INTRODUCTION

CircuitPython runs on many recent microcontollers, over 300 different boards. To get started go to **`https://circuitpython.org/downloads`** and search for your microcontoller board. You will not see the older, classic boards like the *Arduino Uno* – it just is does not have the right capabilities. I would not recommend proceding if your microcontoller board is not listed on CircuitPython.org.

I was searching the CircuitPython reddit and found **`CPy running on a $4 microcontroller`**. I ordered several Wemos/Lolin S2Mini through AliExpress.com and found they work fine. I have ordered them twice and found it takes about three weeks for them to arrive. These are the devices I am using for the workshop.

INSTALLING CIRCUITPYTHON

1) Go to the download site for the S2 Mini **`here`**. On the right side of the page click the button [**`DOWNLOAD .BIN NOW`**]. This will download the latest stable CPy release. When I wrote this it was named **`adafruit-circuitpython-lolin_s2_mini-en_US-7.3.0.bin`**.
2) Navigate to the *ESP Web Flasher* web site **`here`**.
3) Plug the microcontoller into your laptop.
4) You need to get the microcontoller into the bootloader mode. There are helpful directions at the bottom of the download page.
5) On the S2Mini, hold down the boot button labeled **`0`**, press and release the reset button labeled **`RST`** on the S2 Mini, wait a second, then release the boot button.
6) Click [**`Connect`**] button on the web page. A common response is

```
Connecting...
Connected successfully.
Try hard reset.
[Object.debug:187] Finished read loop
Error: Couldn't sync to ESP. Try resetting.
```

   This means you did not get the bootloader to respond.
7) At this point it often takes several attempts to connect to the device. If the above button presses don't work try:
   a) Press the reset button on the microcontoller labeled **`RST`** on the S2 Mini. Connect again.
   b) It often takes several attempts.
8) When it works you will see something like

```
Chip type ESP32-S2
Connected to ESP32-S2
MAC Address: 84:F7:03:D8:25:82
Uploading stub...
Running stub...
Stub is now running...
Detecting Flash Size
FlashId: 0x164020
Flash Manufacturer: 20
Flash Device: 4016
Auto-detected Flash size: 4MB
```

9) Click the [**`Erase`**] button on the web page, then [**`OK`**]. It takes about 20 seconds to erase the flash memory.
10) Click the top line button [**`Choose a file …`**]. Navigate to the fie you downloaded, select and click [**`Open`**].
11) Click [**`Program`**]. It takes about 40 seconds to flash. The output will look something like

```
Image header, Magic=0xFF, FlashMode=0xFF, FlashSizeFreq=0xFF
```

```
Writing data with filesize: 1420576
Erase size 1420576, blocks 87, block size 0x4000, offset 0x0000, encrypted no
Took 32228ms to write 1420576 bytes
Erase size 0, blocks 0, block size 0x4000, offset 0x0000, encrypted no
To run the new firmware, please reset your device.
```

12) Press the reset button on the S2 Mini. After a few seconds a disk named **CIRCUITPY** will show up on your system. You are done uploading CPy!
13) If you open the disk you will see a folder named **lib**, and two files, **boot_out.txt** and **code.py**.
14) Open *Thonny*, click **Tools** ➔ **Options…** ➔ Interpreter. From the interpreter drop down menu select **Circuit-Python (generic)**. In the port menu you should see your S2 Mini. Select it and click [**OK**]. On Macs is is listed as something like **S2 Mini (/dev/cu.usbmodem487F1A2B9F8E)**. On Windows it is a COM port.
15) In the lower window label Shell, you may see the python prompt after a few seconds. If not click the stop icon, , and it should respond with the python prompt. If not you can try pressing the reset button again re-connecting to the port, pressing the stop sign. It will eventually show up.