ESP32 using Micropython Course

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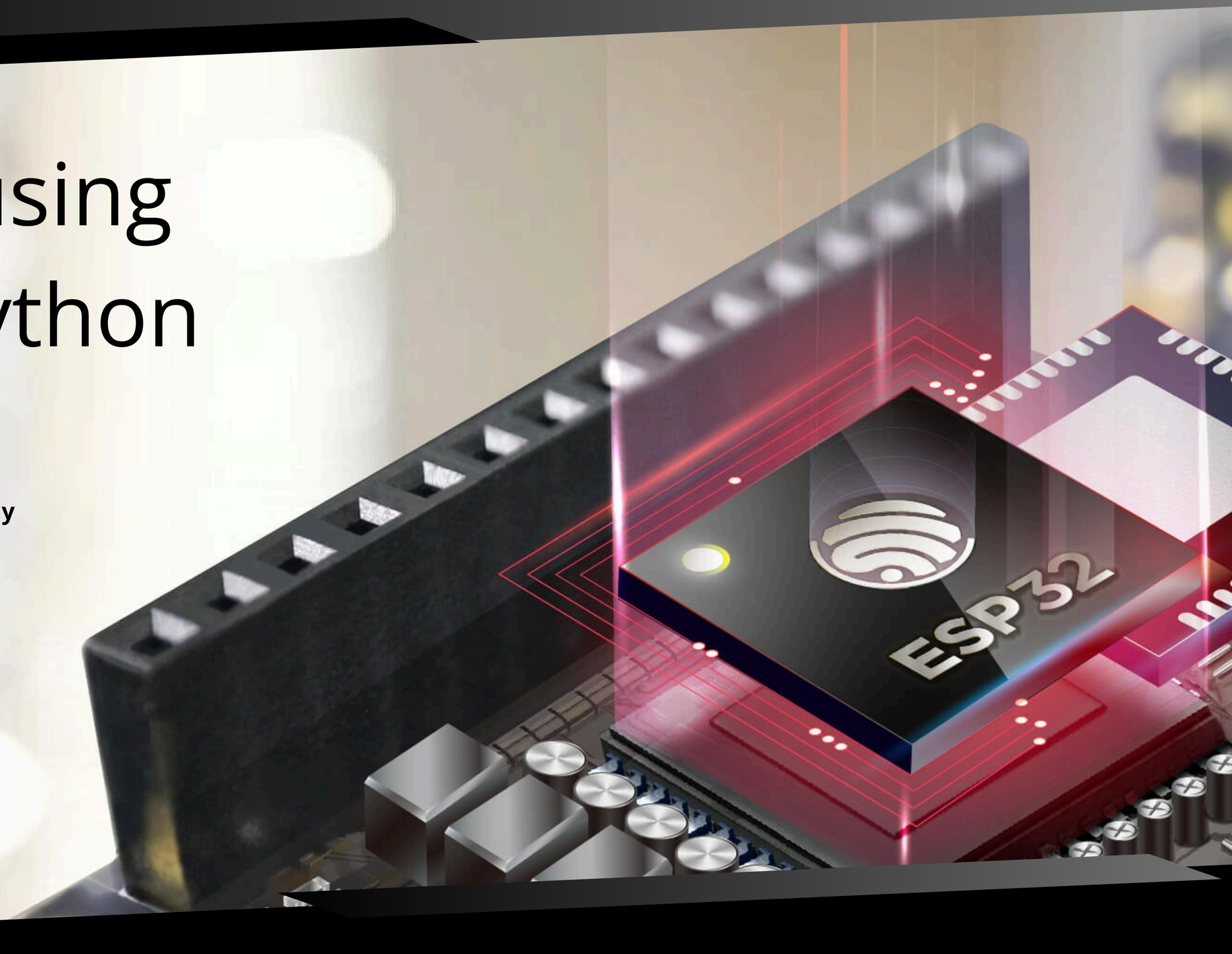

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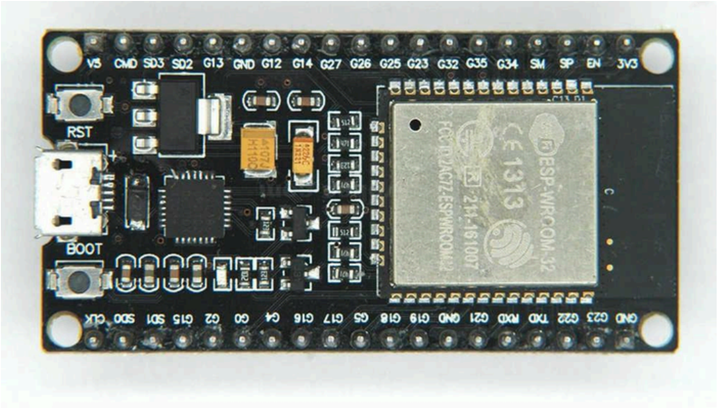
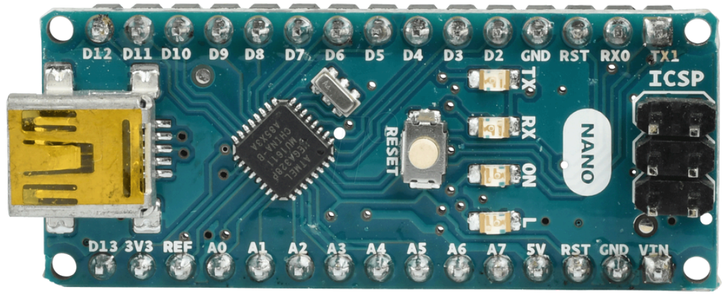
ESP32



VS

ARDUINO



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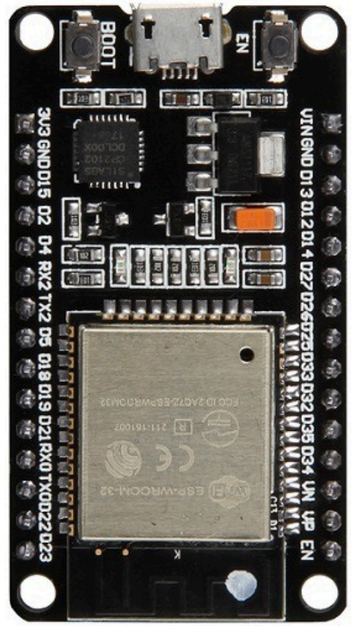
WHY ESP32 ?

Robust Design

ESP32 is capable of functioning reliably in industrial environments, with an operating temperature ranging from –40°C to +125°C. Powered by advanced calibration circuitries, ESP32 can dynamically remove external circuit imperfections and adapt to changes in external conditions.



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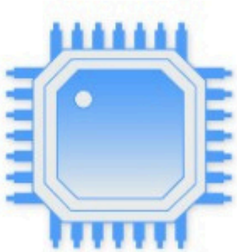
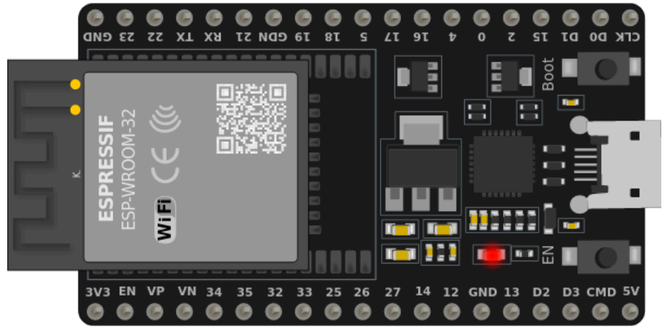
WHY ESP32 ?

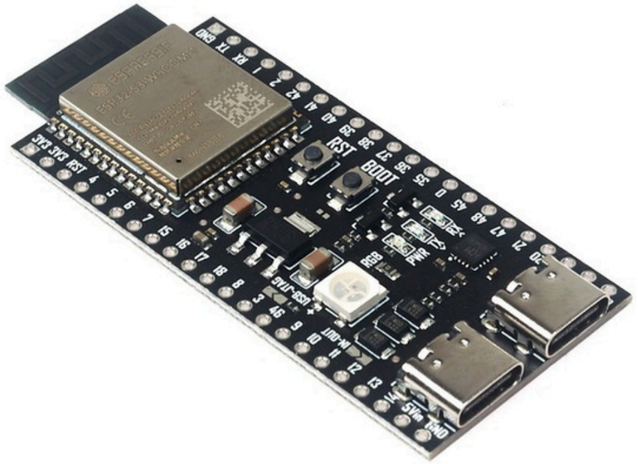




High Level of Integration

ESP32 is highly-integrated with in-built antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules. ESP32 adds priceless functionality and versatility to your applications with minimal Printed Circuit Board (PCB) requirements.

WHY ESP32



Ultra-Low Power Consumption

Engineered for mobile devices, wearable electronics and IoT applications, ESP32 achieves ultra-low power consumption with a combination of several types of proprietary software. ESP32 also includes state-of-the-art features, such as fine-grained clock gating, various power modes and dynamic power scaling.

WHY ESP32 ?

Hybrid Wi-Fi & Bluetooth Chip

ESP32 can perform as a complete standalone system or as a slave device to a host MCU, reducing communication stack overhead on the main application processor. ESP32 can interface with other systems to provide Wi-Fi and Bluetooth functionality through its SPI / SDIO or I2C / UART interfaces.

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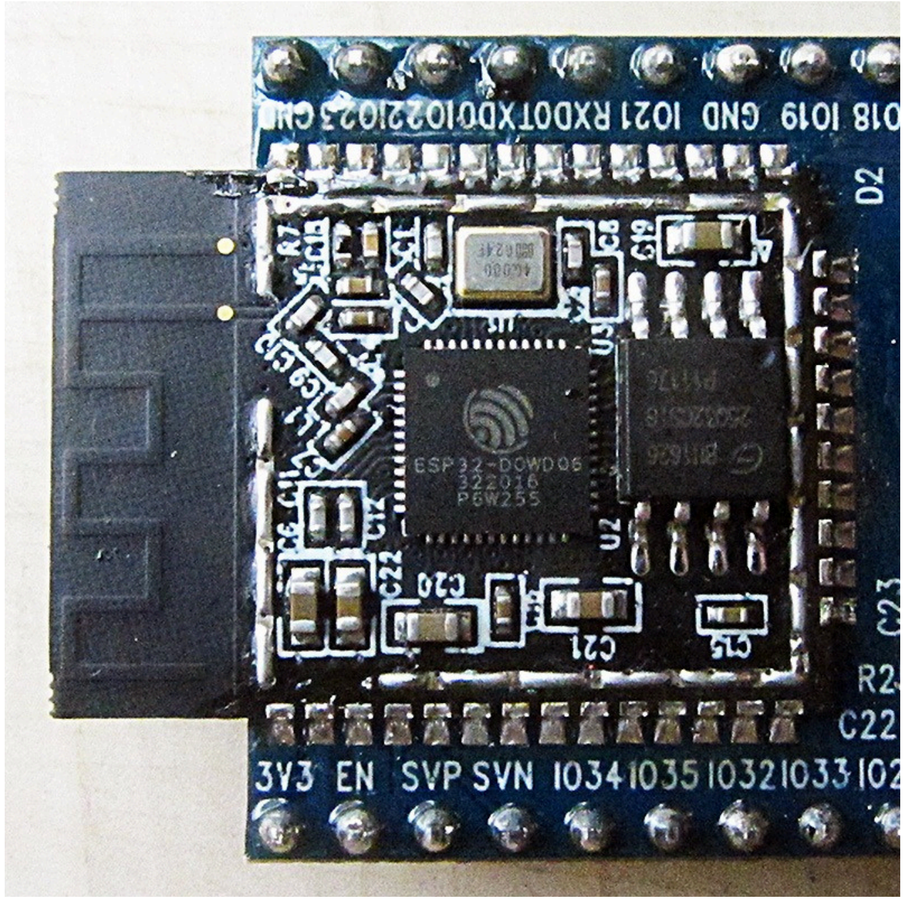
ESP32 MICROCONTROLLER



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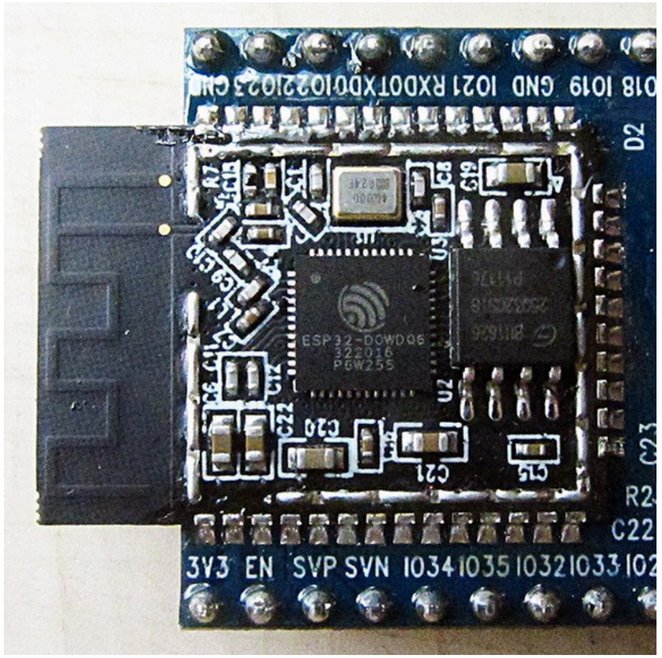

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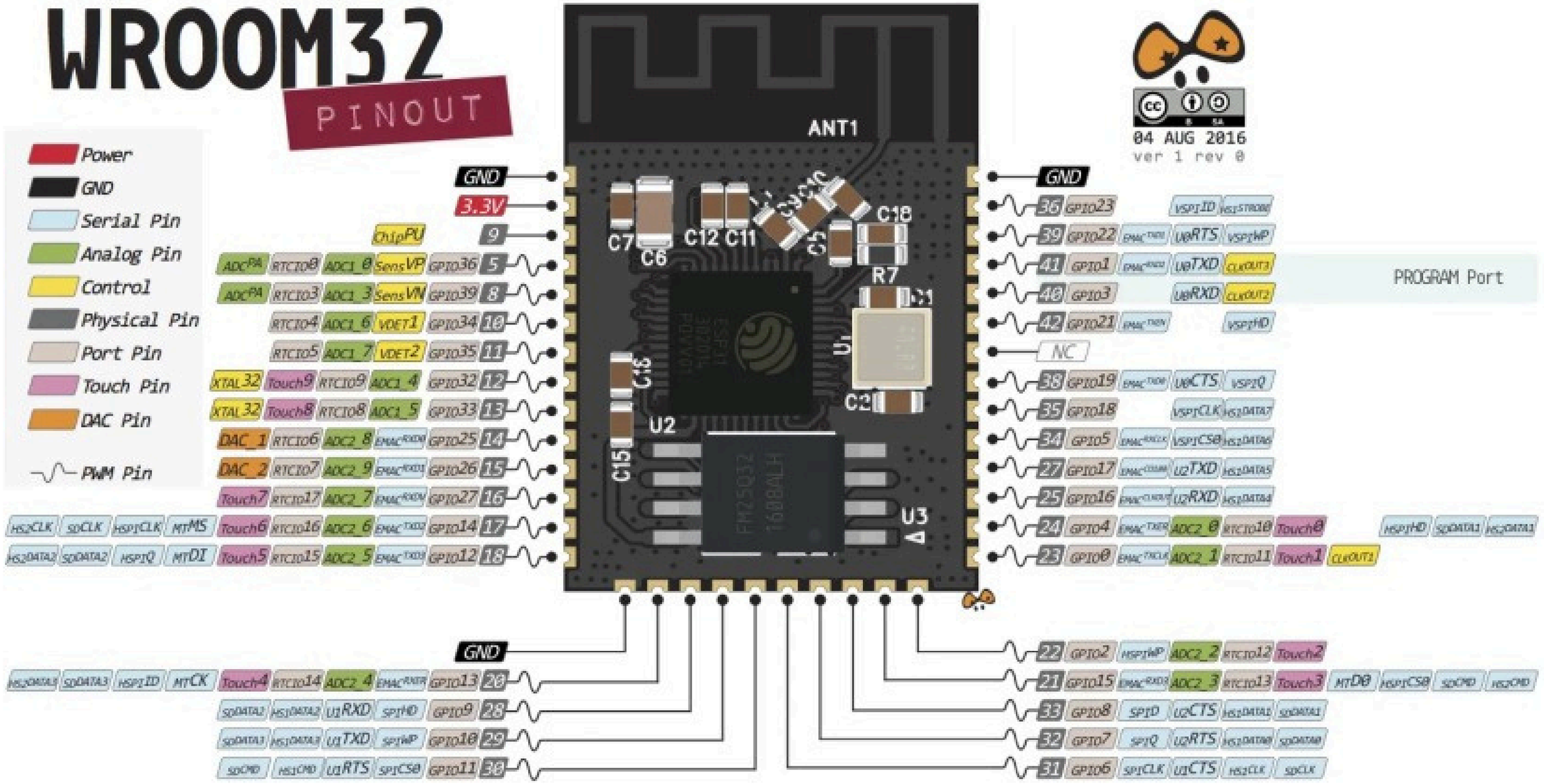

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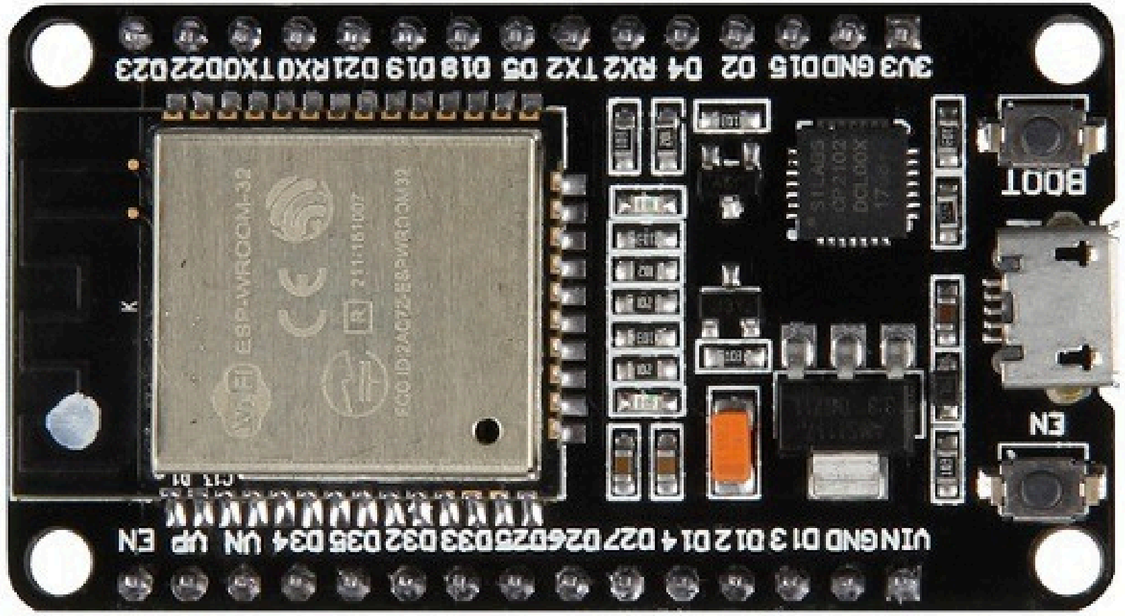
ESP32 WROOM 32 WIFI/BLUETOOTH



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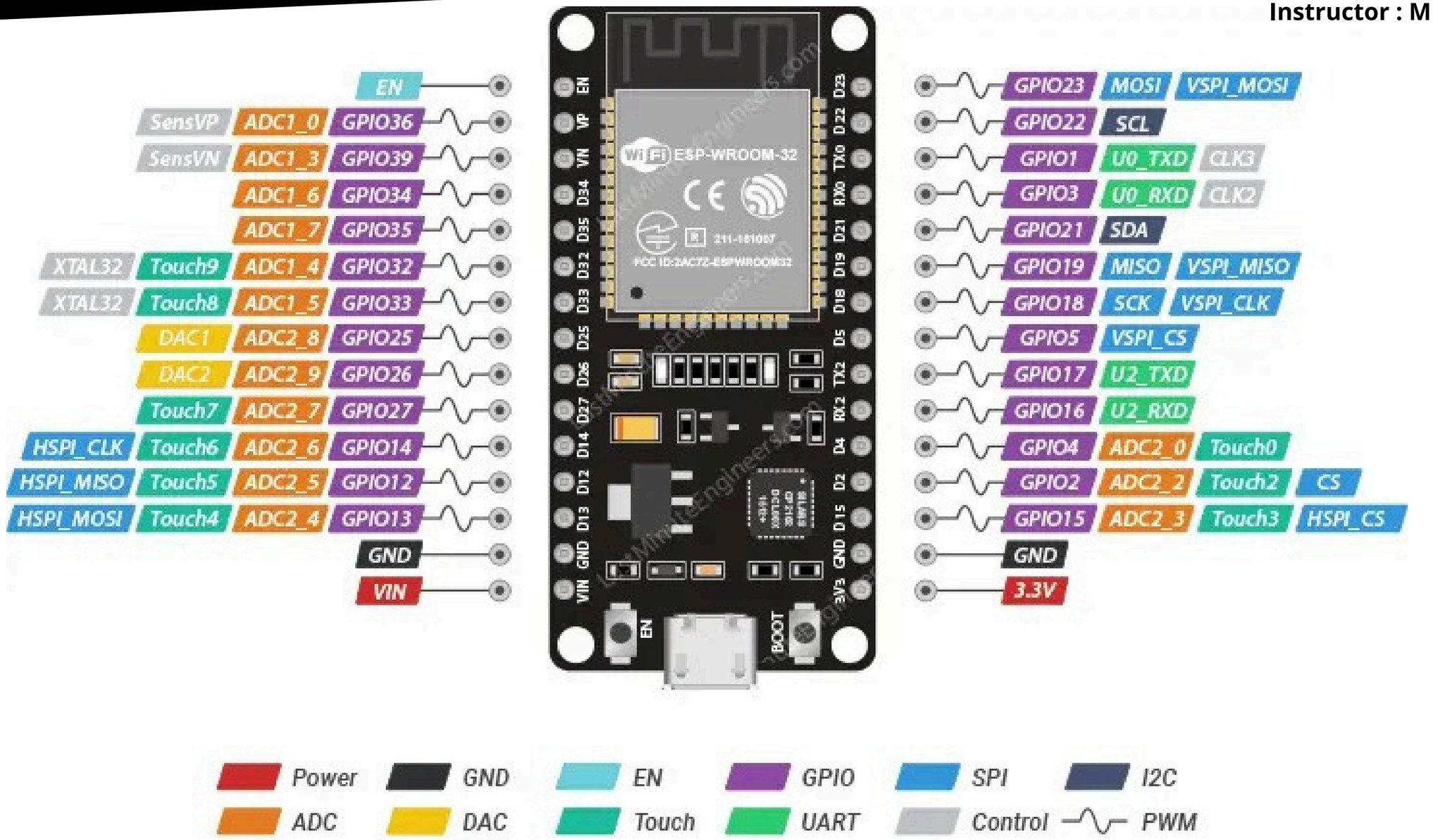

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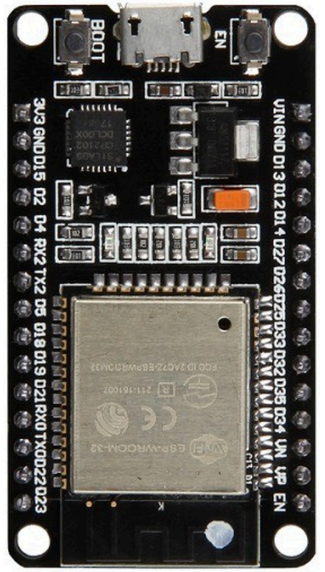
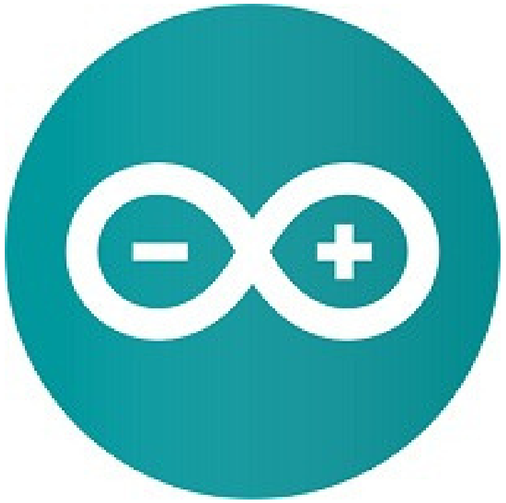
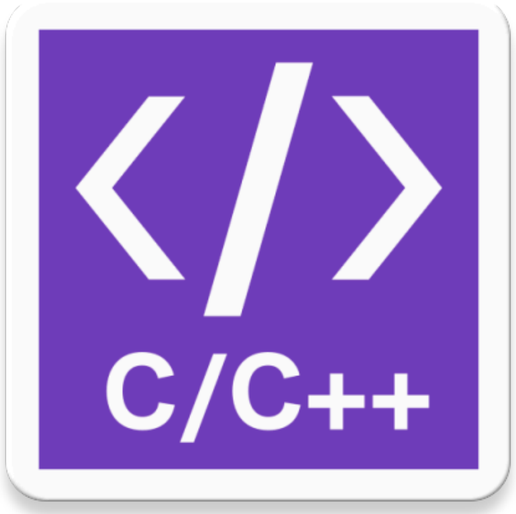
Number of cores	2 (dual core)
Wi-Fi	2.4 GHz up to 150 Mbits/s
Bluetooth	BLE (Bluetooth Low Energy) and legacy Bluetooth
Architecture	32 bits
Clock frequency	Up to 240 MHz
RAM	512 KB
Pins	30, 36, or 38 (depending on the model)
Peripherals	Capacitive touch, ADC (analog to digital converter), DAC (digital to analog converter), I2C (Inter-Integrated Circuit), UART (universal asynchronous receiver/transmitter), CAN 2.0 (Controller Area Netwokr), SPI (Serial Peripheral Interface), I2S (Integrated Inter-IC Sound), RMII (Reduced Media-Independent Interface), PWM (pulse width modulation), and more.
Built-in buttons	RESET and BOOT buttons
Built-in LEDs	built-in blue LED connected to GPIO2; built-in red LED that shows the board is being powered
USB to UART	CP2102



PROGRAMMING LAUNGUAGES





MicroPython

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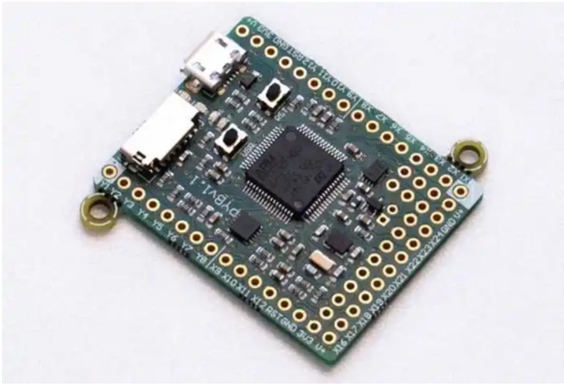
MICROPYTHON BOARDS

RPI PICO W

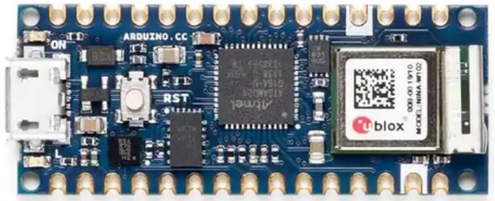
BBC MicroBit

Arduino Nano RP2040

Arduino Portenta H7



Pyboard



Arduino Nano 33 BLE

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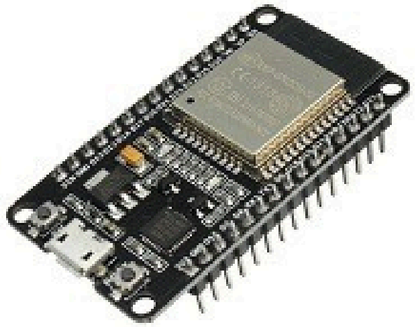
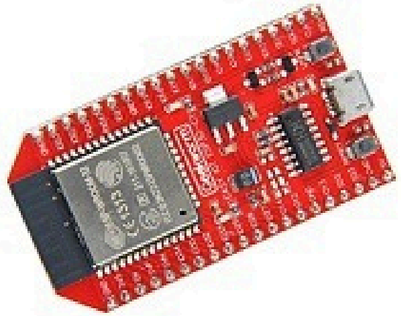
TYPES OF ESP32

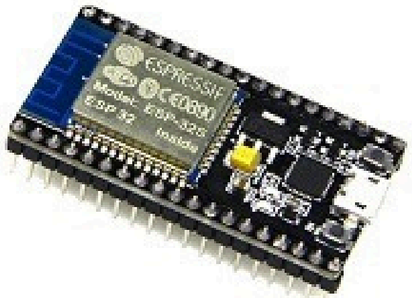
DOIT DEVKIT V1



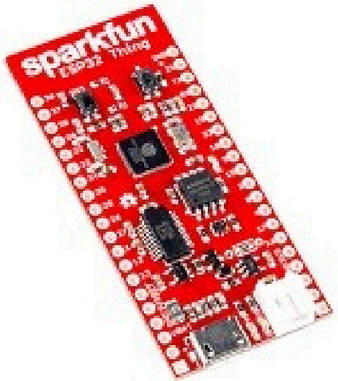
ESP32 DevKit



ESP-32S NodeMCU



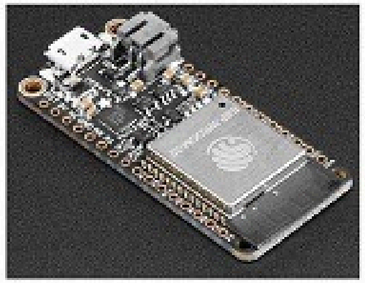
ESP32 Thing



WEMOS LOLIN32

“WeMos” OLED

HUZZAH32



Others

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ESP32 PLC

Industrial ESP32 MEGA PLC IOT Controlling

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CODING

MicroPython

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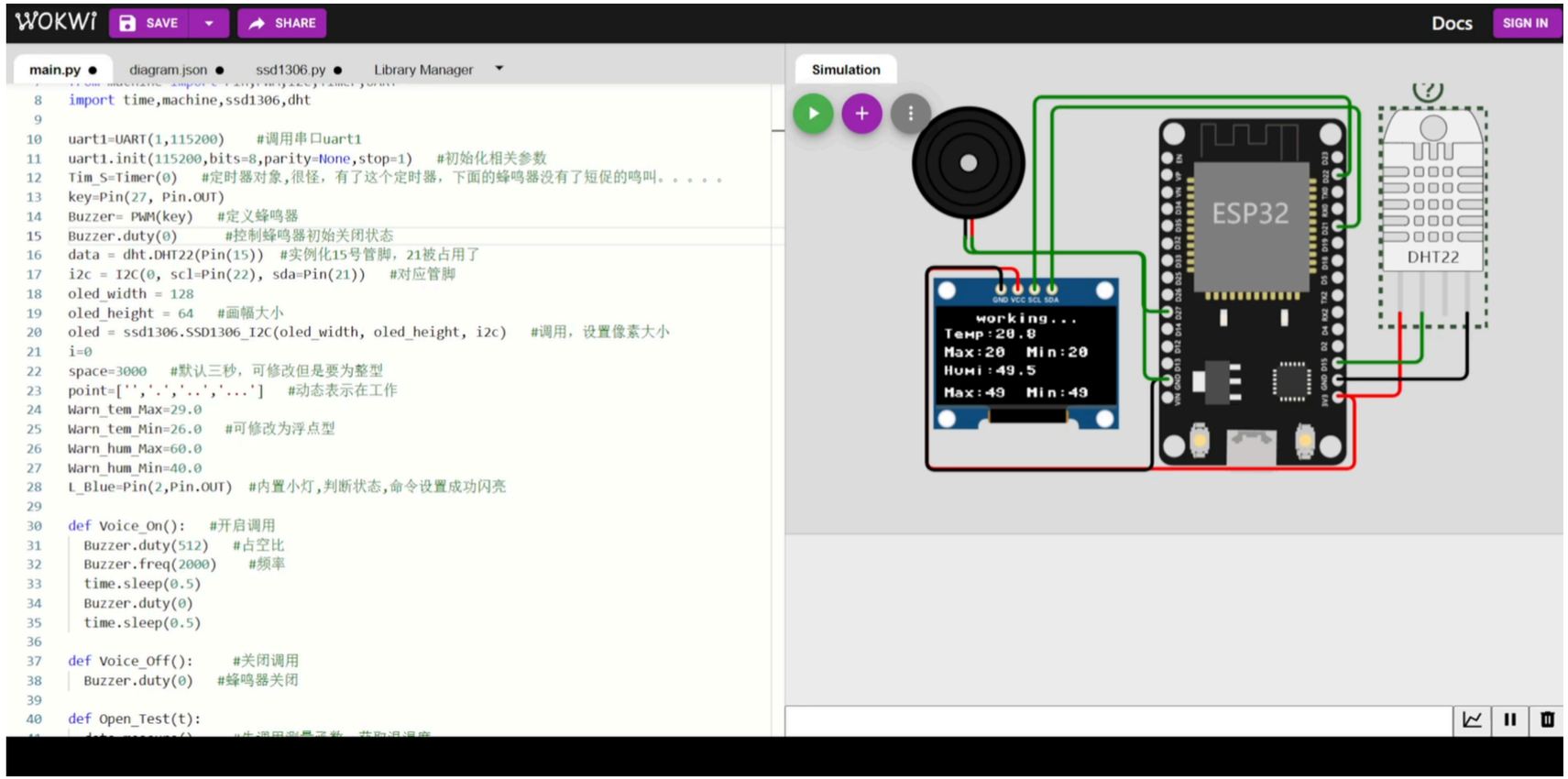
WOKWI SIMULATOR



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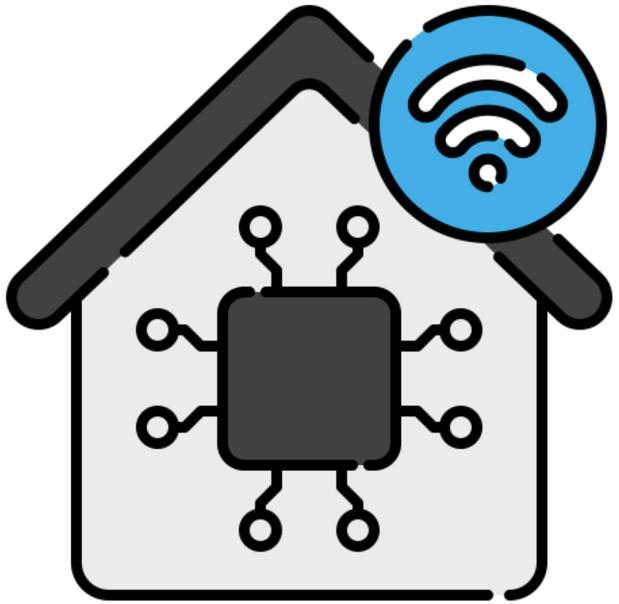
SMART HOME PROJECT



The objective of this project is to develop an intelligent home automation system for managing temperature, humidity, and security in a house.

The system should be capable of **measuring and controlling temperature and humidity**, **managing signaling lights**, and **controlling a_locked door.** It should also include a button to **activate** or **deactivate** the system.

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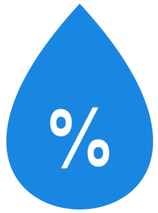
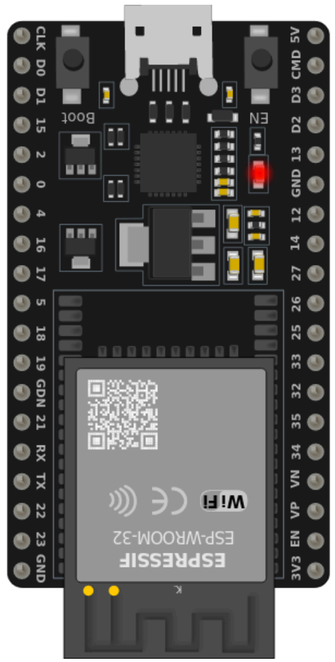
relay

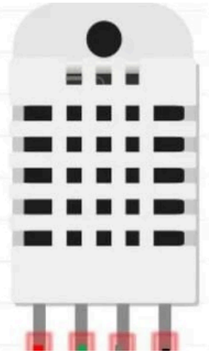


relay

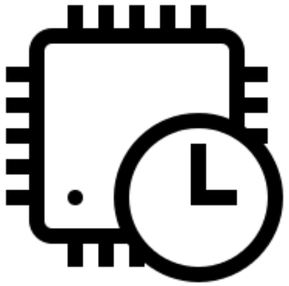
relay



ESP32



DHT22



RTC

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TEMPERATURE MEASUREMENT AND CONTROL

- Temperature sensor to measure temperature variations
- Relays to activate fans and heating elements based on defined temperature thresholds

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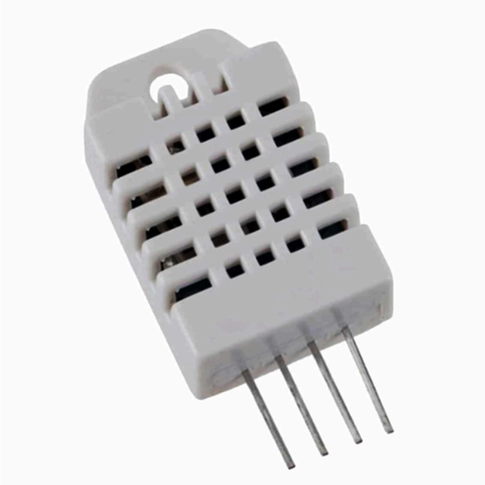
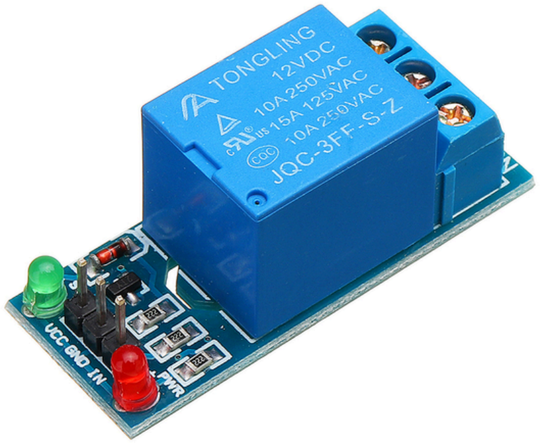
MATERIALS



1 x DHT22



2 x Relay Module

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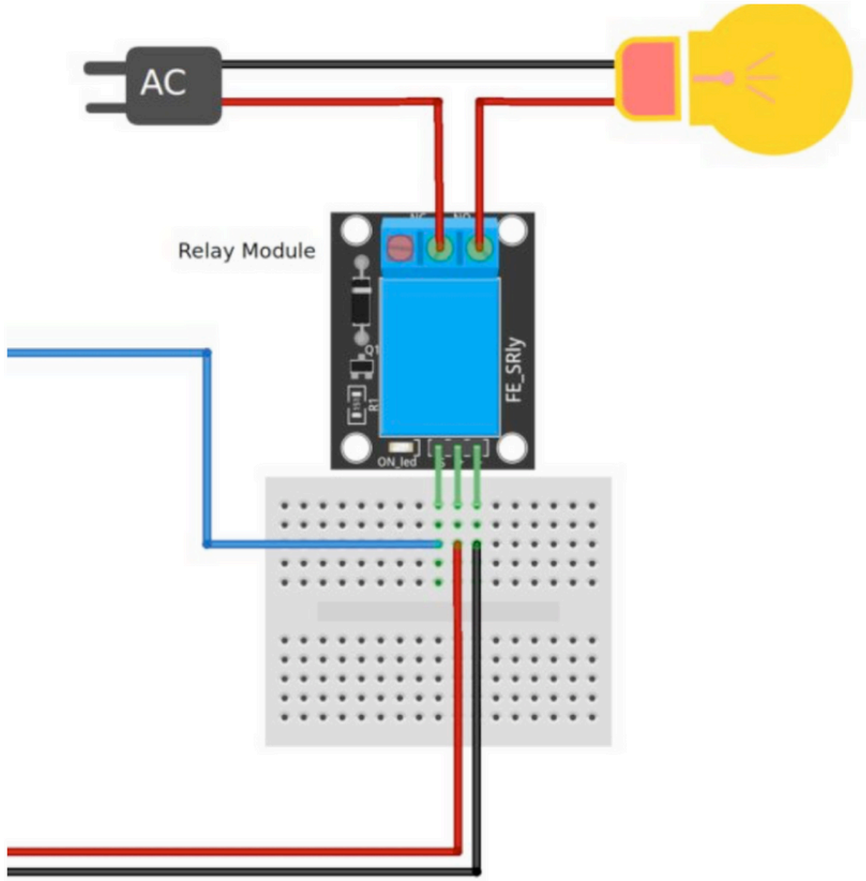
WIRING



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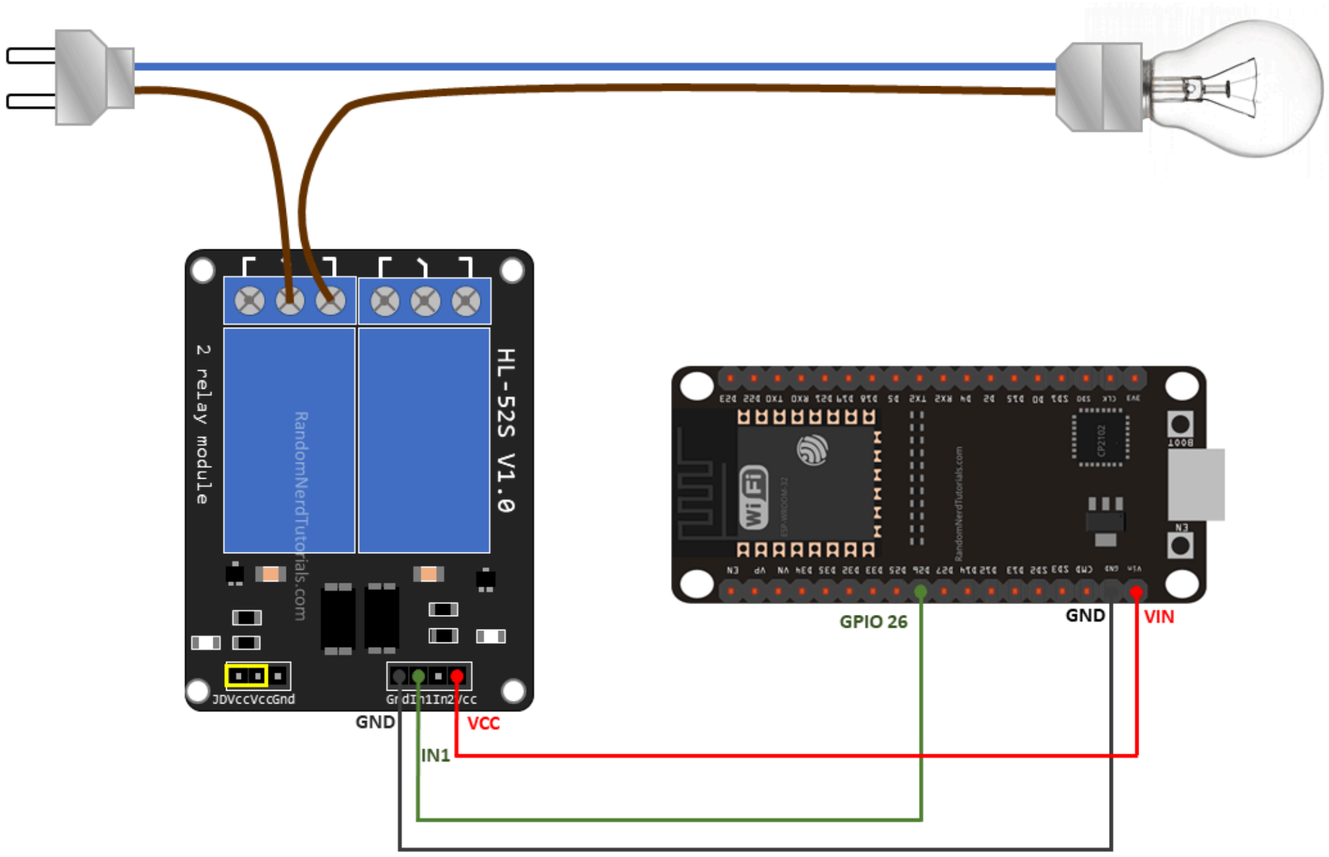
WIRING



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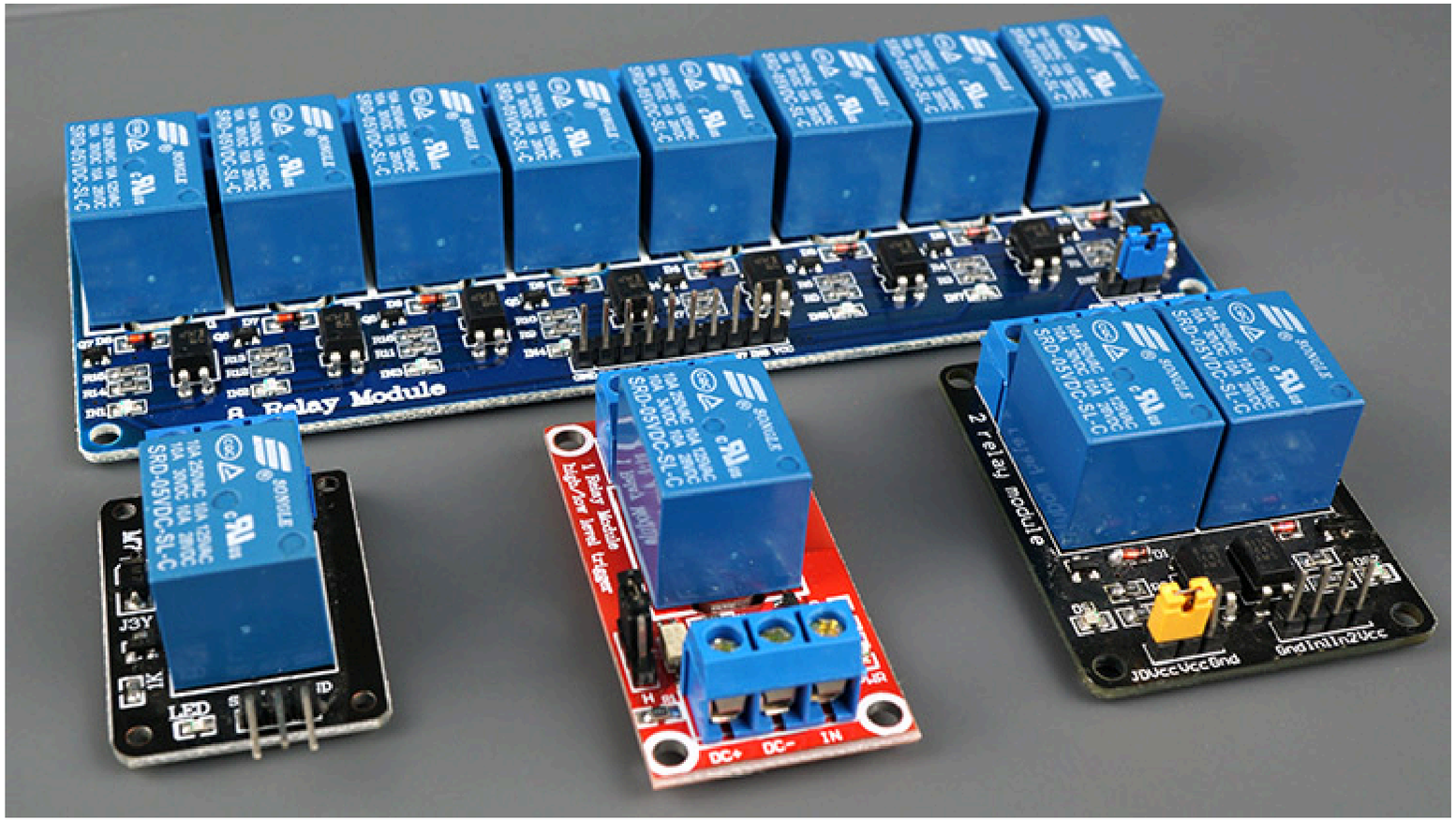

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RELAY PINOUT

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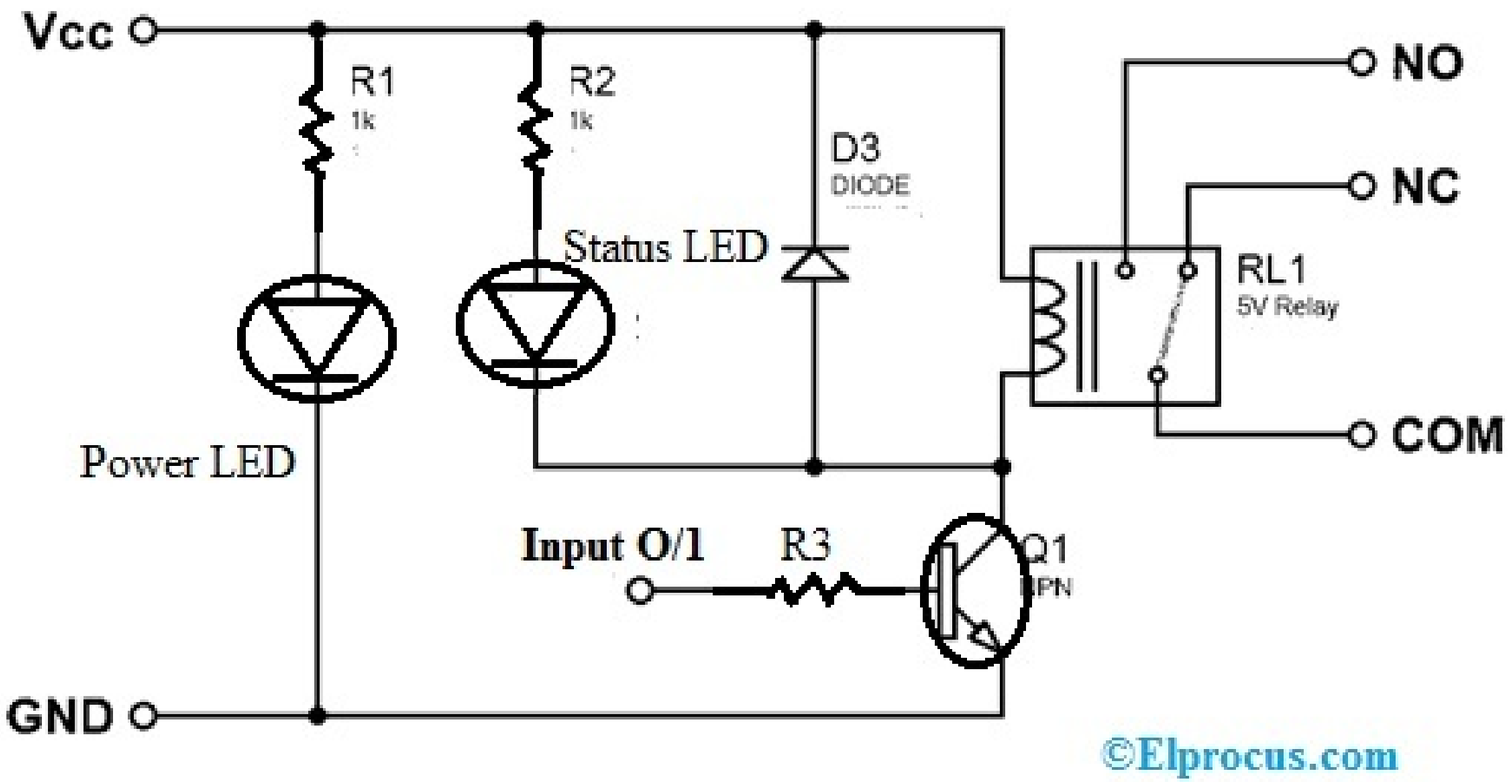
RELAY CIRCUIT



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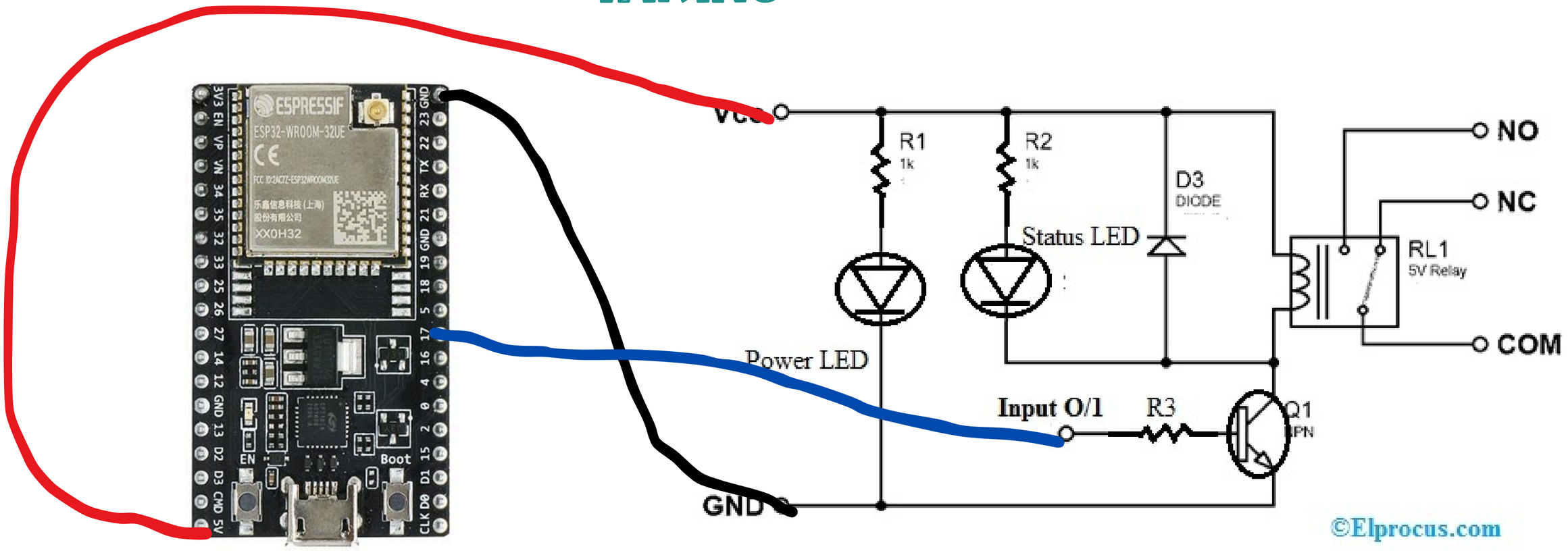

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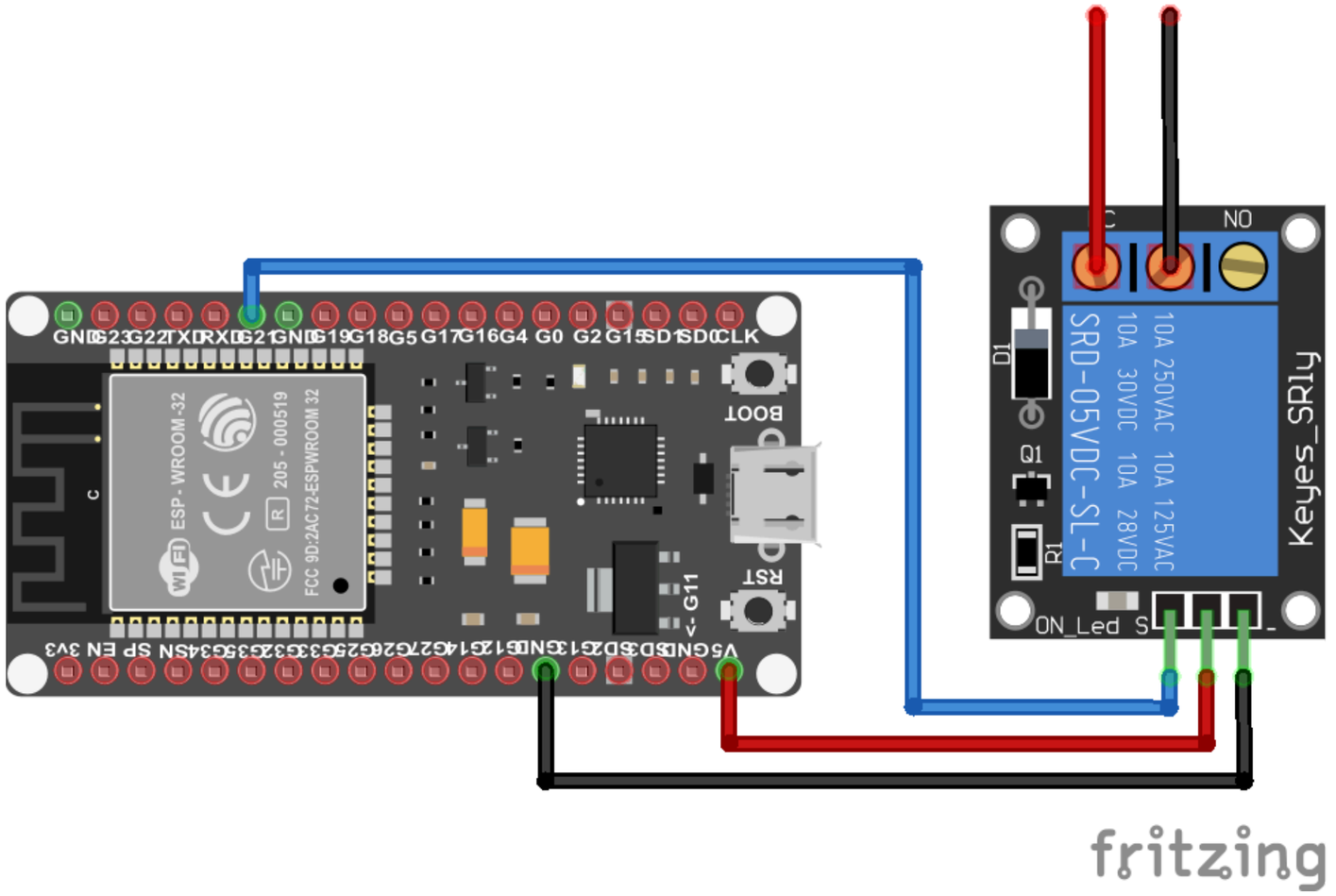

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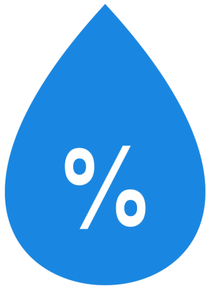
HUMIDITY MEASUREMENT AND CONTROL:

- Humidity sensors to monitor humidity levels.
- Relays to activate dehumidification or humidification devices.



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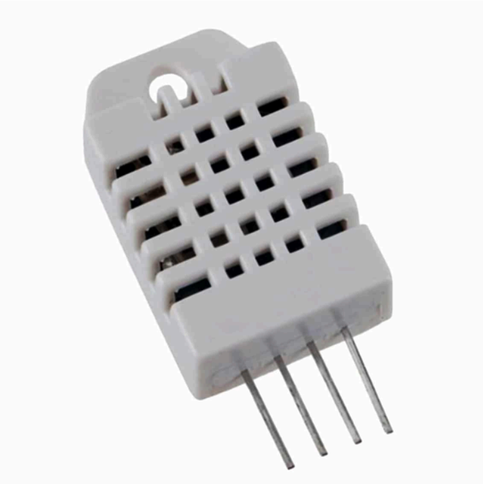
DHR22 SENSOR



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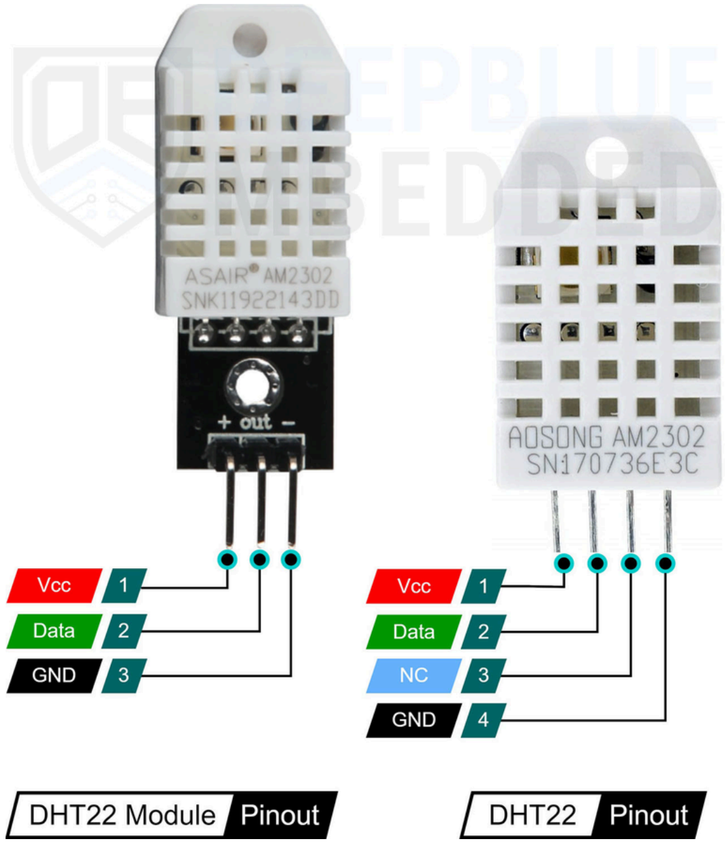
DHT22 PINOUT



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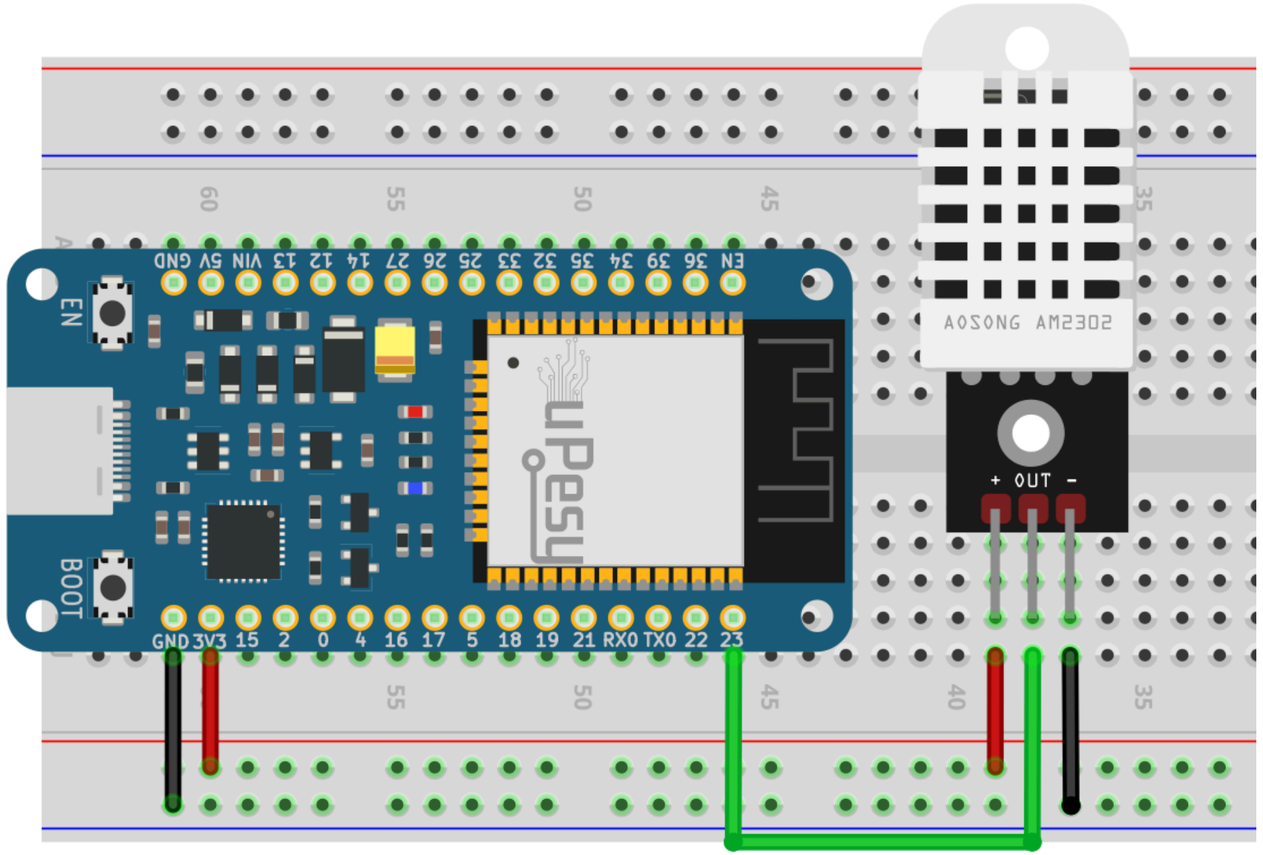
DHT22 MODULE WIRING



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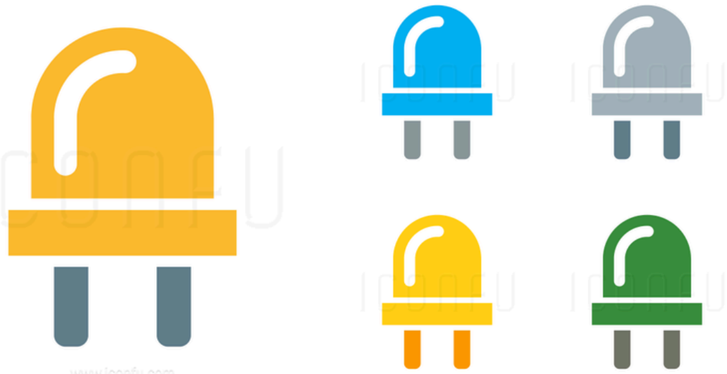
SIGNALING LIGHTS

2 signaling lights: one red and one green.
The red light indicates an alert or malfunction.
The green light indicates normal operation.



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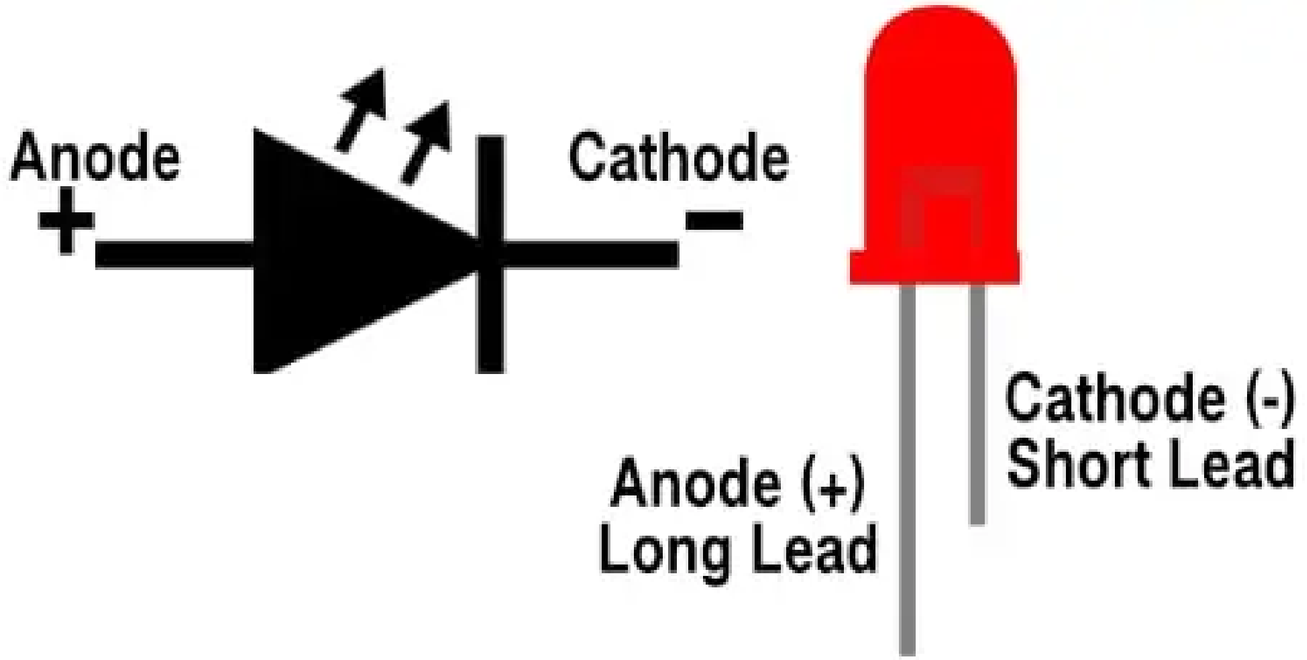
LIGHT EMETTING DIODE



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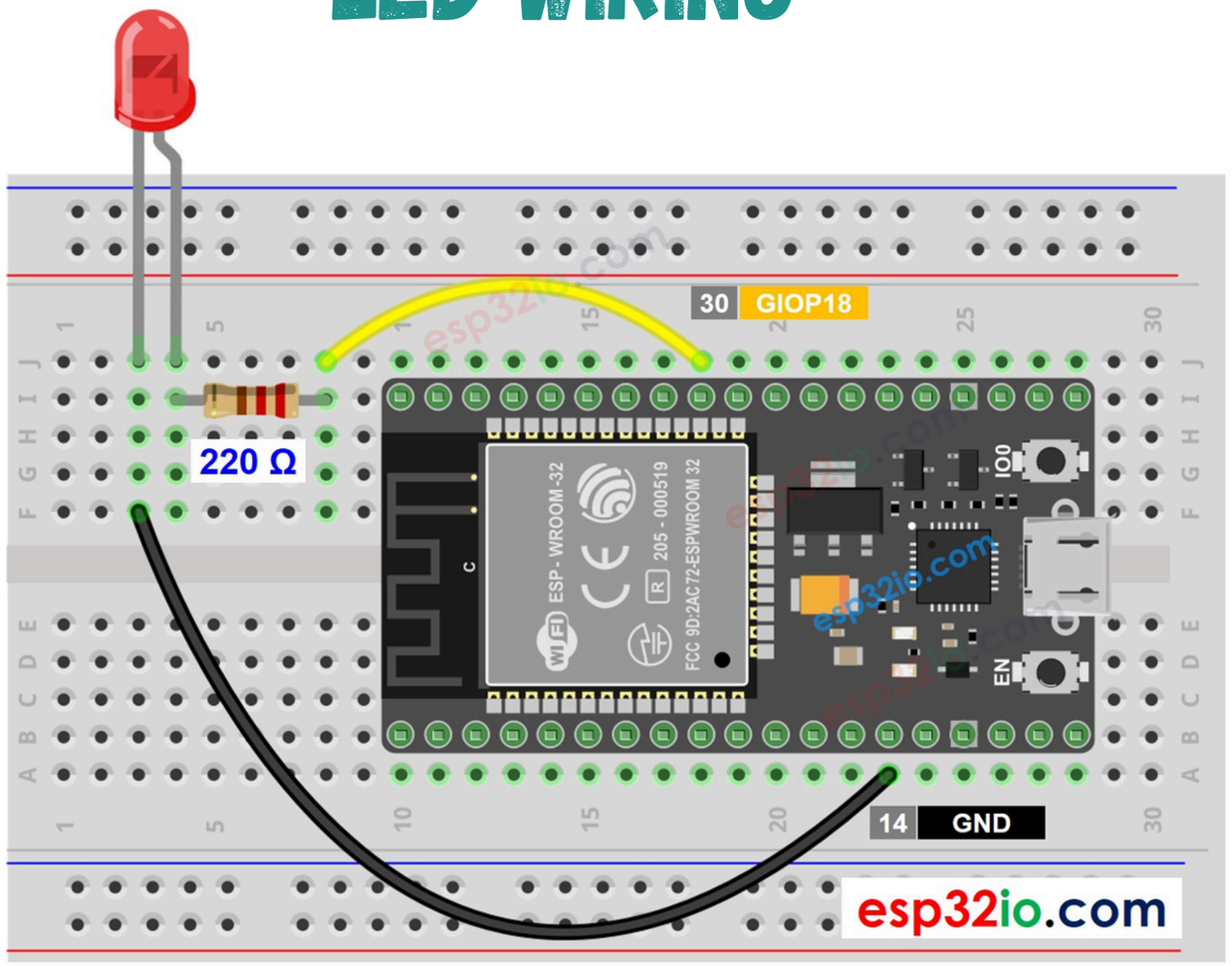
LED WIRING



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DOOR CONTROL

Door locking based on a relay.
The relay should never open during the night (between 8 PM and 6 AM).

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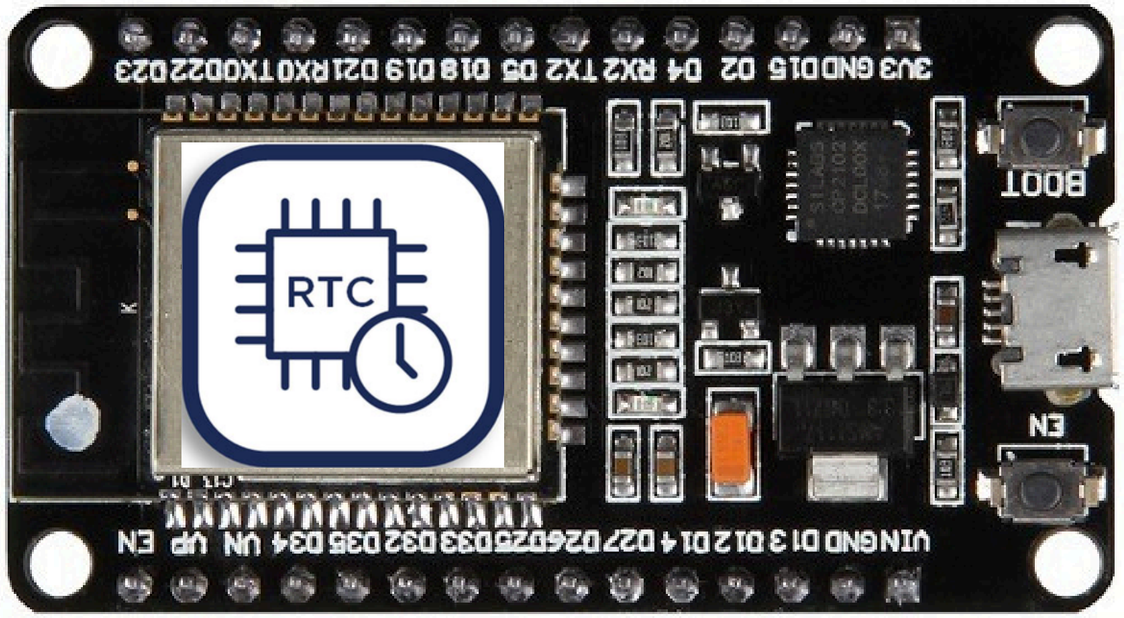
ESP32 REAL TIME CLOCK



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