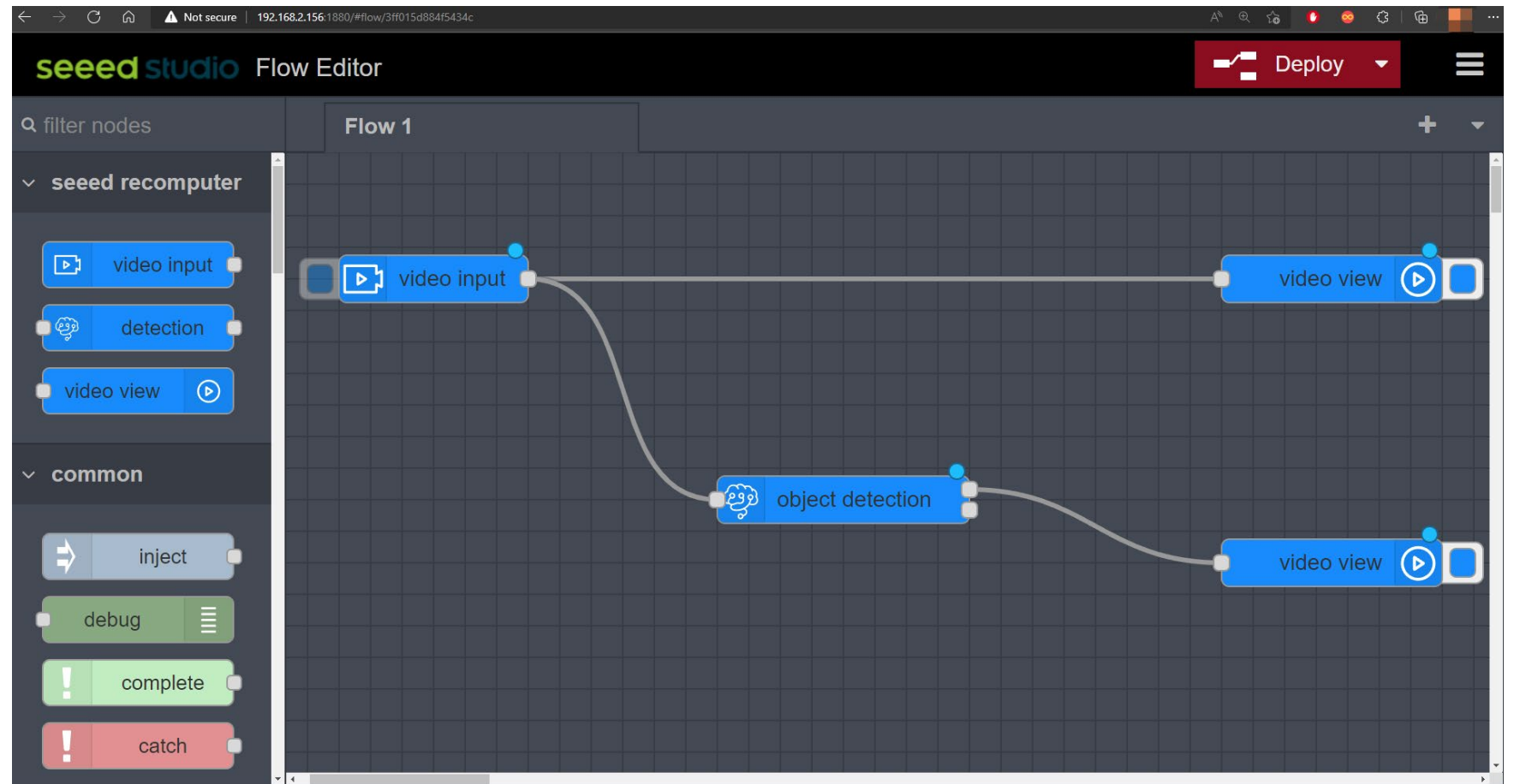


# Programação de Dispositivos IoT

- Linguagens
  - Linguagem de Montagem (“Assembly”)
  - Linguagem “C”, “C++”
  - “Linguagem de Programação Arduino” (mistura de “C”e “C++”)
  - Linguagem Python
  - Linguagem “LUA”
  - Etc.

# Low-Code e No-Code

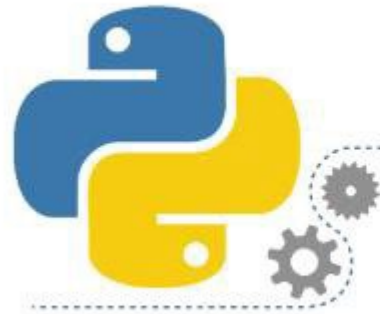
- NODE-RED



# microPython



## MicroPython



ESP8266

# MicroPython IDEs

- ✓ Mu Editor
- ✓ uPyCraft IDE
- ✓ Thonny IDE
  - ✓ [Getting Started with Thonny MicroPython \(Python\) IDE for ESP32 and ESP8266 | Random Nerd Tutorials](#)
- ✓ VS Code + Pymakr Extension
  - ✓ [MicroPython Program ESP32/ESP8266 VS Code and Pymakr | Random Nerd Tutorials](#)
- PyCharm
- MicroIDE

# MicroPython no VSCODE

- MicroPython: Program ESP32/ESP8266 using VS Code and Pymakr.
  - <https://randomnerdtutorials.com/micropython-esp32-esp8266-vs-code-pymakr/>

# Tópicos a serem abordados

- Instalação do firmware microPython
- Teste com o console REPL
- Script1: Blink
- Script2: DHT11

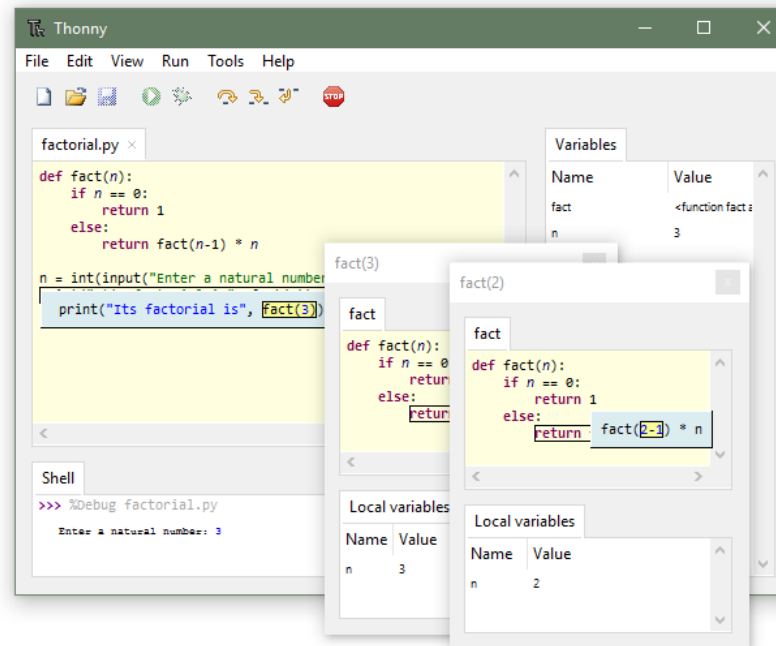


# Atividade 8.1

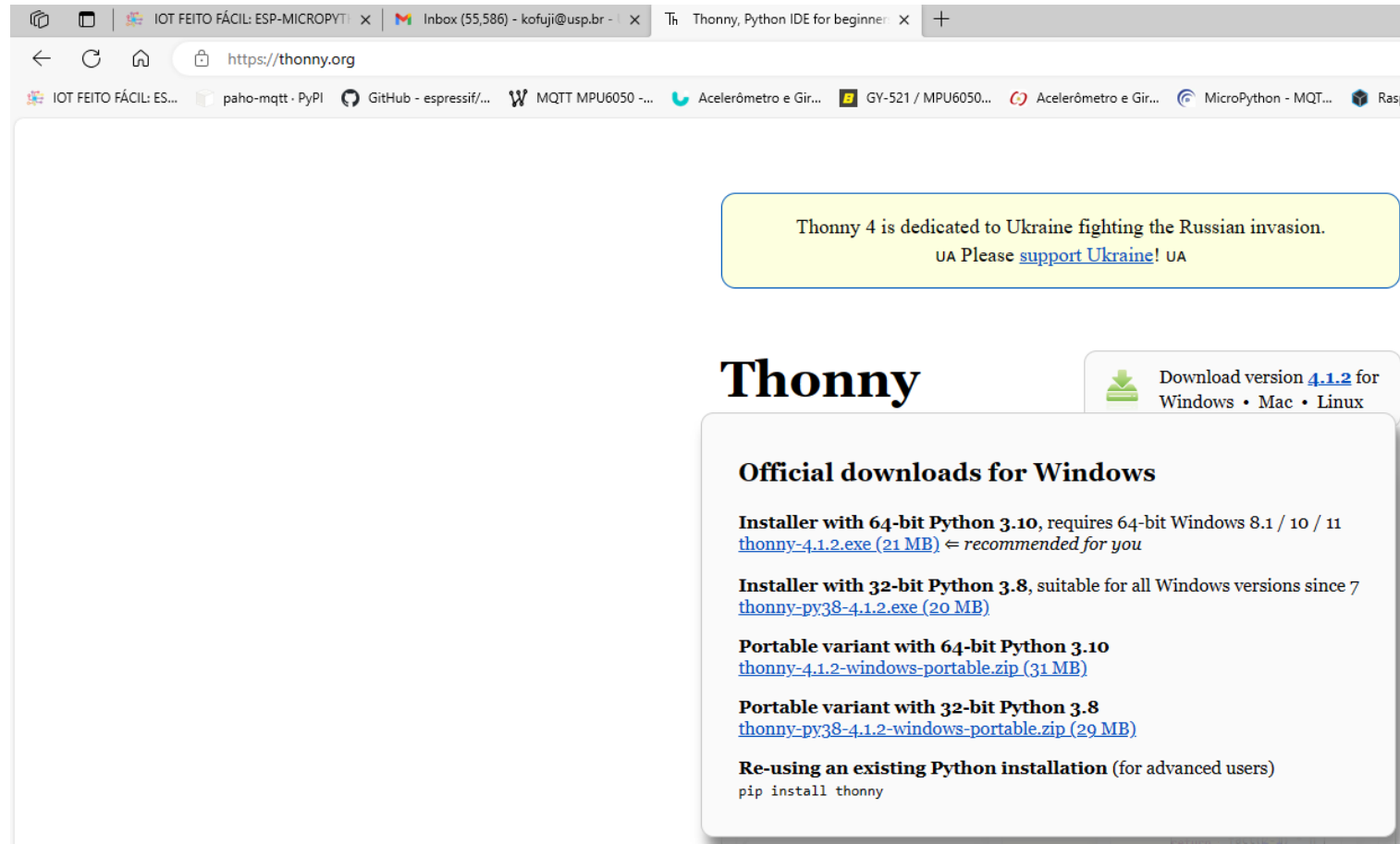
ATIVIDADE 9.1 INSTALAÇÃO DO FIRMWARE MICROPYTHON NO ESP8266/32

# THONNY – IDE MICROPYTHON

- Utilizaremos Thonny(<https://thonny.org/>) como nossa IDE de desenvolvimento em Python
  - Referência: <https://randomnerdtutorials.com/getting-started-thonny-micropython-python-ide-esp32-esp8266/>



# Fazer o download do Thonny e fazer a instalação no modo usuário



The screenshot shows a web browser window with the URL <https://thonny.org>. The browser's address bar and tabs are visible at the top. The main content area features a yellow banner with a message about Ukraine. Below this, the word "Thonny" is displayed in a large, bold font. To the right of the name is a download button with a green arrow icon and the text "Download version 4.1.2 for Windows • Mac • Linux". Underneath, there is a section titled "Official downloads for Windows" which lists four options: an installer with 64-bit Python 3.10 (recommended), an installer with 32-bit Python 3.8, a portable variant with 64-bit Python 3.10, and a portable variant with 32-bit Python 3.8. At the bottom of this section, there is a note about re-using an existing Python installation with the command `pip install thonny`.

Thonny 4 is dedicated to Ukraine fighting the Russian invasion.  
UA Please [support Ukraine!](#) UA

## Thonny

Download version **4.1.2** for  
Windows • Mac • Linux

### Official downloads for Windows

**Installer with 64-bit Python 3.10**, requires 64-bit Windows 8.1 / 10 / 11  
[thonny-4.1.2.exe \(21 MB\)](#) ← *recommended for you*

**Installer with 32-bit Python 3.8**, suitable for all Windows versions since 7  
[thonny-py38-4.1.2.exe \(20 MB\)](#)

**Portable variant with 64-bit Python 3.10**  
[thonny-4.1.2-windows-portable.zip \(31 MB\)](#)

**Portable variant with 32-bit Python 3.8**  
[thonny-py38-4.1.2-windows-portable.zip \(29 MB\)](#)

**Re-using an existing Python installation** (for advanced users)  
`pip install thonny`

# Instalar o Sistema Micropython no ESP32/8266

- Dependendo de seu dispositivo (ESP32 ou ESP8266), você terá que baixar o firmware do MicroPython(Arquivo .bin).

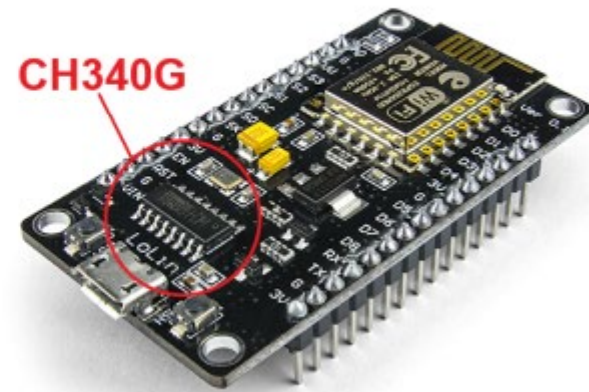
[https://micropython.org/download/ESP32\\_GENERIC/](https://micropython.org/download/ESP32_GENERIC/)

[https://micropython.org/download/ESP8266\\_GENERIC/](https://micropython.org/download/ESP8266_GENERIC/)

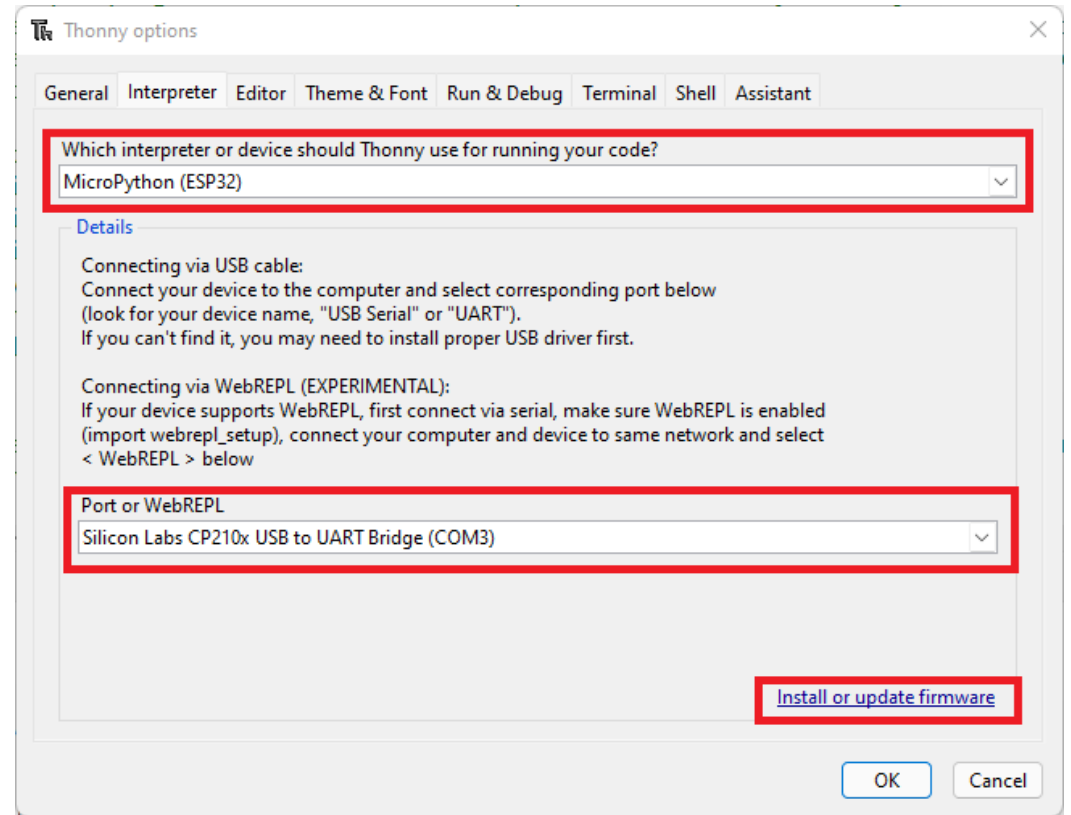
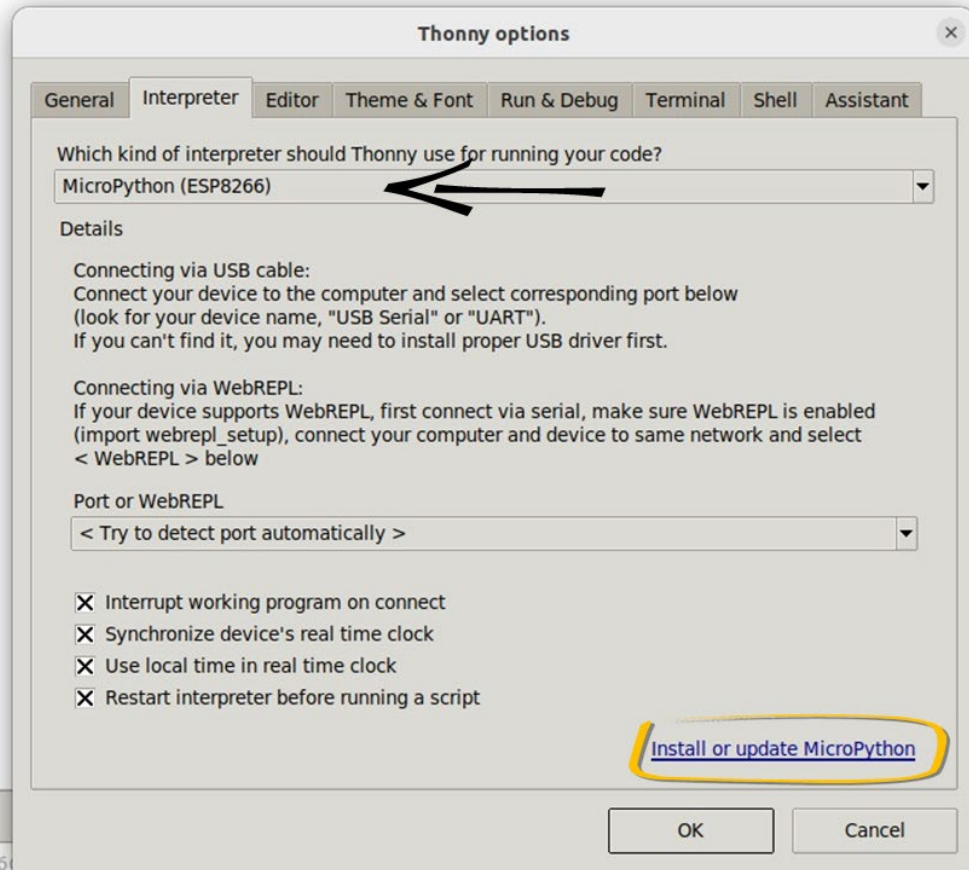
- No Windows, será necessário instalar o driver do dispositivo USB (CP210x p/placas NodeMCU V2 e ESP32 ou o CH340G p/placas NodeMCU V3)

- <https://www.robocore.net/tutoriais/instalando-driver-do-nodemcu>

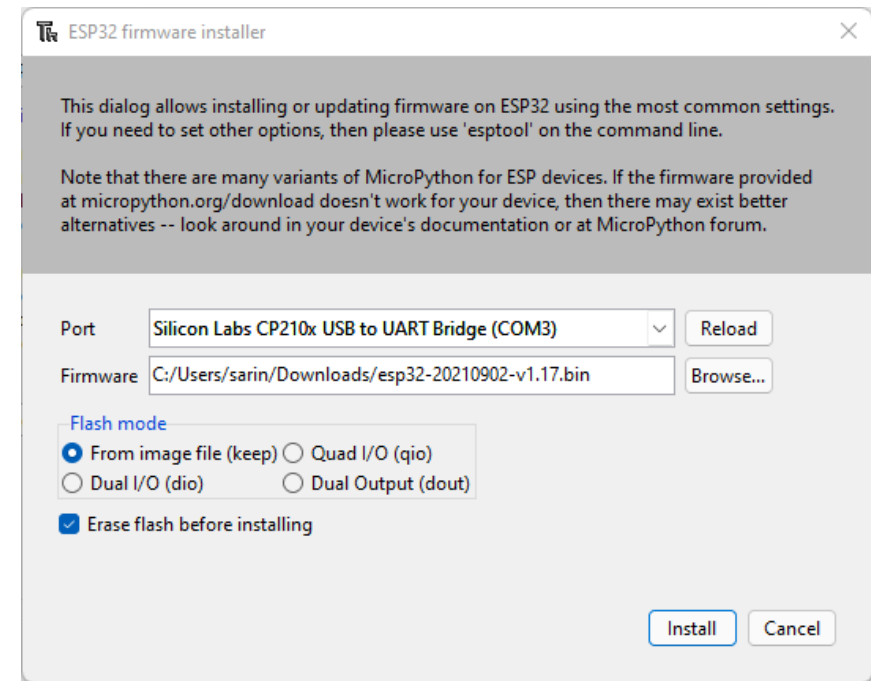
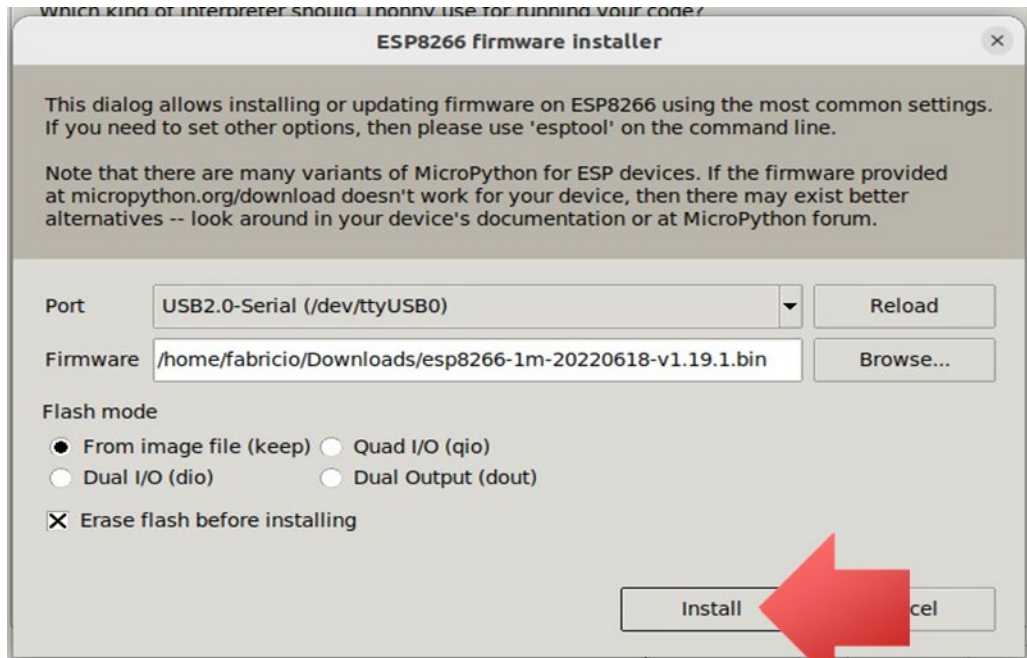
- <https://embedded-systems-design.github.io/esp32-installation-and-setup/>



# Gravar o MicroPython no dispositivo...



# Gravar o MicroPython no dispositivo...



# Execução de comando microPython

- Teste 1
  - print (“hello word”)
  - print (“hello PSI3542 2023 ATIVIDADE 8 *numerousp data*”)
- Teste 2
  - import machine
  - pin = machine.pin(2, machine.pin.out)
  - pin.on()
  - pin.off()



# Atividade 8.2

Execução de script micropython

# 1º. script

- Edite e execute o script
  - from machine inport pin
  - from time import sleep
- led = pin(2, pin.out)
- While True:
  - led.value(not led.value)
  - sleep (1)

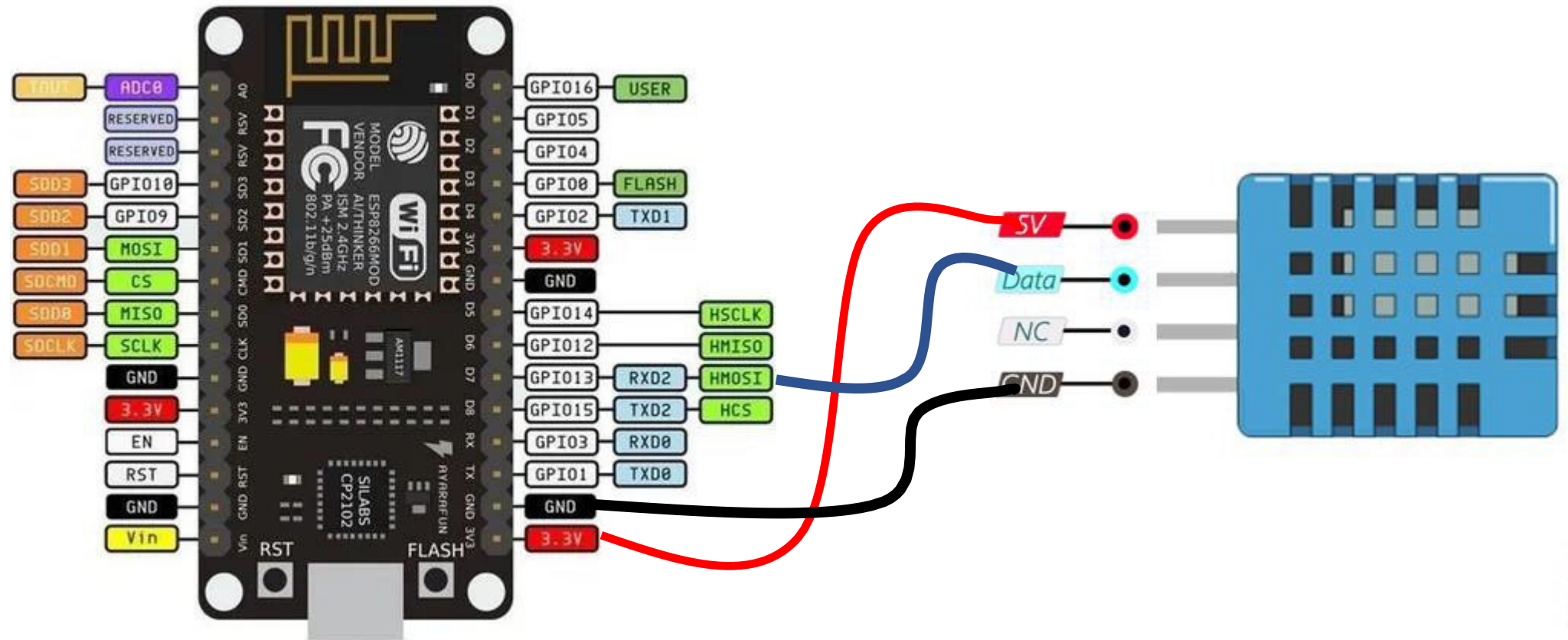
# Atividade 8.3

Dispositivo medidor de temperatura e pressão com microPython

# ATIVIDADE 8.3

- ESCREVA UM SCRIPT QUE LEIA DADOS DE TEMPERATURA E HUMIDADE DE UM SENSOR DHT11 E IMPRIMA NO CONSOLE.
- Tome como base o roteiro:
  - <https://randomnerdtutorials.com/esp32-esp8266-dht11-dht22-micropython-temperature-humidity-sensor/>
- Conecte o DHT11 ao ESP32/8266 conforme o esquema seguinte.
- Atenção: Modifique o script para usar o pino GPIO usado na montagem!

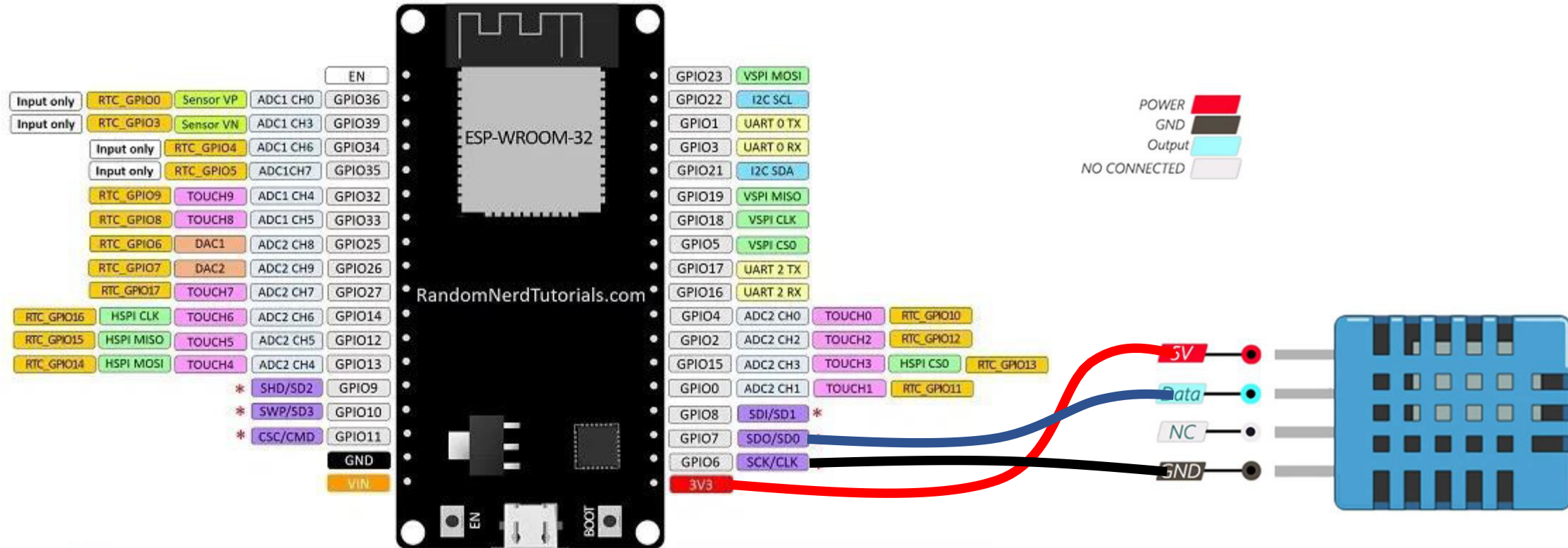
# MONTAGEM ESP8266 + DHT11



# ESP32 DEVKIT V1 – DOIT

version with 36 GPIOs

# MONTAGEM ESP32 + DHT11



\* Pins SCK/CLK, SDO/SD0, SD1/SD1, SHD/SD2, SWP/SD3 and SCS/CMD, namely, GPIO6 to GPIO11 are connected to the integrated SPI flash integrated on ESP-WROOM-32 and are not recommended for other uses.

# Atividade 8.3

Dispositivo iot MQTT Thingspeak sensor temperatura e umidade com micropython

# Atividade 8.4

- Implementar um canal no Thingspeak com dois campos e um broker MQTT
- Seguir (adaptar conforme o caso)
  - <https://randomnerdtutorials.com/micropython-mqtt-publish-dht11-dht22-esp32-esp8266/>
- Dica:
  - <https://www.tudosobreiot.com.br/blog/1103-iot-feito-facil-esp-micropython-mqtt-thingspeak>



# Bom Trabalho!

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