CEC Continuing Education Center

DesignNews

Getting Started with the Raspberry Pi Pico

DAY 5 : Using MicroPython on the Raspberry Pi Pico

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Webinar Logistics

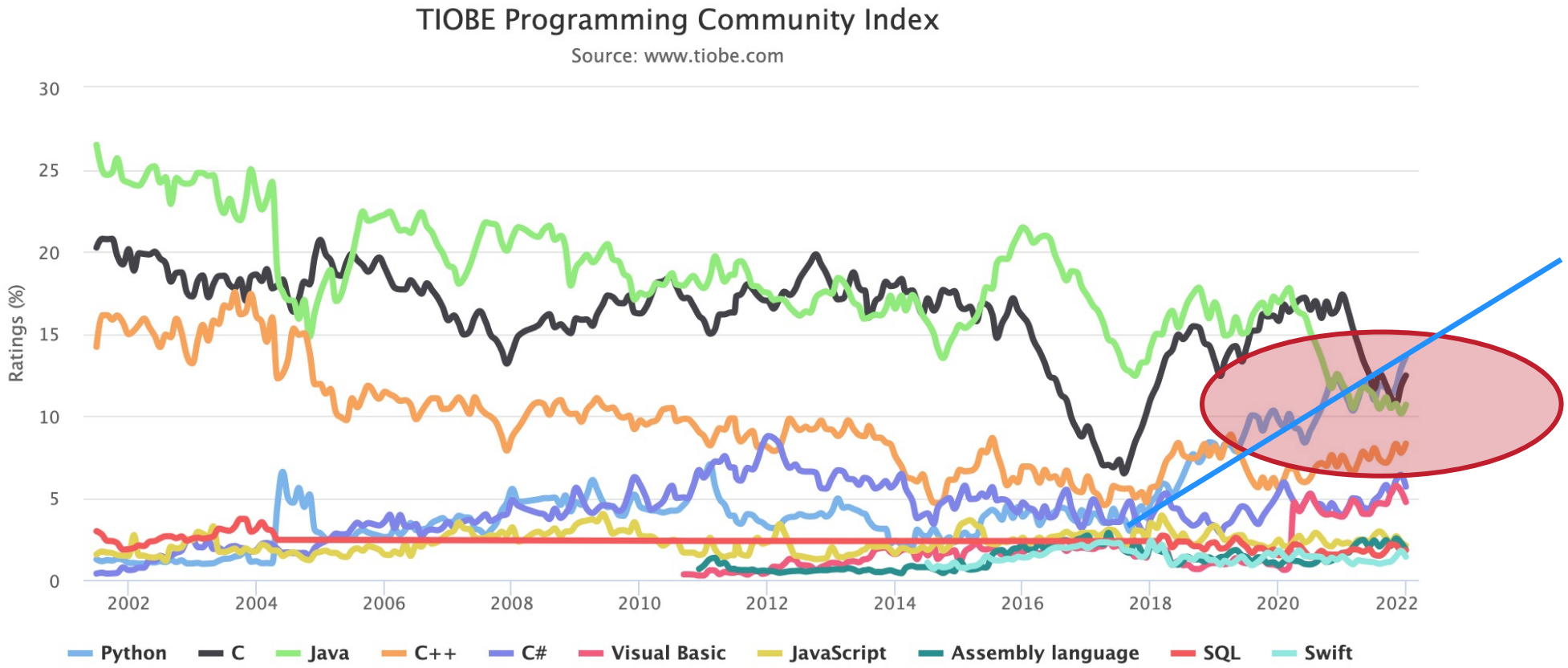
- Turn on your system sound to hear the streaming presentation.
- If you have technical problems, click “Help” or submit a question asking for assistance.
- Participate in ‘Group Chat’ by maximizing the chat widget in your dock.
- Submit questions for the lecturer using the Q&A widget. They will follow-up after the lecture portion concludes.

Course Sessions

- Introduction to the Raspberry Pi Pico
- Writing your First Raspberry Pi Pico Application
- Interfacing with Raspberry Pi Pico Peripherals
- Designing Multicore Raspberry Pi Pico Applications
- Using MicroPython on the Raspberry Pi Pico

1 Introduction to MicroPython

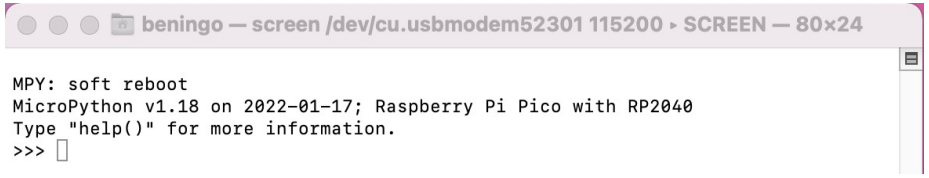
Introduction



MicroPython

"MicroPython is a lean and efficient implementation of the Python 3 programming language that includes a small subset of the Python standard library and is optimised to run on microcontrollers and in constrained environments."

(Source: micropython.org)



What level of expertise do you have writing Python scripts?
- None
- Beginner
- Intermediate
- Expert

2 Installing MicroPython

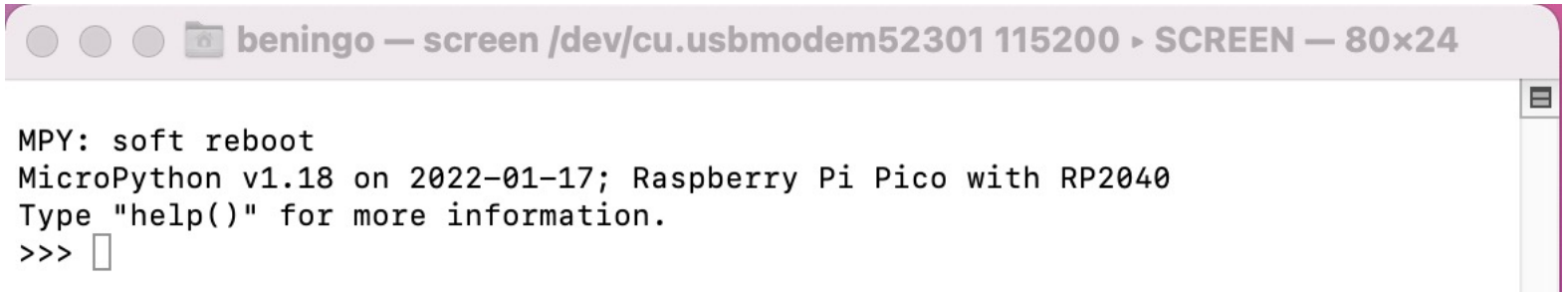
Installing MicroPython

1) Download the MicroPython UF2 file.
2) Hold BOOTSEL and power the Pico
3) Drag the MicroPython UF2 file to the USB MSD named RPI-RP2
4) The USB MSD drive will disappear.
5) The device should now show up as a USB serial device:

```
beningo@Jacobs-MacBook-Pro ~ % ls /dev/cu*
/dev/cu.BLTH                    /dev/cu.usbmodem52301
/dev/cu.Bluetooth-Incoming-Port
```

Verify Installation

1) Use your favorite terminal software to connect to the Pico @ 115200 bps
2) Press CTRL-D on the keyboard:

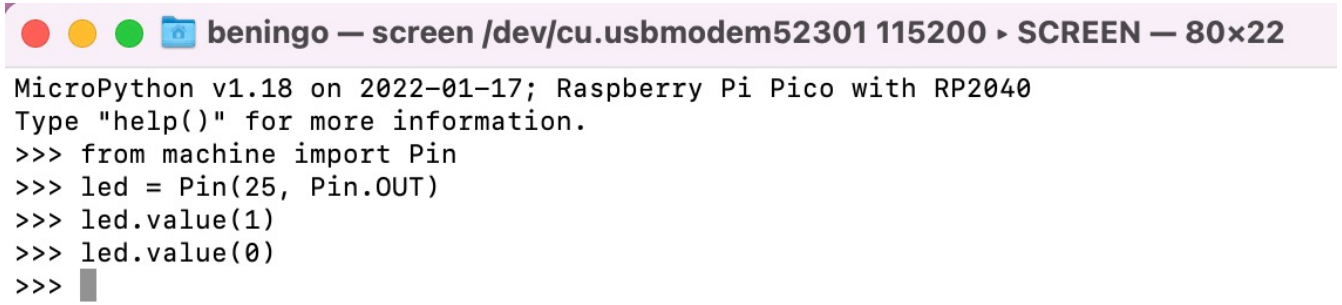


Running Code on the RP2040

Four Methods to execute code

- REPL
- Remote Script
- From main.py
- Through “frozen code” (mpy files)

The REPL



Controls	Function
CTRL-A	Enter raw REPL mode
CTRL-B	Enter normal REPL mode
CTRL-C	Interrupt a running program
CTRL-D	Soft reset
help()	Displays information on the library

Do you currently use MicroPython?
- Yes
- No
- Hoping to in the near future

3 Writing a Blinky LED Script

Connect to Pico through rshell

- Install rshell if you don't have it already:
  - python –m pip install rshell

```
beningo@Jacobs-MacBook-Pro ~ % rshell
Connecting to /dev/cu.usbmodem52301 (buffer-size 512)...
Trying to connect to REPL  connected
Retrieving sysname ... rp2
Testing if sys.stdin.buffer exists ... Y
Retrieving root directories ...
Setting time ... Jan 19, 2022 12:13:27
Evaluating board_name ... pyboard
Retrieving time epoch ... Jan 01, 1970
Welcome to rshell. Use Control-D (or the exit command) to exit rshell.
/Users/beningo>
```

Start a REPL

```
[/Users/beningo> help

Documented commands (type help <topic>):
========================================
args    cat   connect  date  edit  filesize  help  mkdir  rm     shell
boards  cd    cp       echo  exit  filetype  ls    repl   rsync

Use Control-D (or the exit command) to exit rshell.
/Users/beningo>
```

```
[/Users/beningo> repl
Entering REPL. Use Control-X to exit.
>
MicroPython v1.18 on 2022-01-17; Raspberry Pi Pico with RP2040
Type "help()" for more information.
>>>
>>>
```

Write an LED brightness module

```
from machine import Pin, PWM

led = PWM(Pin(25))

def ledon(intensity=65535):
        led.duty_u16(intensity)
```

```
/Users/beningo/RPI> cp picoled.py /pyboard
Copying '/Users/beningo/RPI/picoled.py' to '/pyboard/picoled.py' ...
/Users/beningo/RPI> repl
Entering REPL. Use Control-X to exit.
>
MicroPython v1.18 on 2022-01-17; Raspberry Pi Pico with RP2040
Type "help()" for more information.
>>>
>>> import picoled
>>> picoled.ledon(65535)
>>> picoled.ledon(30000)
>>> picoled.ledon(0)
>>> picoled.ledon(10000)
>>>
```

Writing an application

```
from picoled import ledon
from time import sleep

while True:
        for Intensity in range(0, 65500, 500):
                ledon(Intensity)
                sleep(0.05)
```

```
/Users/beningo/rpi> cp main.py /pyboard
Copying '/Users/beningo/rpi/main.py' to '/pyboard/main.py' ...
/Users/beningo/rpi>
beningo@Jacobs-MacBook-Pro ~ %
```

Do you CEC courses that are
- Theory only
- Practical (hands-on) only
- A little of both

4 Going Further

Thank you for attending

Please consider the resources below:

- www.beningo.com
  - Blog, White Papers, Courses
  - Embedded Bytes Newsletter
    - http://bit.ly/1BAHYXm

From www.beningo.com under

- Blog > CEC – Getting Started with the Raspberry Pi Pico

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