

# Introduction to Python

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ESPOL



# Python's growth



Programming languages

## Python has brought computer programming to a vast new audience

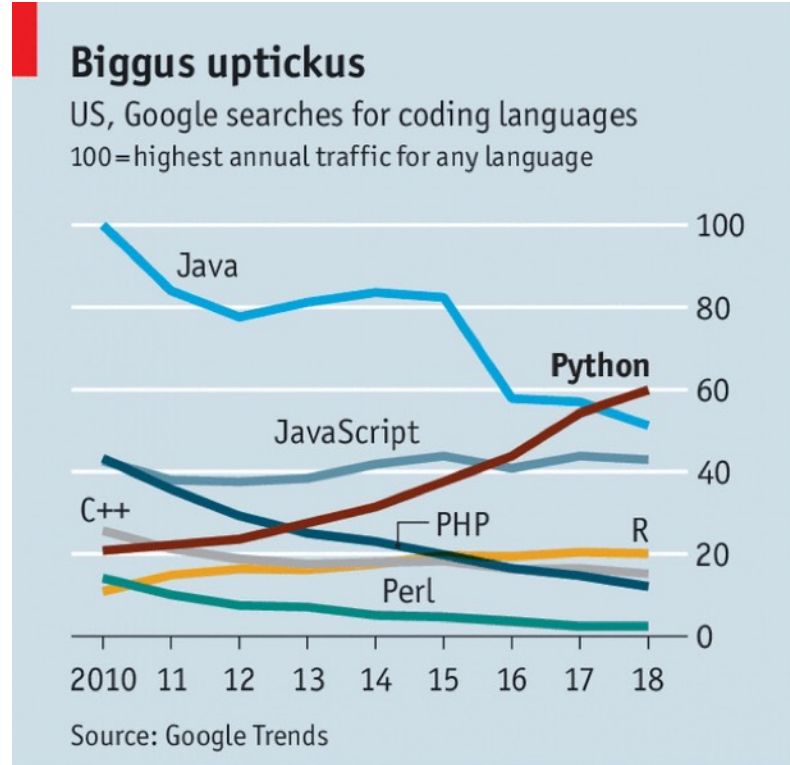
*And its inventor has just stepped down*



[The Economist](#), July 2018

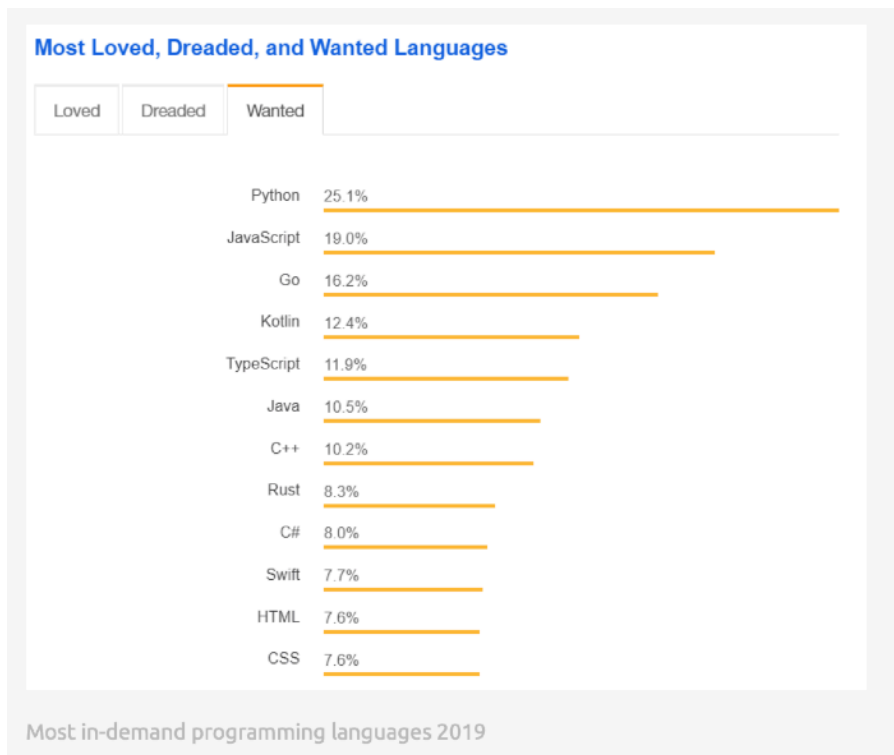


# Python's growth



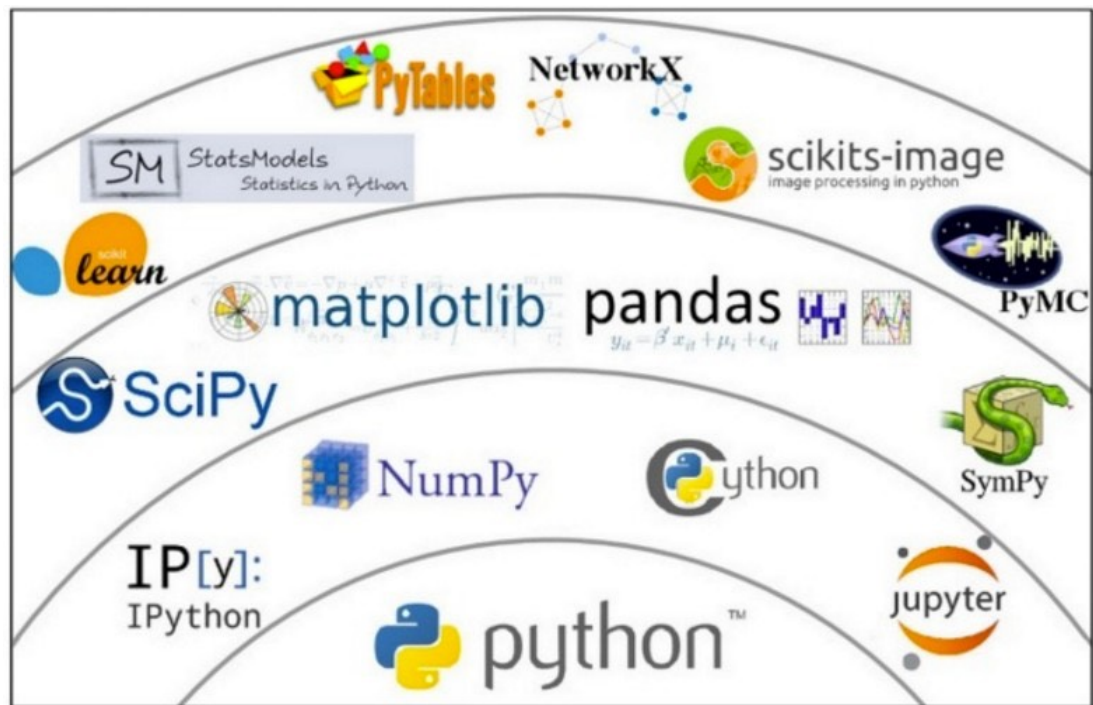
Economist.com

# Python's growth



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

# Python's ecosystem



# IDE's



The image shows the Python.org website. The Python logo is at the top left. Navigation links for 'About', 'Downloads', and 'Documentation' are in the top bar. The main heading is 'Download the latest version for Mac'. A yellow button labeled 'Download Python 3.8.0' is circled in red. Below it, there are links for 'Windows', 'Linux/UNIX', 'Mac OS X', and 'Other'. Further down, there are links for 'Prereleases' and 'Docker images'. At the bottom, it says 'Looking for Python 2.7? See below for specific releases'.

python™

About Downloads Documentation

Download the latest version for Mac

Download Python 3.8.0

Looking for Python with a different OS? Python for [Windows](#), [Linux/UNIX](#), [Mac OS X](#), [Other](#)

Want to help test development versions of Python? [Prereleases](#) [Docker images](#)

Looking for Python 2.7? See below for specific releases



The PyCharm logo consists of a black square with the letters 'PC' in white, set against a background of overlapping green and yellow hexagons.

Version: 2019.2.4  
Build: 192.7142.42  
10/31/2019

[System requirements](#)  
[Installation Instructions](#)  
[Other versions](#)

## Download PyCharm

[Windows](#)

[macOS](#)

[Linux](#)

### Professional

For both Scientific and Web Python development. With HTML, JS, and SQL support.

DOWNLOAD

Free trial

### Community

For pure Python development

DOWNLOAD

Free, open-source



# 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 x

```
print "Hola mundo"
print "Este un ejemplo desde python"
```

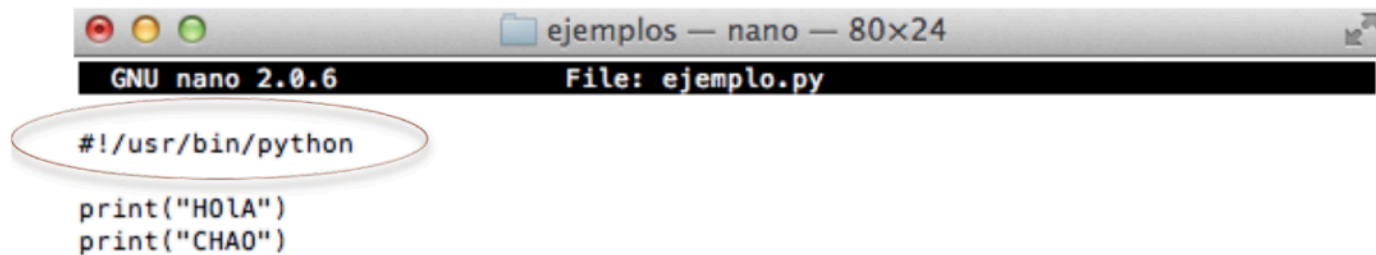
GNU nano 2.0.6

File: ejemplo.py

```
#!/usr/bin/python
```

```
print("HOLA")
print("CHAO")
```

# IDE's



A screenshot of a macOS window titled "ejemplos — nano — 80x24". The window shows the nano text editor editing a file named "ejemplo.py". The editor's status bar at the top indicates "GNU nano 2.0.6" and "File: ejemplo.py". The code content is as follows:

```
#!/usr/bin/python
print("HOLA")
print("CHAO")
```

The first line, `#!/usr/bin/python`, is circled in red.


```
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




← → ↻ repl.it/repls/MediumpurpleCurlyComputerscience ☆

 @anonymous/MediumpurpleC... No description run ▶ share ↗ + new repl talk

Files  

 main.py

main.py  saved ▼

```
1 print("Hola Mundo...")
```

Hola Mundo...  
▶

# IDE's



 demo.ipynb ☆

Archivo Editar Ver Insertar Entorno de ejecución Herramientas Ayuda

+ Código + Texto

```
[1] print("hola mundo")
```

```
↳ hola mundo
```

```
[2] a = 10  
    b = 5  
    c = a+b  
    print(c)
```

```
↳ 15
```



# IDE's



# IDE's

## Pydroid<sup>3</sup> a portable Python 3 IDE

### Features:

- Full-blown IDE with code analysis\* and completion\*
- Pip package manager
- Tkinter, Kivy & PyQt5 for GUI
- Prebuilt educational packages (numpy, pandas, sklearn, etc.)
- Builtin C compiler able to install almost any Python library

\* Premium feature



# 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

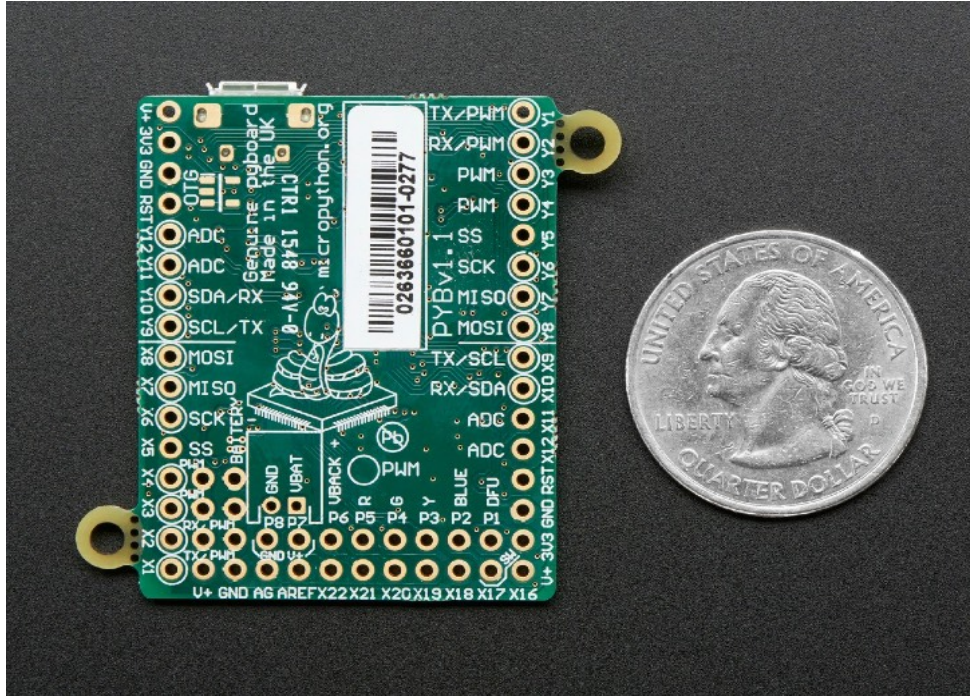
MicroPython is packed full of advanced features such as an interactive prompt, arbitrary precision integers, closures, list comprehension, generators, exception handling and more. Yet it is compact enough to fit and run within just **256k of code space and 16k of RAM.**



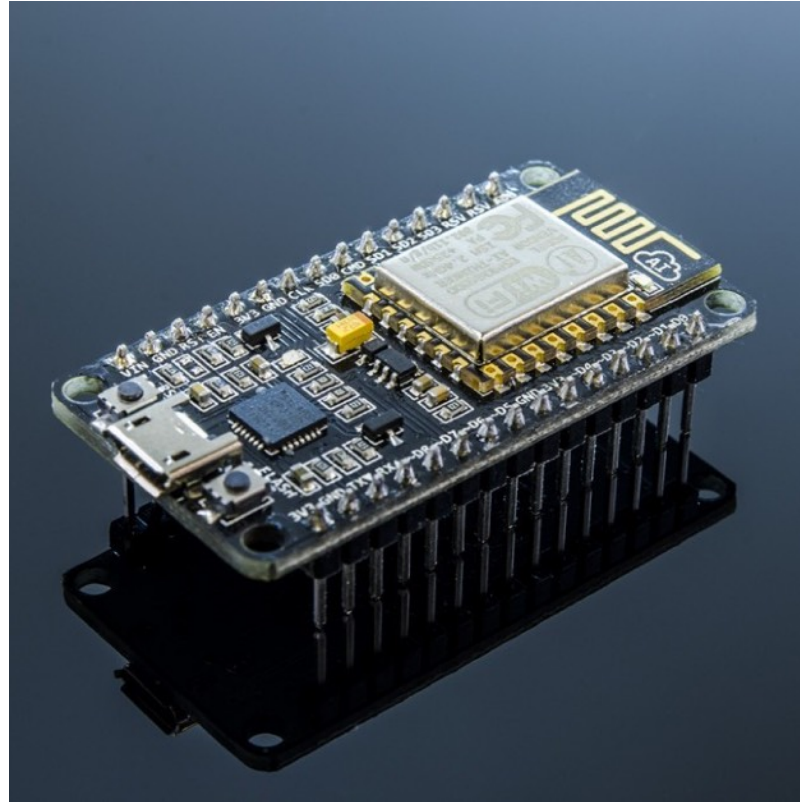
# pyBoard

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



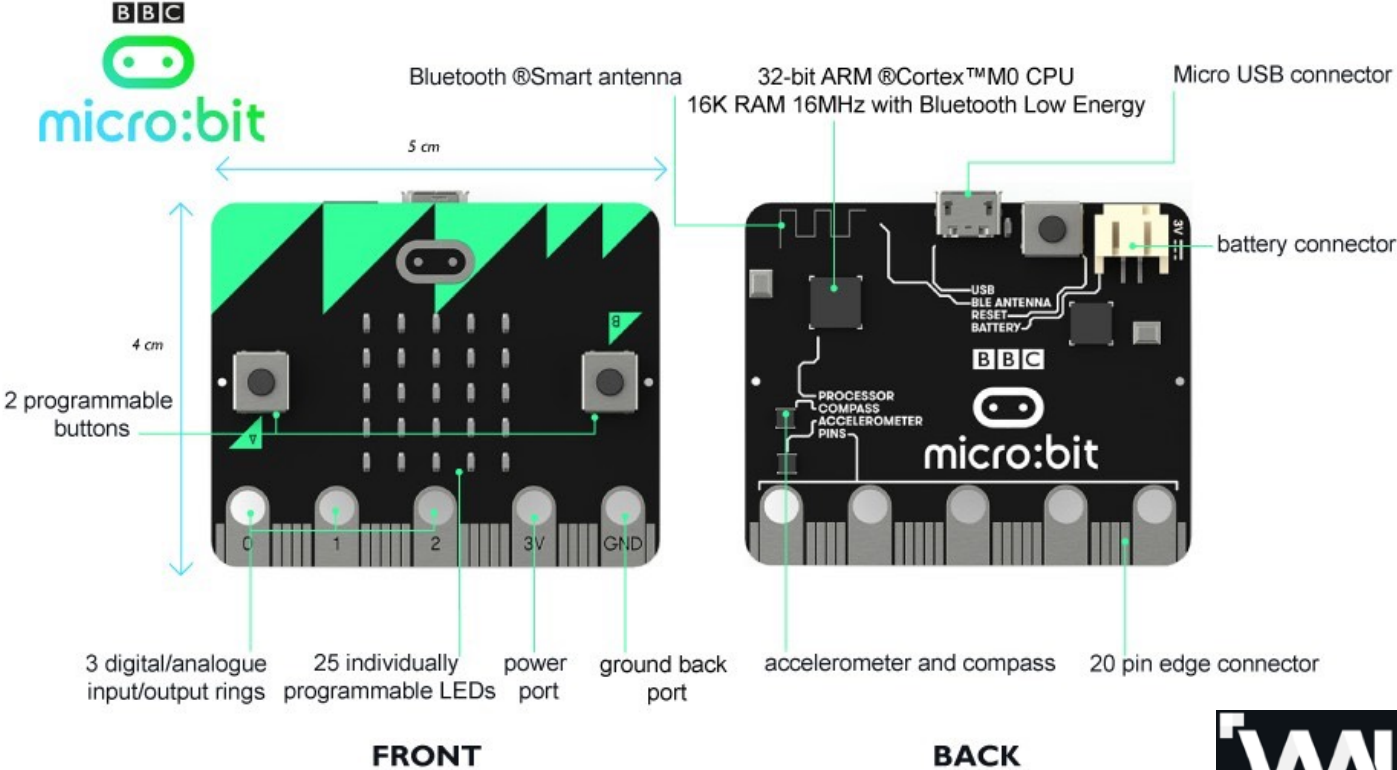
ESP8266: low cost



ESP32

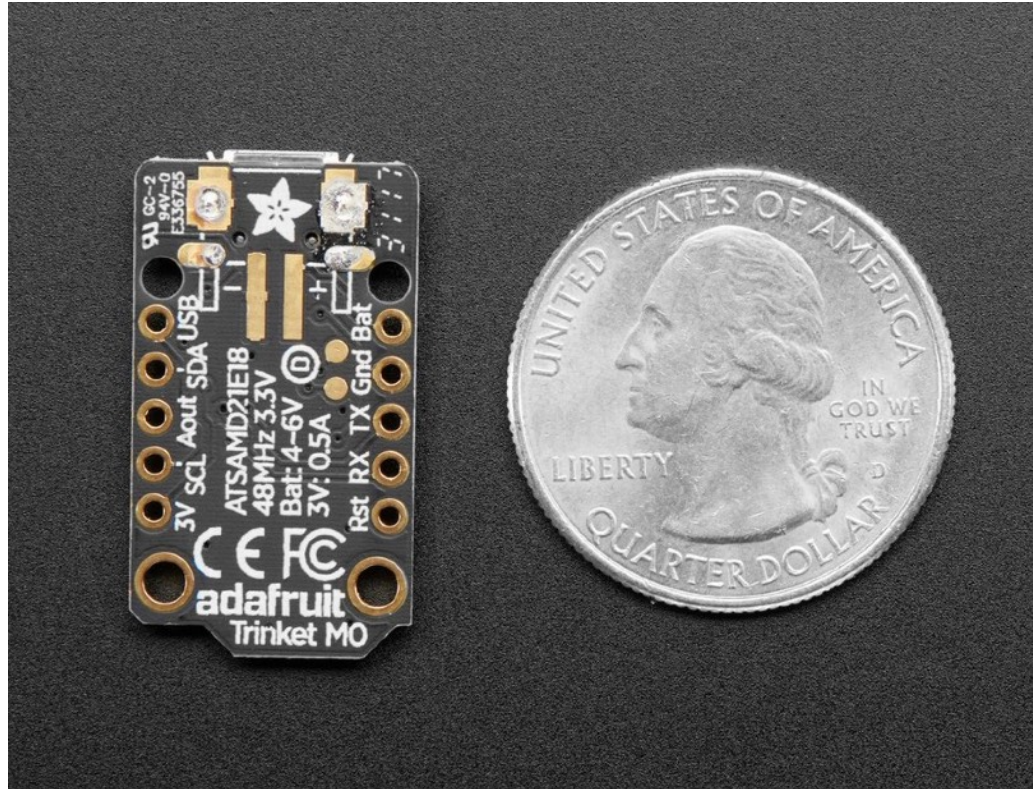


# BBC Micro:bit



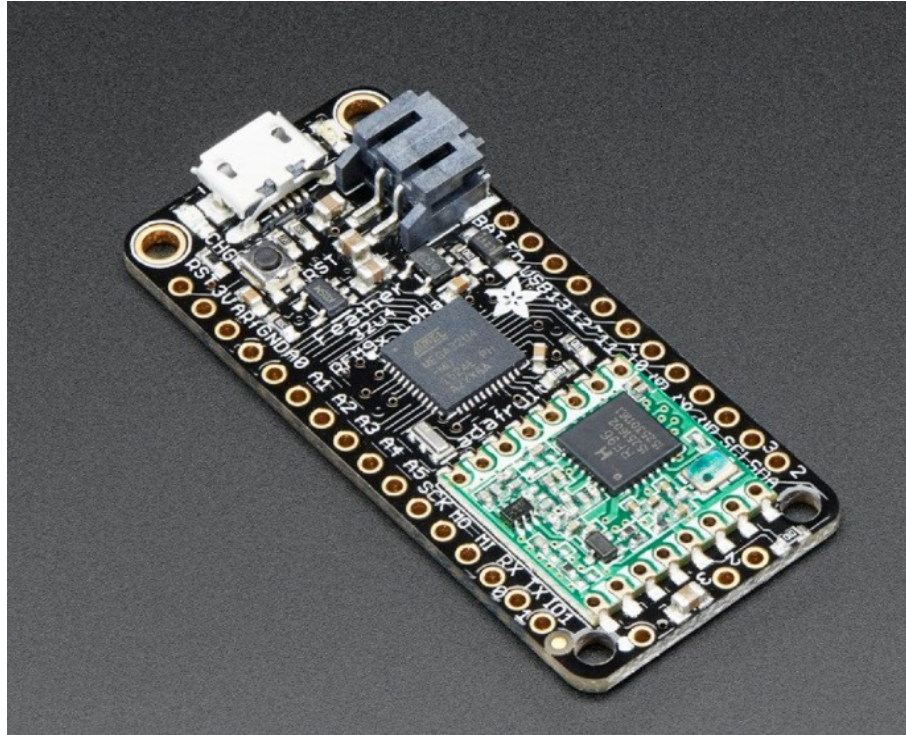


# Trinket

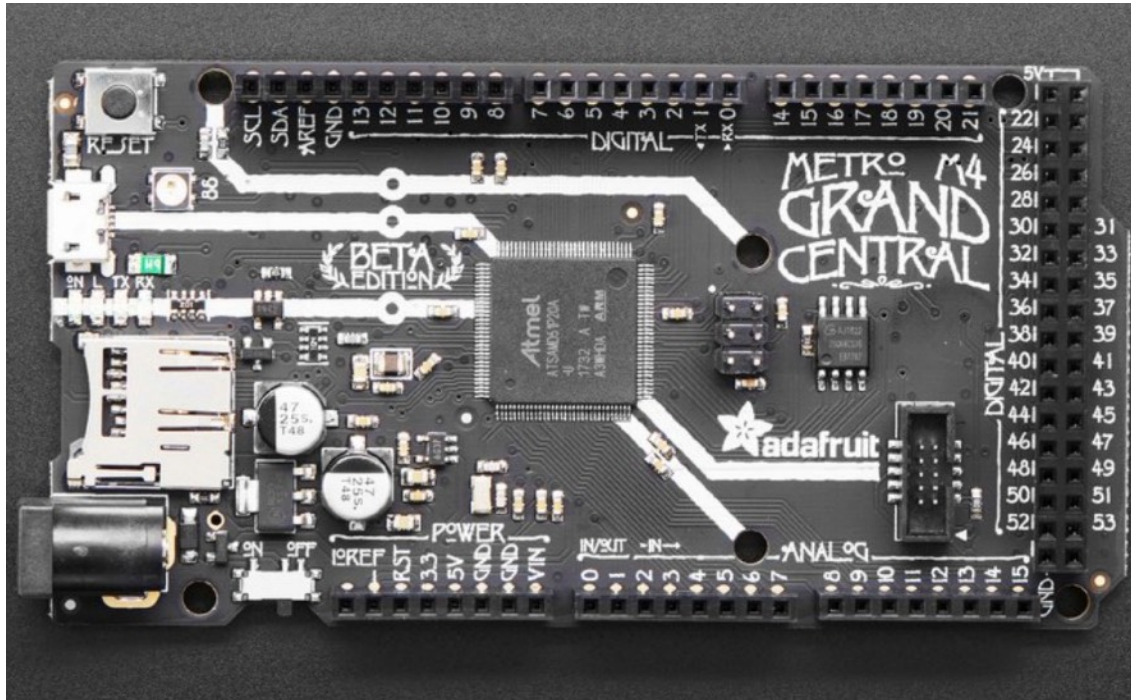




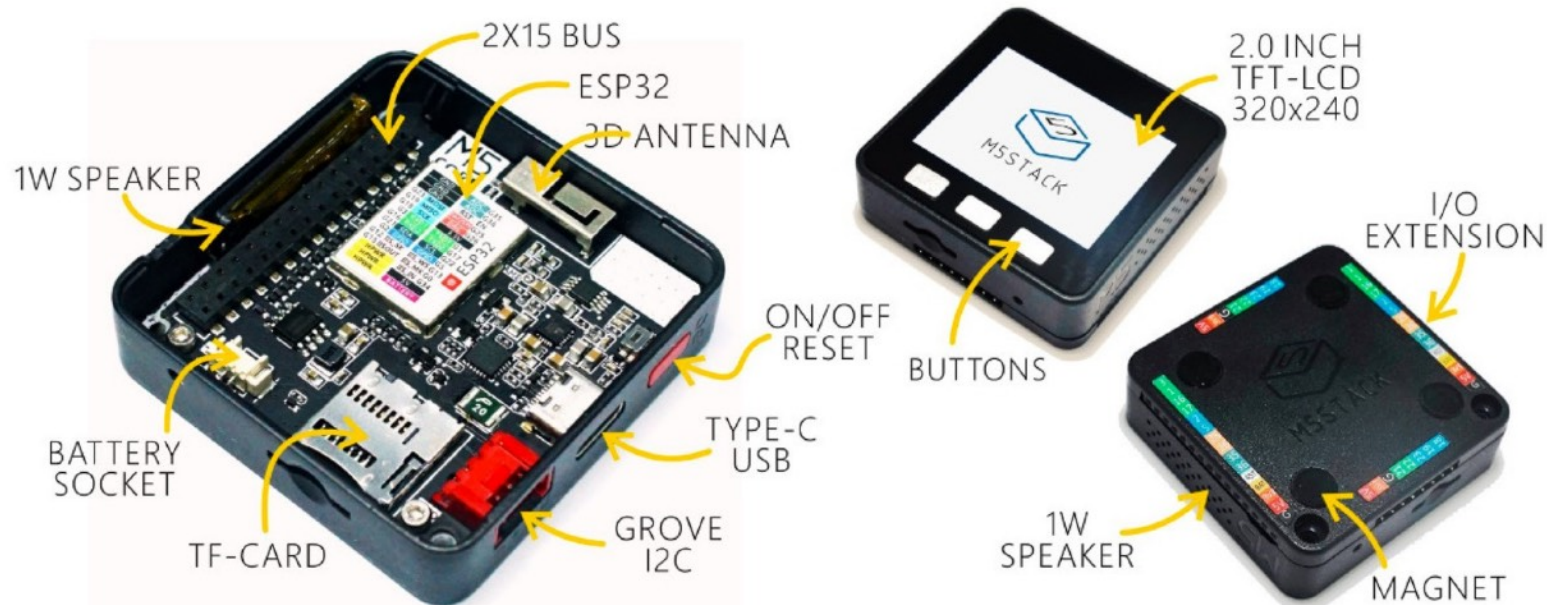
## Feather 32u4 RFM95



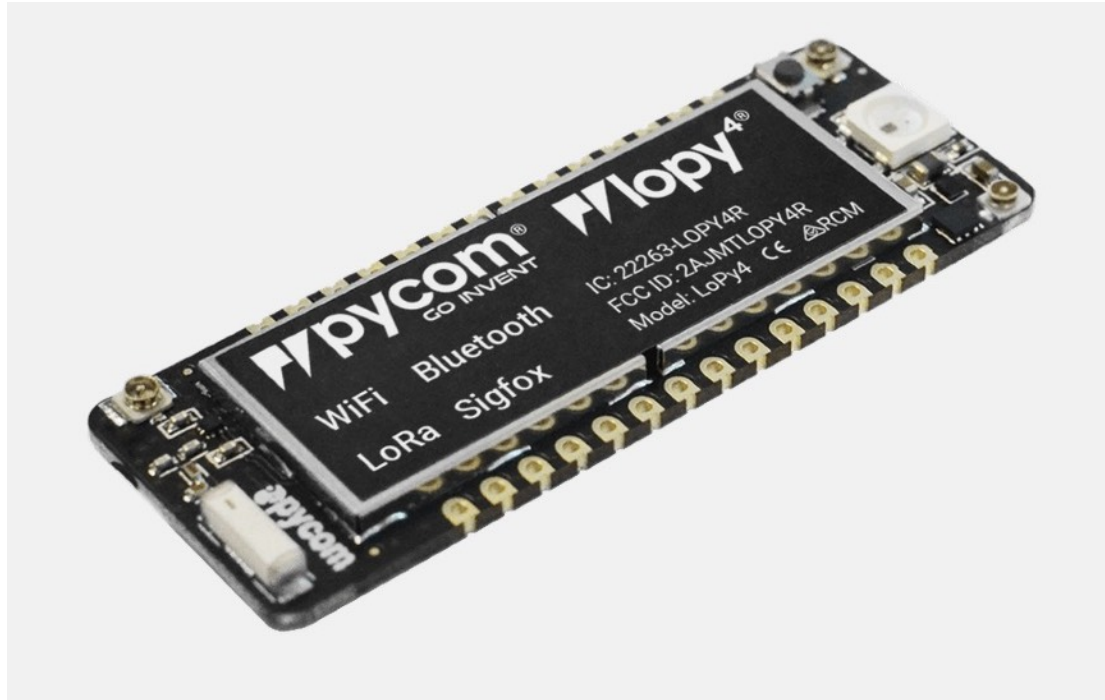
## Grand Central M4 Express



# M5stack



# Pycom: LoPy4



# Pycom: LoPy4

Espressif ESP32 chipset

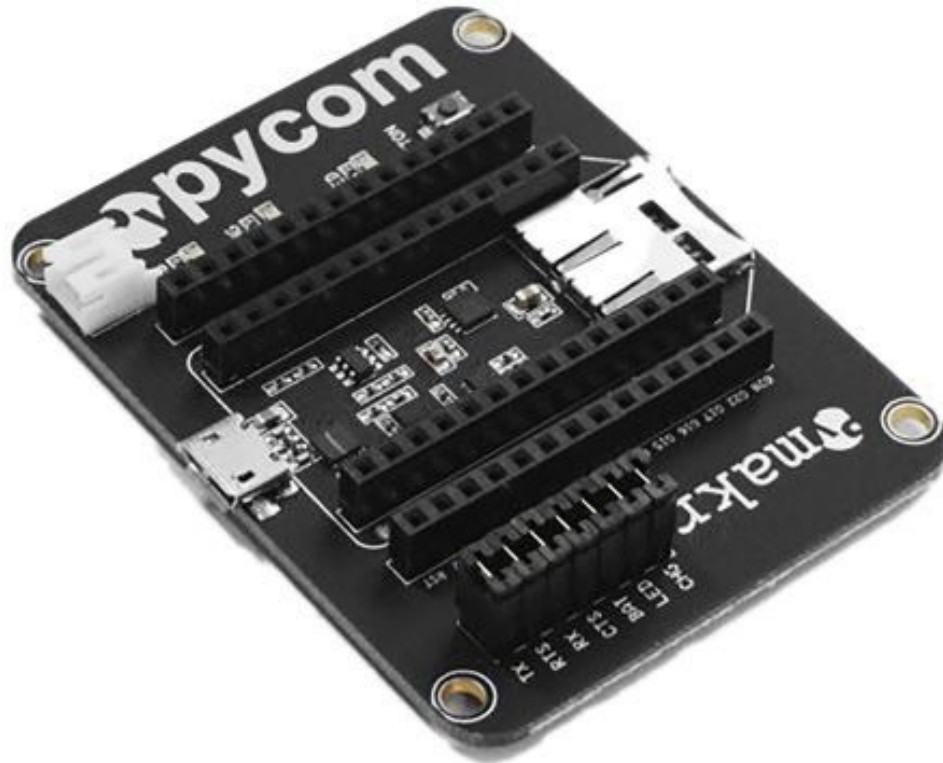
Quadruple network MicroPython enabled  
development board (LoRa, Sigfox, WiFi,  
Bluetooth)

RAM: 4MB

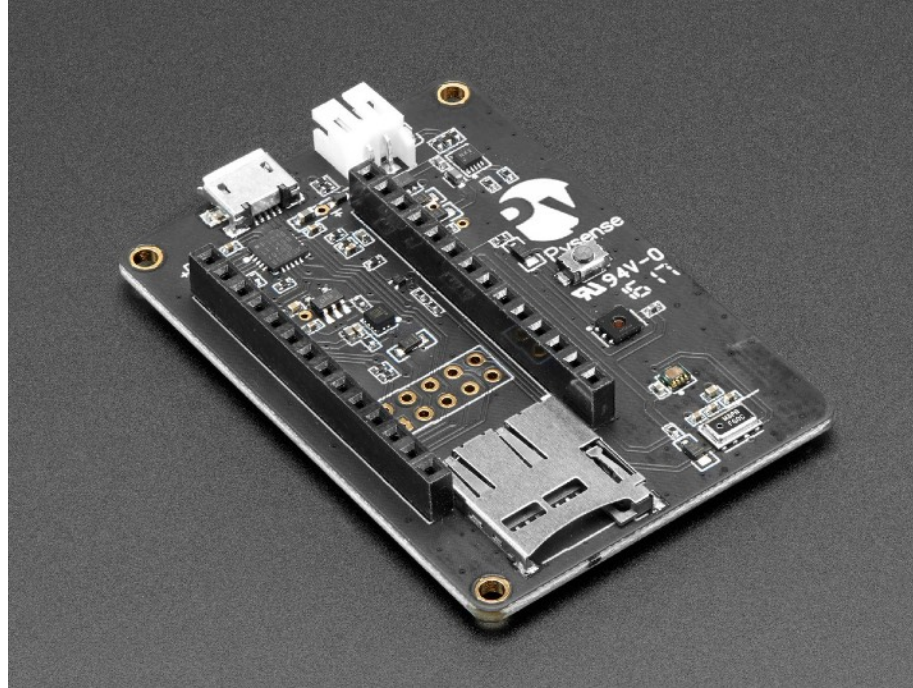
External flash: 8MB



# 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

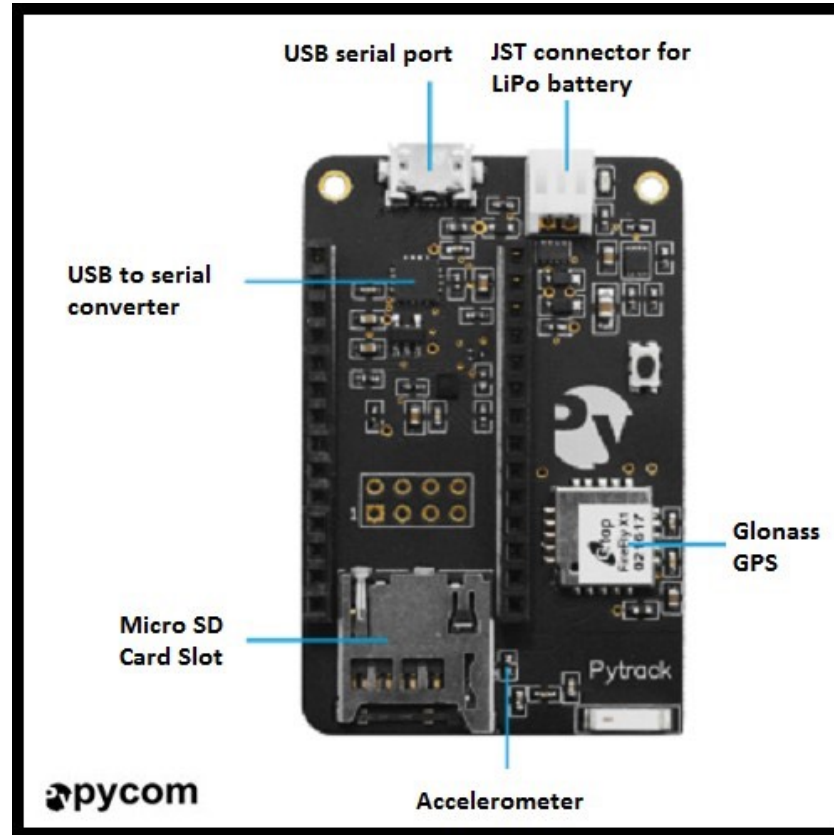
MicroSD card compatibility

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](mailto:mzennaro@ictp.it)

