Introduction to Python

Ronald Criollo, Msig.
ESPOL

Python's growth

The Economist, July 2018

Python's growth

Biggus uptickus

US, Google searches for coding languages
100=highest annual traffic for any language

Java

Python

JavaScript

C++

PHP

R

Perl

2010 11 12 13 14 15 16 17 18

100
80
60
40
20
0

Source: Google Trends
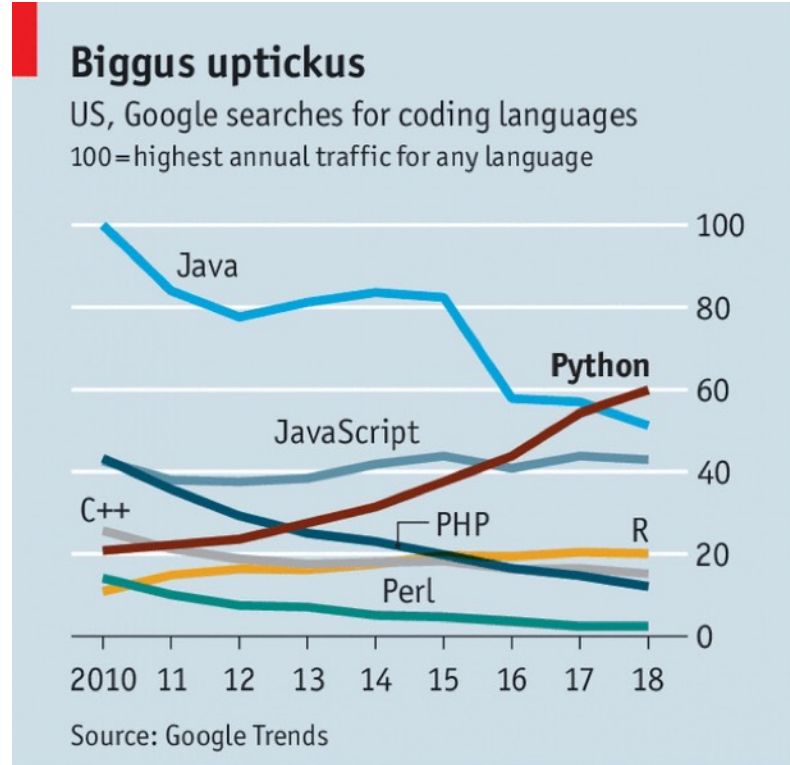
Economist.com

Python's growth

Most Loved, Dreaded, and Wanted Languages

| Loved | Dreaded | Wanted |

Python	25.1%
JavaScript	19.0%
Go	16.2%
Kotlin	12.4%
TypeScript	11.9%
Java	10.5%
C++	10.2%
Rust	8.3%
C#	8.0%
Swift	7.7%
HTML	7.6%
CSS	7.6%

Most in-demand programming languages 2019

https://insights.stackoverflow.com/survey/2018/#technology

Python's ecosystem

IDE's

IDE's


```
VRs-MacBook-Air:~ vr$ python
Python 2.7.5 (default, Mar  9 2014, 22:15:05)
[GCC 4.2.1 Compatible Apple LLVM 5.0 (clang-500.0.68)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> print('Ejemplo')
Ejemplo
>>> a=5
>>> b=7
>>> a+b
12
>>>
```

main.py ✕

```
print "Hola mundo"
print "Este un ejemplo desde python"
```
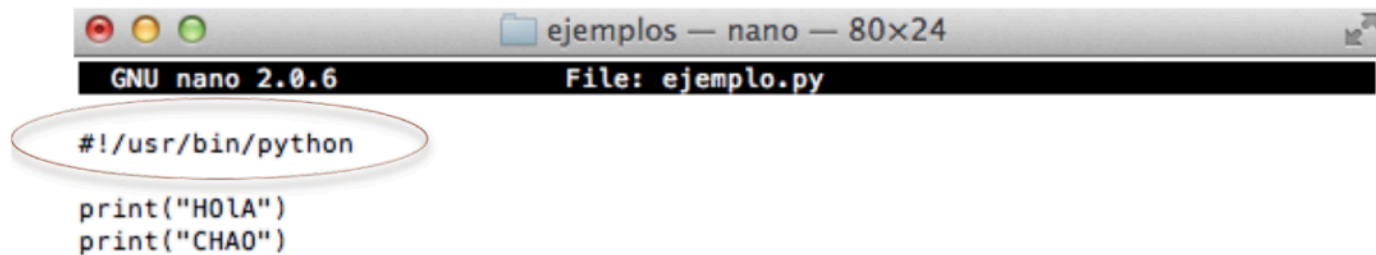
GNU nano 2.0.6   File: ejemplo.py

```
#!/usr/bin/python

print("HOlA")
print("CHAO")
```

IDE's


```
#!/usr/bin/python

print("HOlA")
print("CHAO")
```

```
VRs-MacBook-Air:ejemplos vr$ nano ejemplo.py
VRs-MacBook-Air:ejemplos vr$ ./ejemplo.py
HOlA
CHAO
VRs-MacBook-Air:ejemplos vr$ python ejemplo.py
HOlA
CHAO
```

IDE's

IDE's

IDE's

IDE's

Why MicroPython

Marco Zennaro, PhD
ICTP

MicroPython

MicroPython is a **lean and fast** implementation of the Python 3 programming language that is optimised to run on a microcontroller. MicroPython was successfully funded via a **Kickstarter campaign** and the software is now available to the public under the MIT open source license.

MicroPython

It ensures that the memory size/microcontroller performance is **optimised** and fit for purpose for the application it serves. Many **sensor** reading and reporting applications do not require a PC based processor as this would make the total application over priced and under-efficient.

MicroPython options

Adafruit MicroPython webpage

pyBoard

The MicroPython **pyboard** is a compact electronic circuit board that runs MicroPython on the bare metal, giving you a low-level Python operating system that can be used to control all kinds of electronic projects.
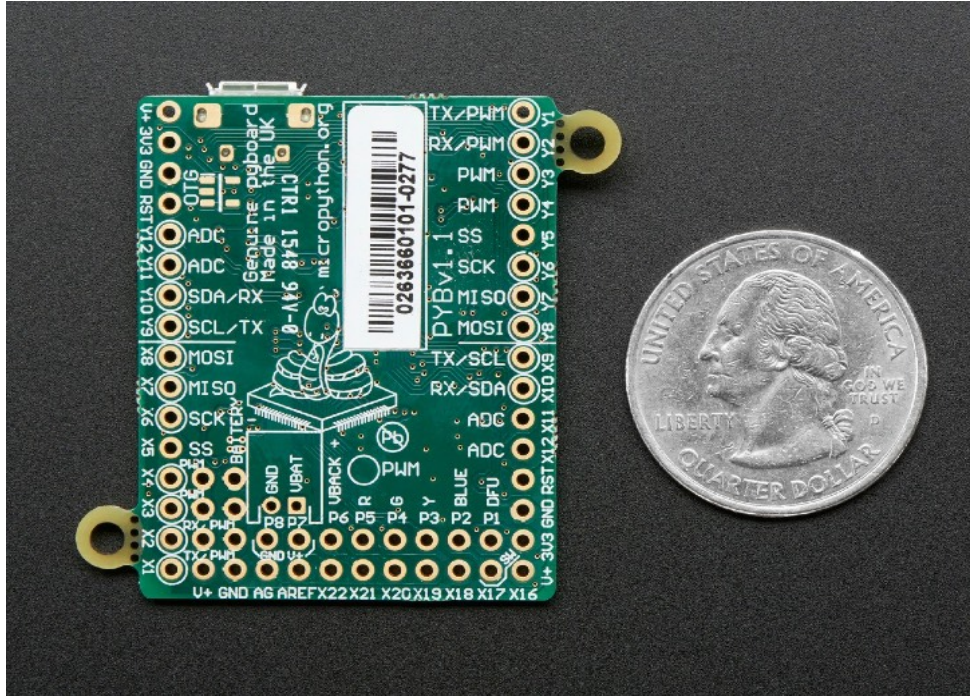
pyBoard

MicroPython is packed full of advanced features such as an interactive prompt, arbitrary precision integers, closures, list comprehension, generators, exception handling and more. Yet it is compact enough to fit and run within just **256k of code space and 16k of RAM**.
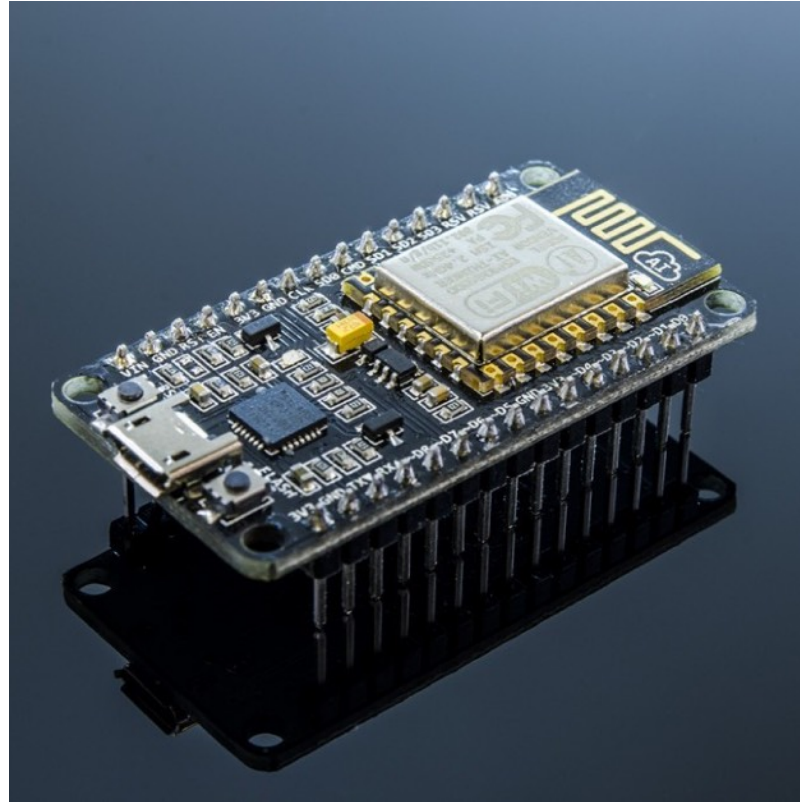
pyBoard

MicroPython aims to be as compatible with normal Python as possible to allow you to transfer code with ease from the desktop to a microcontroller or embedded system.
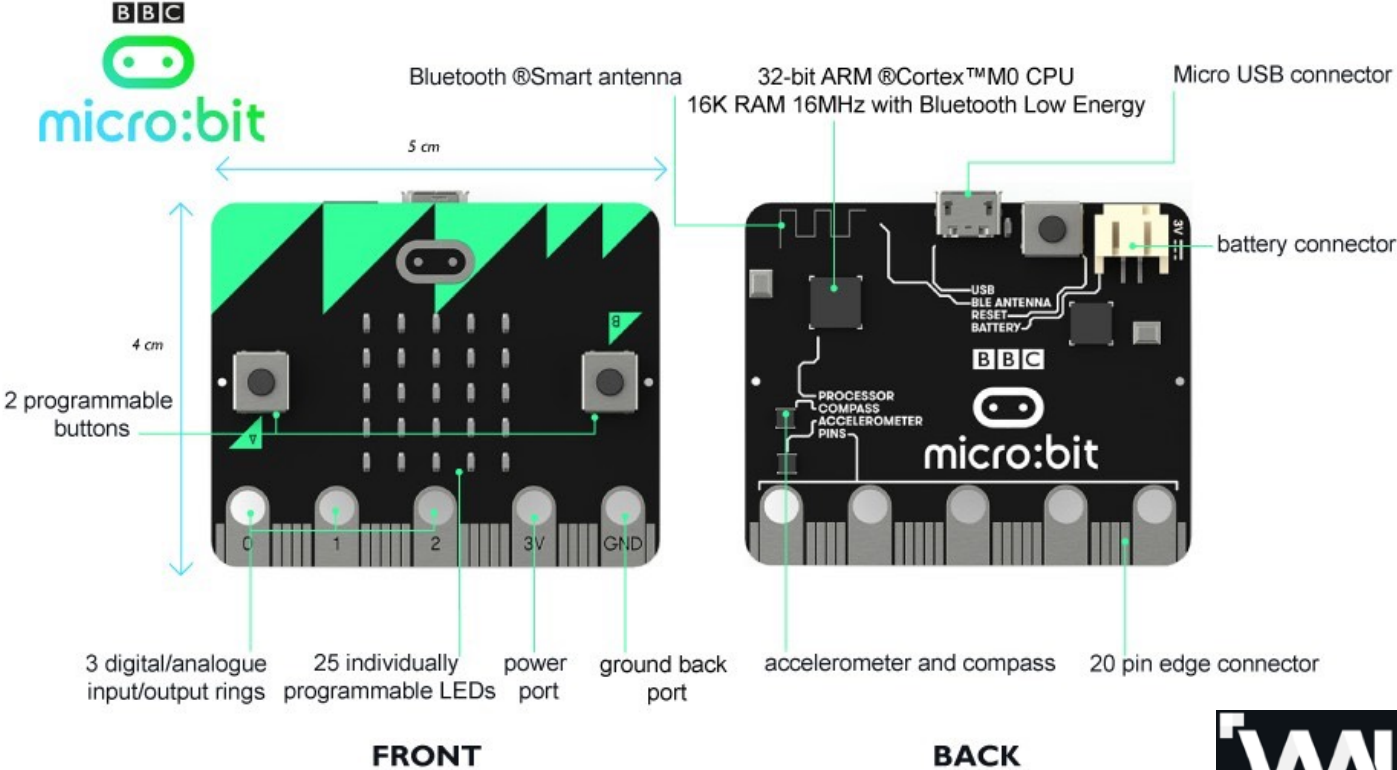
pyBoard

ESP8266: low cost

ESP32

BBC Micro:bit

Bluetooth ®Smart antenna

32-bit ARM ®Cortex™M0 CPU
16K RAM 16MHz with Bluetooth Low Energy

Micro USB connector

battery connector

5 cm

4 cm

2 programmable buttons

3 digital/analogue input/output rings

25 individually programmable LEDs

power port

ground back port

accelerometer and compass

20 pin edge connector

FRONT

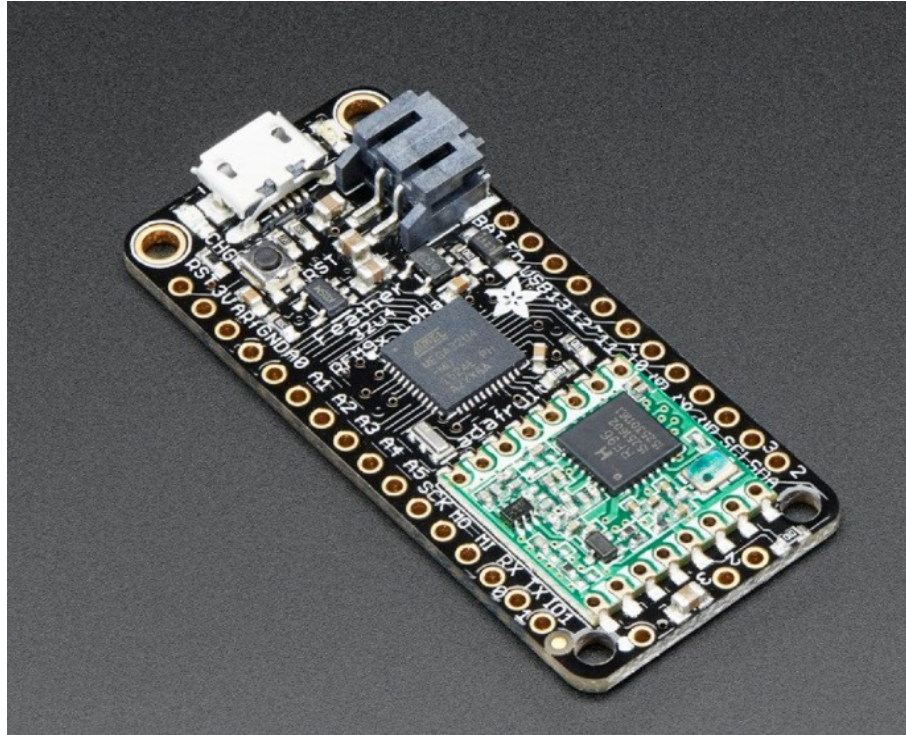**BACK**

Trinket
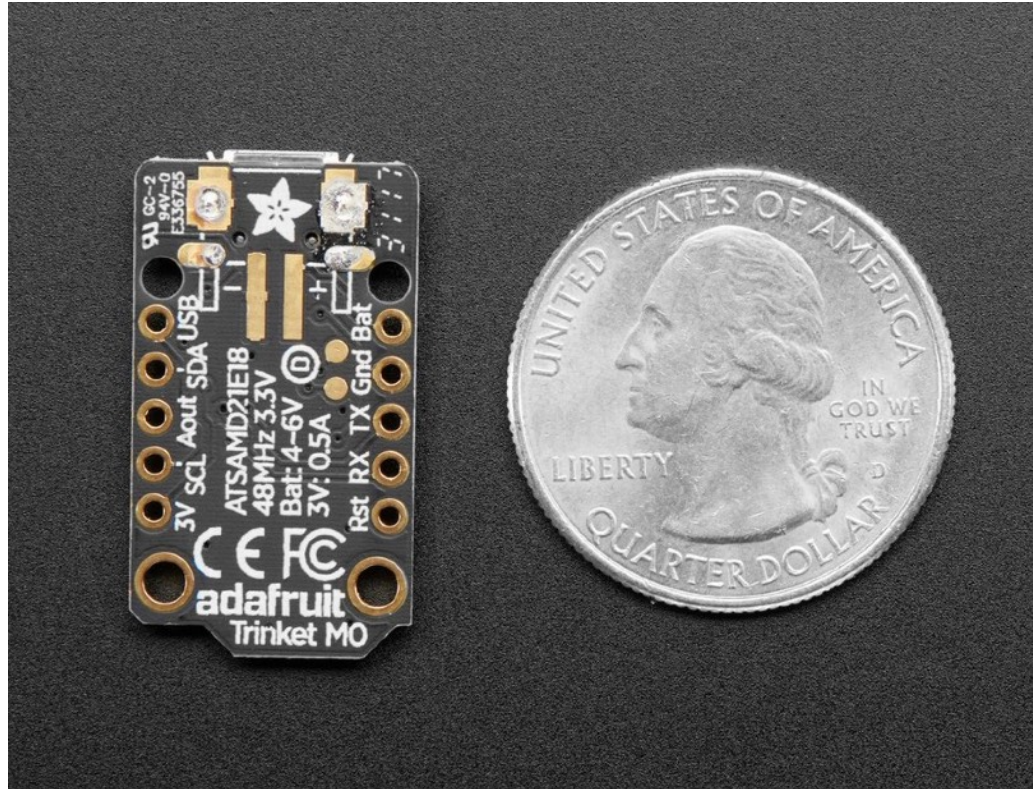
Feather 32u4 RFM95

Grand Central M4 Express

M5stack

2X15 BUS
ESP32 3D ANTENNA
1W SPEAKER
BATTERY SOCKET
TF-CARD
GROVE I2C
TYPE-C USB
ON/OFF RESET
2.0 INCH TFT-LCD 320x240
BUTTONS
I/O EXTENSION
1W SPEAKER
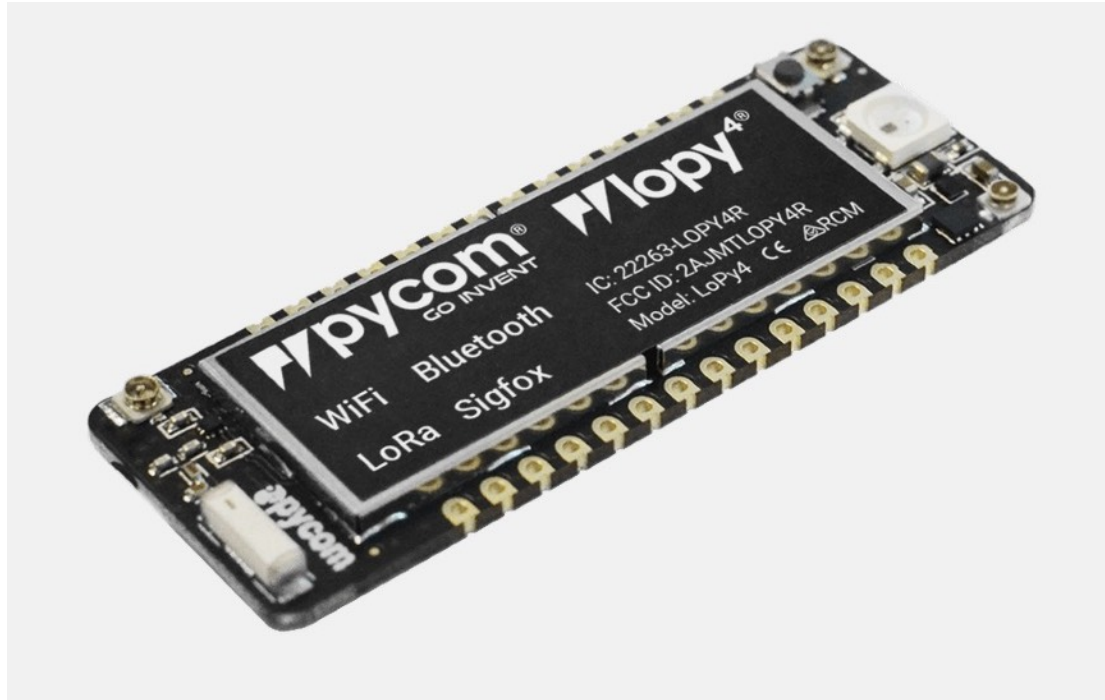MAGNET
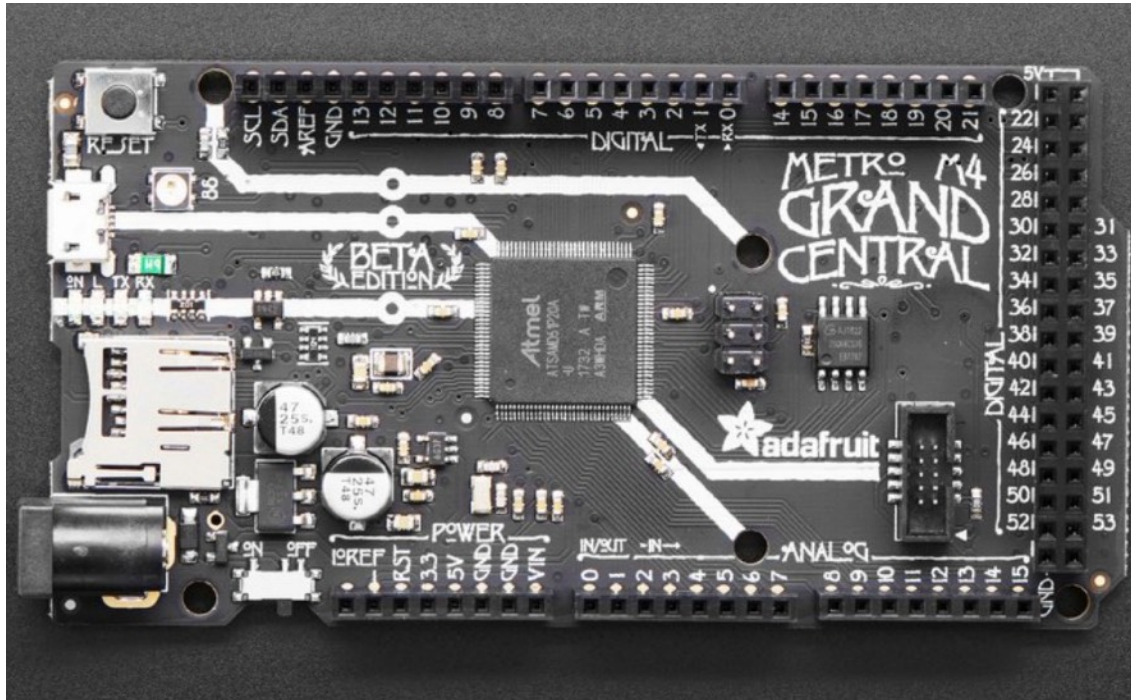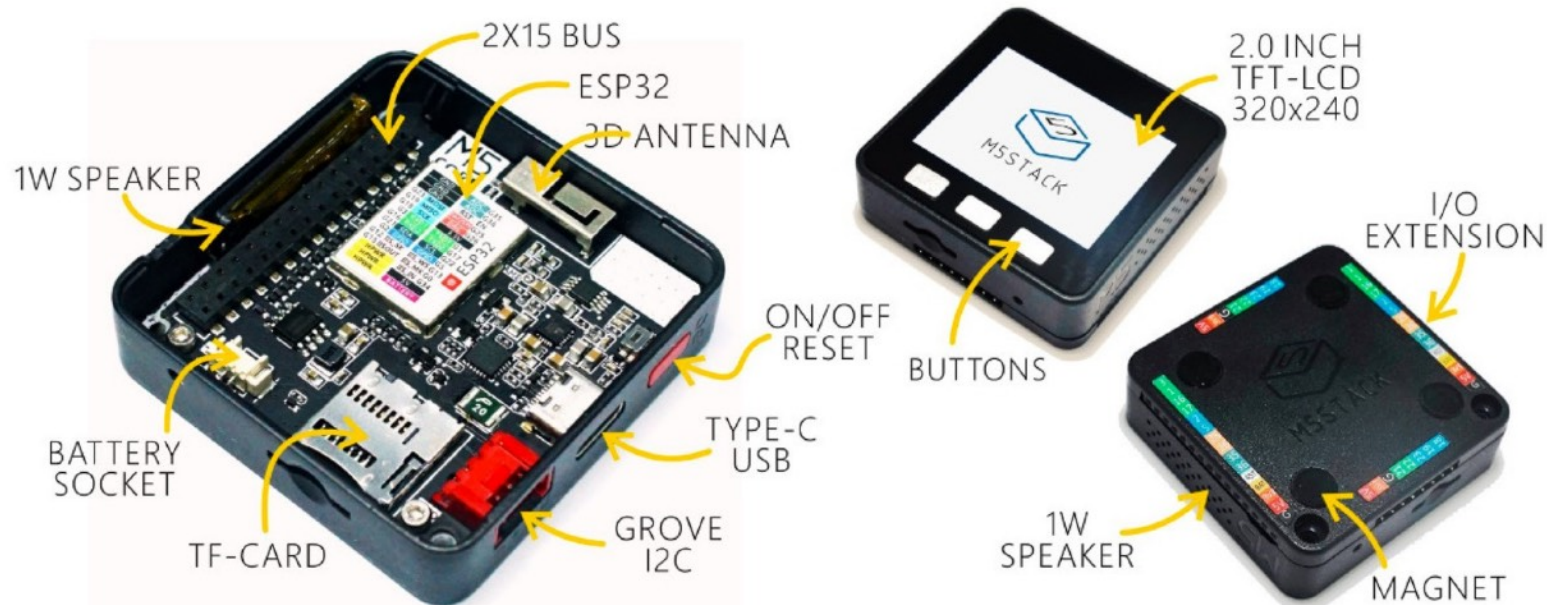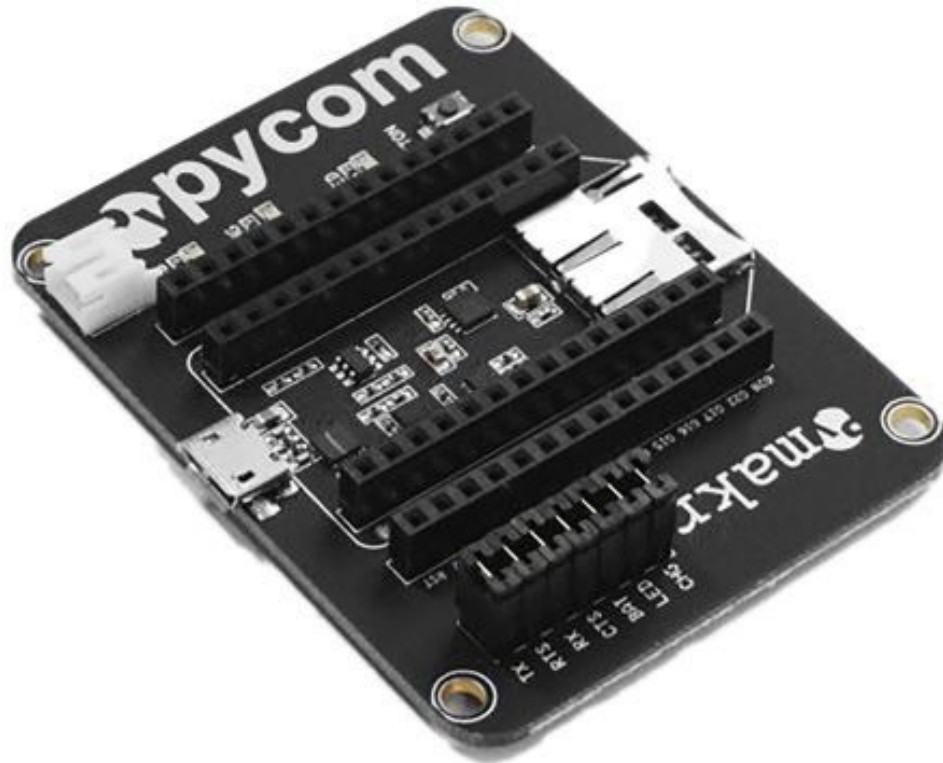
Pycom: LoPy4

Pycom: LoPy4

Espressif ESP32 chipset
Quadruple network MicroPython enabled
development board (LoRa, Sigfox, WiFi,
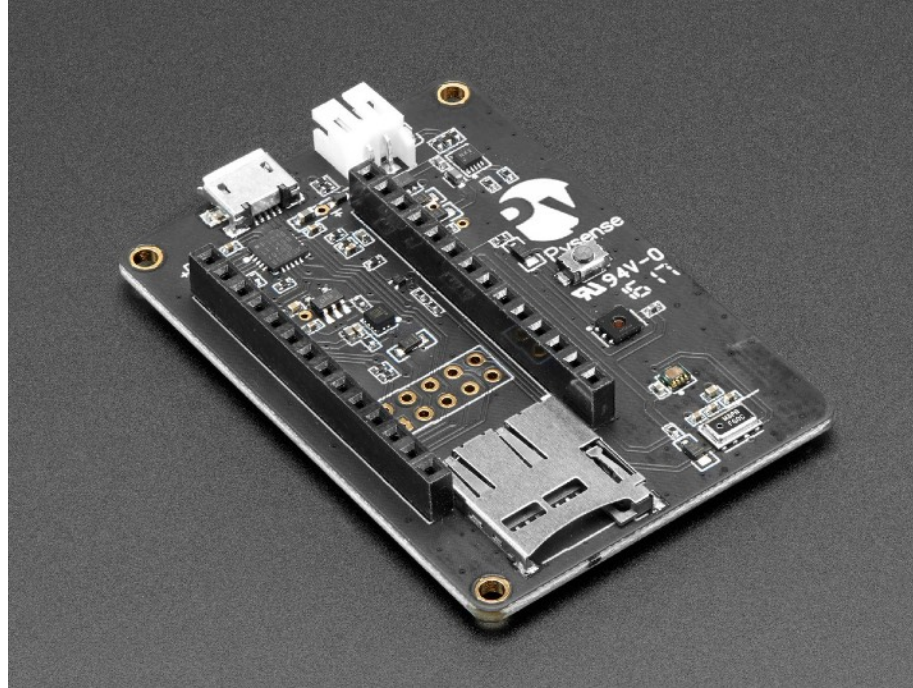Bluetooth)
RAM: 4MB
External flash: 8MB

Pycom: Expansion Board

Pycom: PySense

Pycom: PySense

Ambient light sensor

Barometric pressure sensor

Humidity sensor

3 axis 12-bit accelerometer

Temperature sensor

USB port with serial access
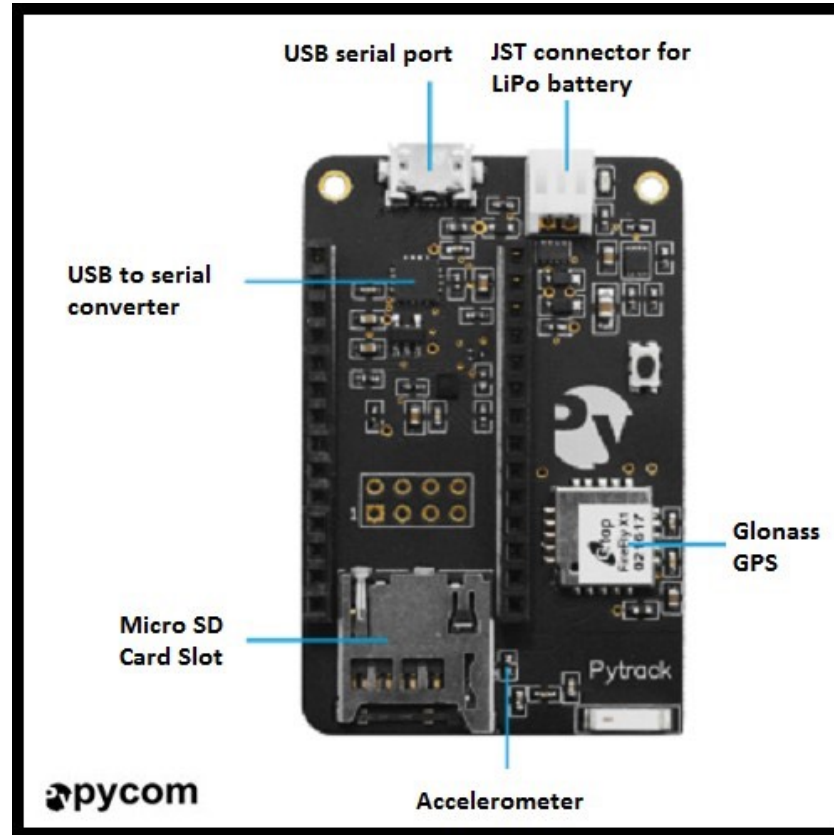
LiPo battery charger

MicroSD card compatibility

Ultra low power operation (1uA in deep sleep)

Pycom: PyTrack

Pycom: PyTrack

GNSS + Glonass GPS
3 axis 12-bit accelerometer
USB port with serial access
LiPo battery charger
MicroSD ard compatibility
Ultra low power operation (1uA in deep sleep)

Summary

We introduced MicroPython.

We learned why it's the best ☺️

We looked at different boards that support MicroPython.

We learned about Pycom boards.

Feedback?

Email mzennaro@ictp.it