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Computing Systems

ESP32

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Introduction

ESP32 is a family of WiFi/Bluetooth Development Boards

DOIT DEVKIT V1



ESP32 DevKit



ESP-32S NodeMCU



ESP32 Thing



WEMOS LOLIN32



"WeMos" OLED



HUZZAH32



Others

(...)



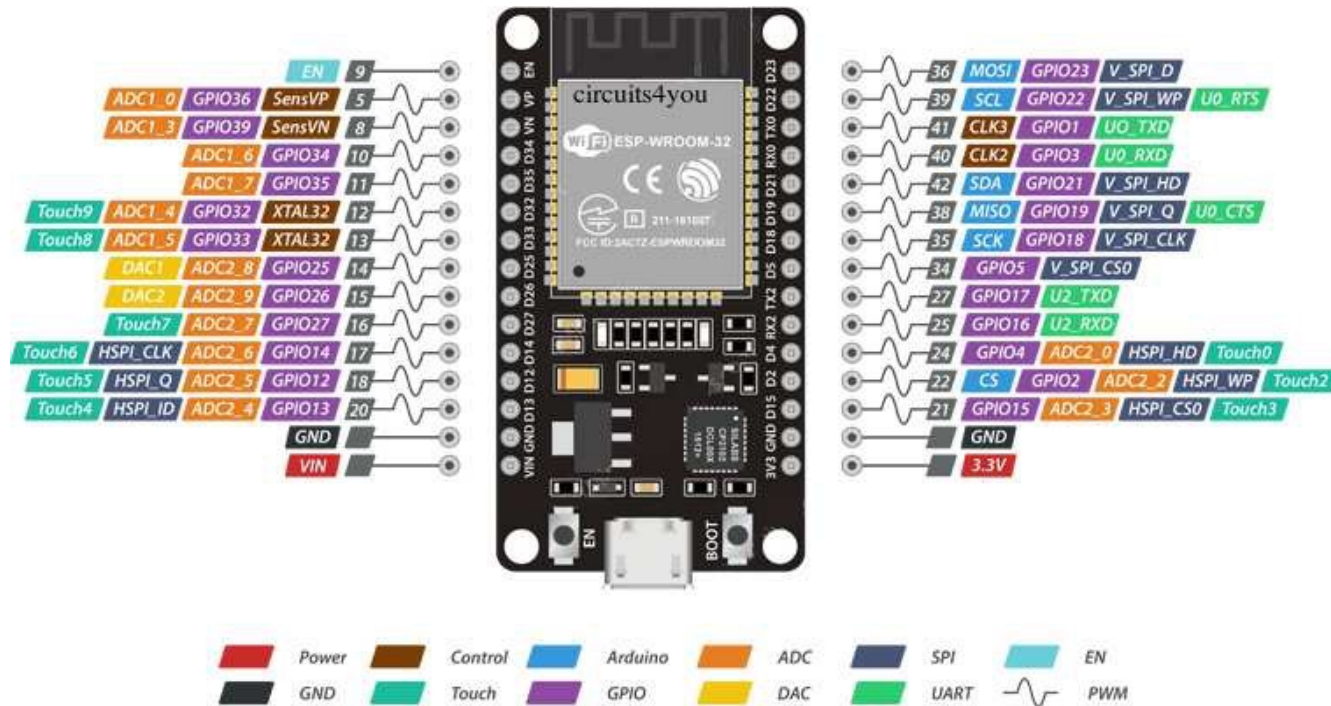
Specifications

- Dual core
- WiFi + Bluetooth/BLE
- Clock Up to 240MHz
- 512KB Ram
- 30-36 pins
- ADC, DAC, UART, SPI, I2C
- Built in Hall effect sensor
- Built in Temperature sensor



Pinout

Check your actual board's pinout!



ESP32 Dev. Board Pinout circuits4you.com



Programming environments

- Arduino
- Espressif (IoT Development Framework)
- Micropython
- JavaScript
- LUA

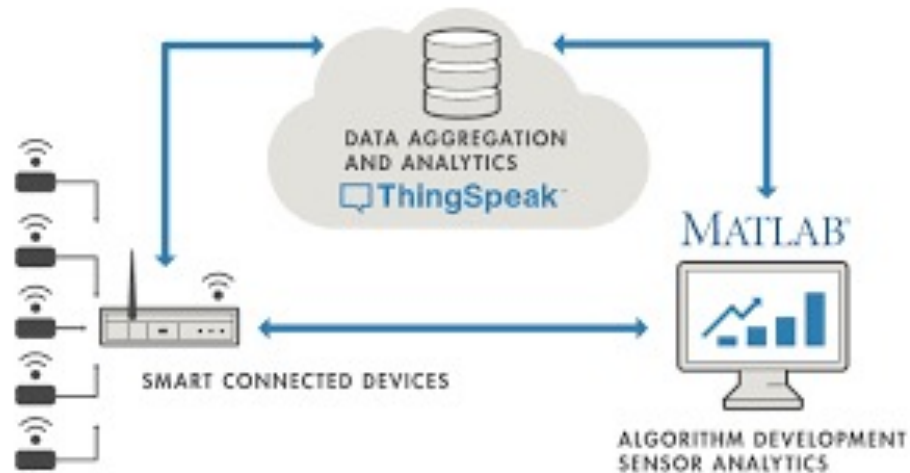


Programming with Arduino IDE

- In order to properly configure the IDE you can follow an online tutorial (following the instructions for your operating system – software version).
- E.g.: <https://randomnerdtutorials.com/installing-the-esp32-board-in-arduino-ide-windows-instructions/>



Data storage visualization and processing



Collect

Send sensor data privately to the cloud.



Analyze

Analyze and visualize your data with MATLAB.



Act

Trigger a reaction.

Free academic Mathworks license for Polimi Students



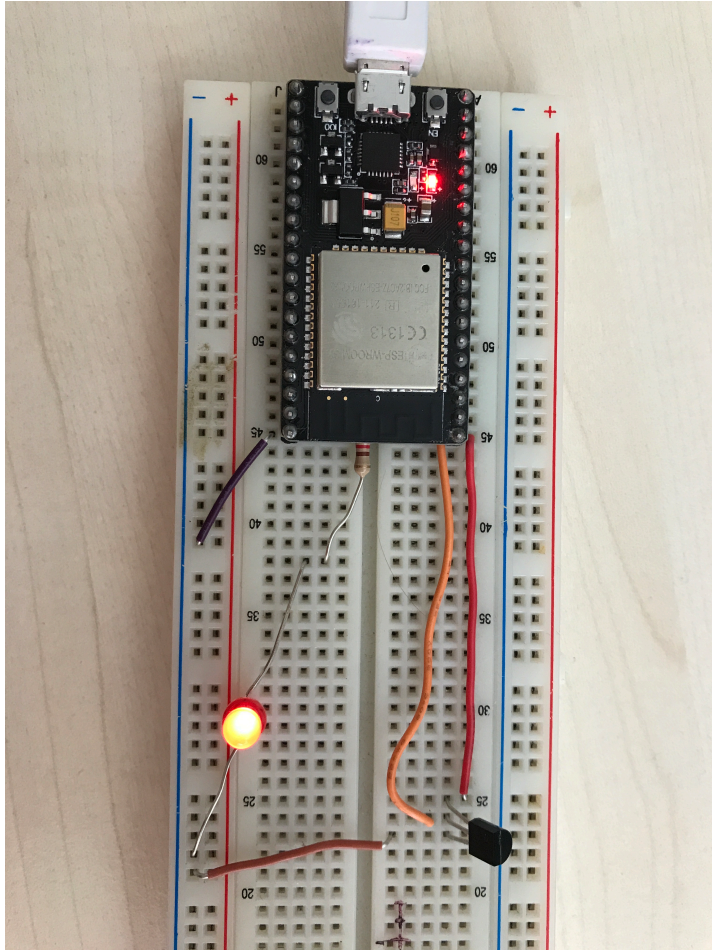
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Exercise

- Acquire ambient temperature using:
 - ESP32
 - TMP36 sensor
- Transmit temperature data to ThingSpeak
- Data stream visualization
- Data analysis



Exercise (continue)



- Configure the Arduino IDE to use Esp32
- Download the TMP36 datasheet and properly connect the sensor to the ESP32 board
- Download the thingspeak library using the Arduino IDE repository (sketch -> include library)



Exercise (continue)

- Register an account on Thingspeak
- Create a channel to store temperature data
- Copy the channel infos and use it in your Arduino code:
 - ChannelID
 - WriteAPIKey
- Get Fun on ThingSpeak!





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Questions?

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