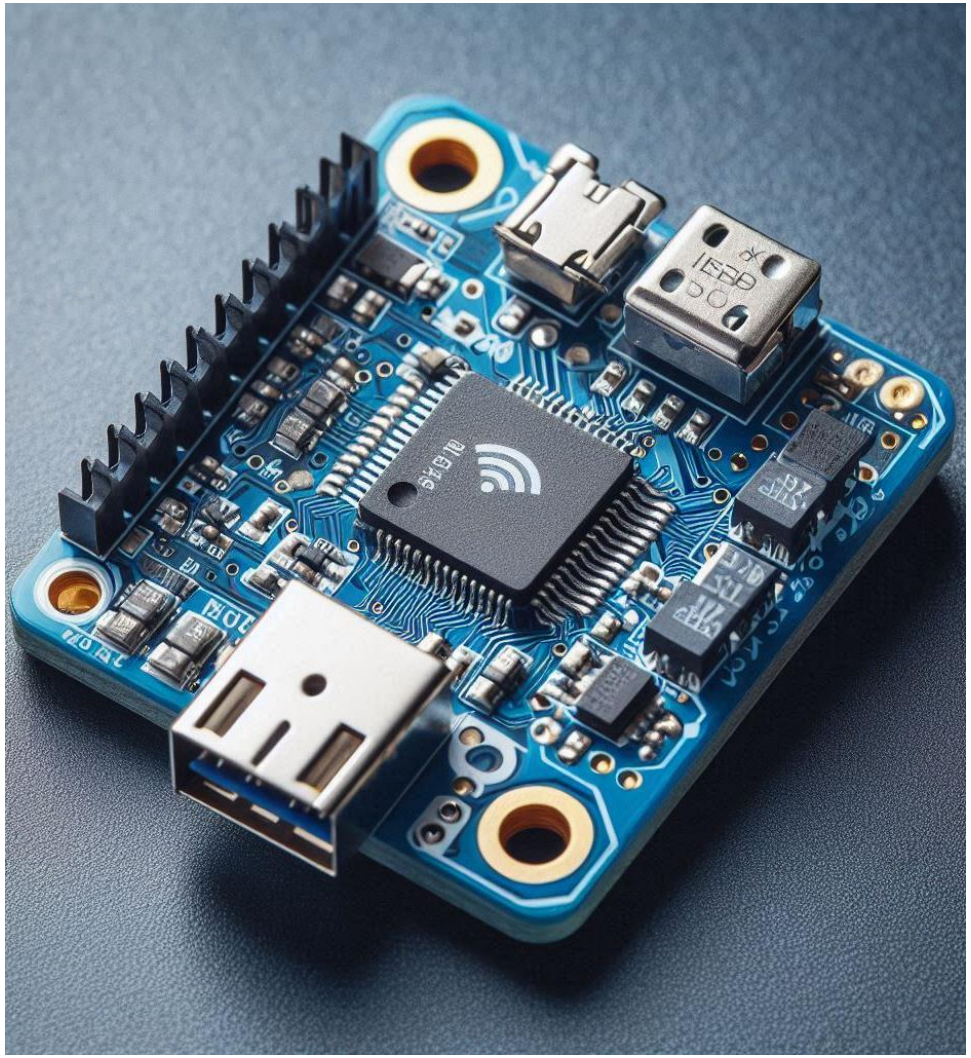

Intro to µPython & µControllers

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https://github.com/nuke66
https://gist.github.com/nuke66

“Everybody wants to save the earth; nobody wants to help Mom do the dishes”

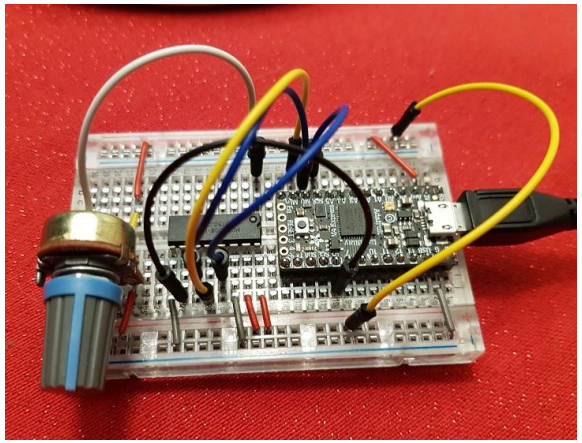
- P.J. O’ROURKE

We'll cover

- What a microcontroller is
- The MicroPython language
- Code demonstrations
- Recommendations of where to start
- Questions

What is a microcontroller

A small, cheap, electronic device that you can program to interact with sensors, actuators, other devices, or networks.



https://github.com/nuke66/Circuitpython-MCP3008-ADC

Come in many forms

May differ by:

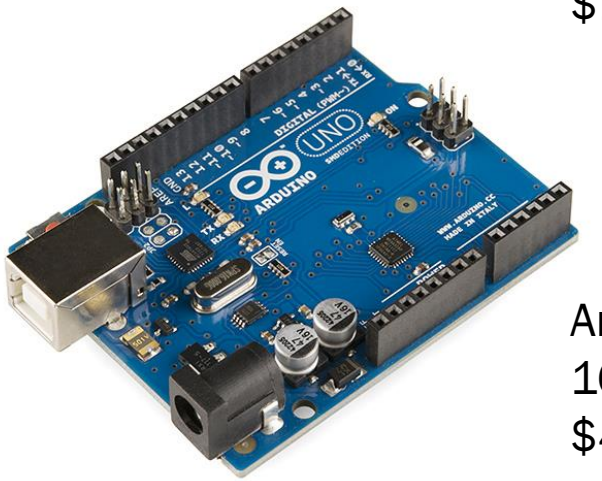
- Hardware
- Physical size and power requirements
- Number of pins and connectors
- Programming language(s)
- How they programmed
- Interfaces/protocols supported

Examples

AT Tiny 85
1Mhz, 8kb RAM
$2-3

ESP-32
96Mhz, 4Mb RAM, 3.3V
Wifi, BLE
$12

Raspberry Pi Pico W
133Mhz, 2Mb RAM, 3.3V
Wifi, BLE
$14



Arduino Uno
16Mhz, 2kb RAM, 5V
$45+

Why use a MicroPython

Excels at connecting to other devices.

Using those devices our software can interact with the real world.

Examples:

- Home automation
- Weather station
- GPS tracker
- Multimedia keyboard
- Animated Halloween pumpkin
- Remote monitoring station
- Cosplay
- Toys and games
- Remote controlled vehicles
- Cloud connected sensors

MicroPython

- Developed by Australian Damien George
- Written to support core Python language on microcontrollers
- Supports REPL
- Open source, with ongoing community development
- Variants based on MicroPython exist, e.g CircuitPython

Demo

Demo uses a Raspberry Pi Pico,
Pico pin layout link

IDE used is Thonny, free download. Basic but reliable.

Tutorial on setting up a Pico, installing Thonny, running your first programs
https://projects.raspberrypi.org/en/projects/getting-started-with-the-pico/0

Getting started

Recommend start with a MicroPython or CircuitPython compatible microcontroller.

1) Find an online beginners' tutorial to follow.

2) Purchase the items you need.

3) Find a good forum (or ask AI) for solving issues

4) Explore online resources

Resources

Adafruit https://learn.adafruit.com/welcome-to-circuitpython
Creators of the CircuitPython language with EXCELLENT tutorials and library support. Great starting point for beginners or all ages.

Raspberry Pi https://www.raspberrypi.com/products/raspberry-pi-pico/
Most well known on this list. Good tutorials, lots of community support.

MicroPython https://micropython.org/
Creators of the MicroPython language, contains language reference. Makers of the PyBoard microcontrollers.

Arduino https://www.arduino.cc/
Creators of the Arduino language, microcontrollers and accessories. Great library and tutorial support. Many Arduino boards are MicroPython compatible.

MagPi Magazine – https://magpi.raspberrypi.com/issues
Free downloadable (pdf) magazine issues about Raspberry Pi's and building projects in Python.

Inspiration

ROLE MODELS :

Limor Fried a.k.a "Lady Ada“ https://www.adafruit.com/about
MIT graduate, owner of Adafruit Industries, supporter of the makers movement and open source hardware/software.

Damian George. https://dpgeorge.net/
Australian theoretical physicist. Creator of MicroPython language. Complete legend.