

Welcome to CircuitPython!

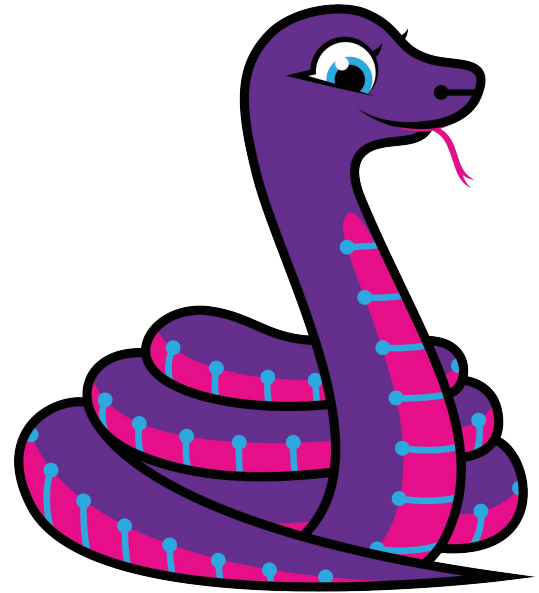
Kattni Rembor

Overview

- What is CircuitPython?
- Why would I use CircuitPython?
- The CircuitPython Community
- Getting Started
- Circuit Playground Express!

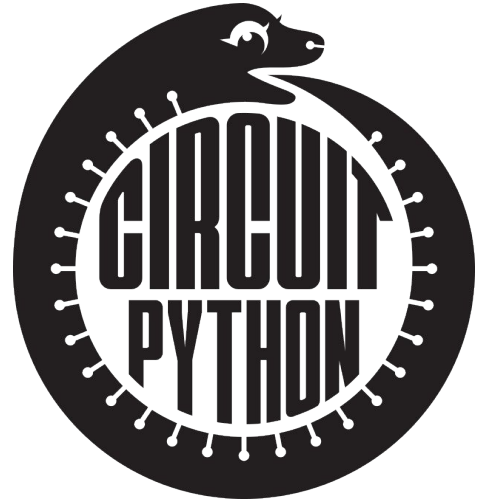
What is CircuitPython?

- Open Source
- Amazing, supportive community
- Runs on microcontrollers
- Higher level programming language
- Designed for learning
- Lowers the barrier for entry



Why would I use CircuitPython?

- New to programming
- Get your project up and running quickly
- Easily update your code - live!
- Serial console and REPL
- Solid hardware support
- It's Python!
- Open Source Software on Open Source Hardware



The Adafruit CircuitPython Community

- Everyone's welcome!
- Open Source Community
- Discord
- Forums
- GitHub

CODE + COMMUNITY = circuitpython

Getting Started

Getting started is as simple as plugging in the board, opening an editor, and editing code.

Code for the Tutorial

- All of the code used in this tutorial can be found at:

https://github.com/kattni/pyohio_2018_cp

CircuitPython Code Basics

- `import`
- Setup
- Main loop:
 - `while True:`

Circuit Playground Express Library

- To use the CPX library, import `cpx` by typing the following at the beginning of your file:

- `from adafruit_circuitplayground.express import cpx`

01. Blinky - The CircuitPython “Hello, world!”

```
import time
from adafruit_circuitplayground.express import cpx

while True:
    cpx.red_led = True
    time.sleep(0.5)
    cpx.red_led = False
    time.sleep(0.5)
```

Let's play with the plotter!

02. Light Sensor

```
import time
from adafruit_circuitplayground.express import cpx

while True:
    print("Light level:", cpx.light)
    print((cpx.light,))
    time.sleep(1)
```

03. Accelerometer

```
import time
from adafruit_circuitplayground.express import cpx

while True:
    x, y, z = cpx.acceleration
    print((x, y, z))
    time.sleep(0.5)
```

Let's take a look at some other inputs and sensors!

04. Button A

```
from adafruit_circuitplayground.express import cpx
```

```
while True:
```

```
    if cpx.button_a:
```

```
        cpx.red_led = True
```

05. Button B

```
from adafruit_circuitplayground.express import cpx
```

```
while True:
```

```
    if cpx.button_b:
```

```
        cpx.red_led = True
```

```
    else:
```

```
        cpx.red_led = False
```


06. Shake

```
from adafruit_circuitplayground.express import cpx

while True:
    if cpx.shake():
        print("Shake detected!")
        cpx.red_led = True
    else:
        cpx.red_led = False
```

07. Slide switch

```
from adafruit_circuitplayground.express import cpx

while True:
    # Left returns True. Right returns False.
    cpx.red_led = cpx.switch
```

08. Tap

```
from adafruit_circuitplayground.express import cpx
```

```
cpx.detect_taps = 2
```

```
while True:
```

```
    if cpx.tapped:
```

```
        print("Tap detected!")
```

09. Touch on A1

```
import time
from adafruit_circuitplayground.express import cpx

while True:
    if cpx.touch_A1:
        print("Touched A1!")
        time.sleep(0.1)
```

10. Touch on All Touch Pads

```
import time
from adafruit_circuitplayground.express import cpx

while True:
    if cpx.touch_A1:
        print("Touched A1!")
    if cpx.touch_A2:
        print("Touched A2!")
    if cpx.touch_A3:
        print("Touched A3!")
    ... # This means there's more code here!
    time.sleep(0.1)
```

11. Play Tone

```
from adafruit_circuitplayground.express import cpx
```

```
cpx.play_tone(262, 1)
```

```
cpx.play_tone(294, 1)
```

12. Start and Stop Tone

```
from adafruit_circuitplayground.express import cpx

while True:
    if cpx.button_a:
        cpx.start_tone(262)
    elif cpx.button_b:
        cpx.start_tone(294)
    else:
        cpx.stop_tone()
```

13. Play a Wav File

```
from adafruit_circuitplayground.express import cpx

while True:
    if cpx.button_a:
        cpx.play_file("coin.wav")
    elif cpx.button_b:
        cpx.play_file("eep.wav")
```


14. NeoPixel One

```
from adafruit_circuitplayground.express import cpx  
  
while True:  
    cpx.pixels[1] = (0, 50, 0)
```

15. All NeoPixels

```
from adafruit_circuitplayground.express import cpx
```

```
cpx.pixels.brightness = 0.3
```

```
while True:
```

```
    cpx.pixels.fill((255, 0, 0))
```

Now let's start combining the concepts we've learned!

16. Buttons and NeoPixels

```
from adafruit_circuitplayground.express import cpx
```

```
cpx.pixels.brightness = 0.3
```

```
while True:
```

```
    if cpx.button_a:
```

```
        cpx.pixels[0:5] = [(255, 0, 0)] * 5
```

```
    elif cpx.button_b:
```

```
        cpx.pixels[5:10] = [(0, 255, 0)] * 5
```

```
    else:
```

```
        cpx.pixels.fill((0, 0, 0))
```

17. Tap and NeoPixel

```
from adafruit_circuitplayground.express import cpx
```

```
cpx.detect_taps = 2
```

```
pixel_number = 0
```

```
while True:
```

```
    if cpx.tapped:
```

```
        print("Tap detected!")
```

```
        cpx.pixels.fill((0, 0, 0))
```

```
        cpx.pixels[pixel_number] = (0, 0, 50)
```

```
        pixel_number += 1
```

```
        if pixel_number >= 10:
```

```
            pixel_number = 0
```

18. Touch and Fill NeoPixels

```
import time
from adafruit_circuitplayground.express import cpx

cpx.pixels.brightness = 0.3

while True:
    if cpx.touch_A1:
        print("Touched A1!")
        cpx.pixels.fill((255, 0, 0))
    if cpx.touch_A2:
        print("Touched A2!")
        cpx.pixels.fill((210, 45, 0))
    ...
    time.sleep(0.1)
```

19. Light Up Touch Tone Piano!

```
while True:
    if cpx.switch:
        print("Slide switch off!")
        cpx.pixels.fill((0, 0, 0))
        cpx.stop_tone()
        continue
    if cpx.touch_A1:
        print("Touched 1!")
        cpx.pixels.fill((255, 0, 0))
        cpx.start_tone(262)
    elif cpx.touch_A2:
        ...
    else:
        cpx.stop_tone()
        cpx.pixels.fill((0, 0, 0))
```

Bonus Projects included on GitHub

- Rainbow Accelerometer
- Light Meter
- Sound Meter

Thank You!

Find me:

kattni@adafruit.com

@kattni on Discord

<https://github.com/kattni/>

More Circuit Playground Express:

<https://adafru.it/adafruit-cpx>

<https://adafru.it/cp-on-cpx-made-easy>

More CircuitPython:

<https://adafru.it/cpy-welcome>

<https://adafru.it/discord>

<https://github.com/adafruit/circuitpython/>

<https://circuitpython.readthedocs.io>

