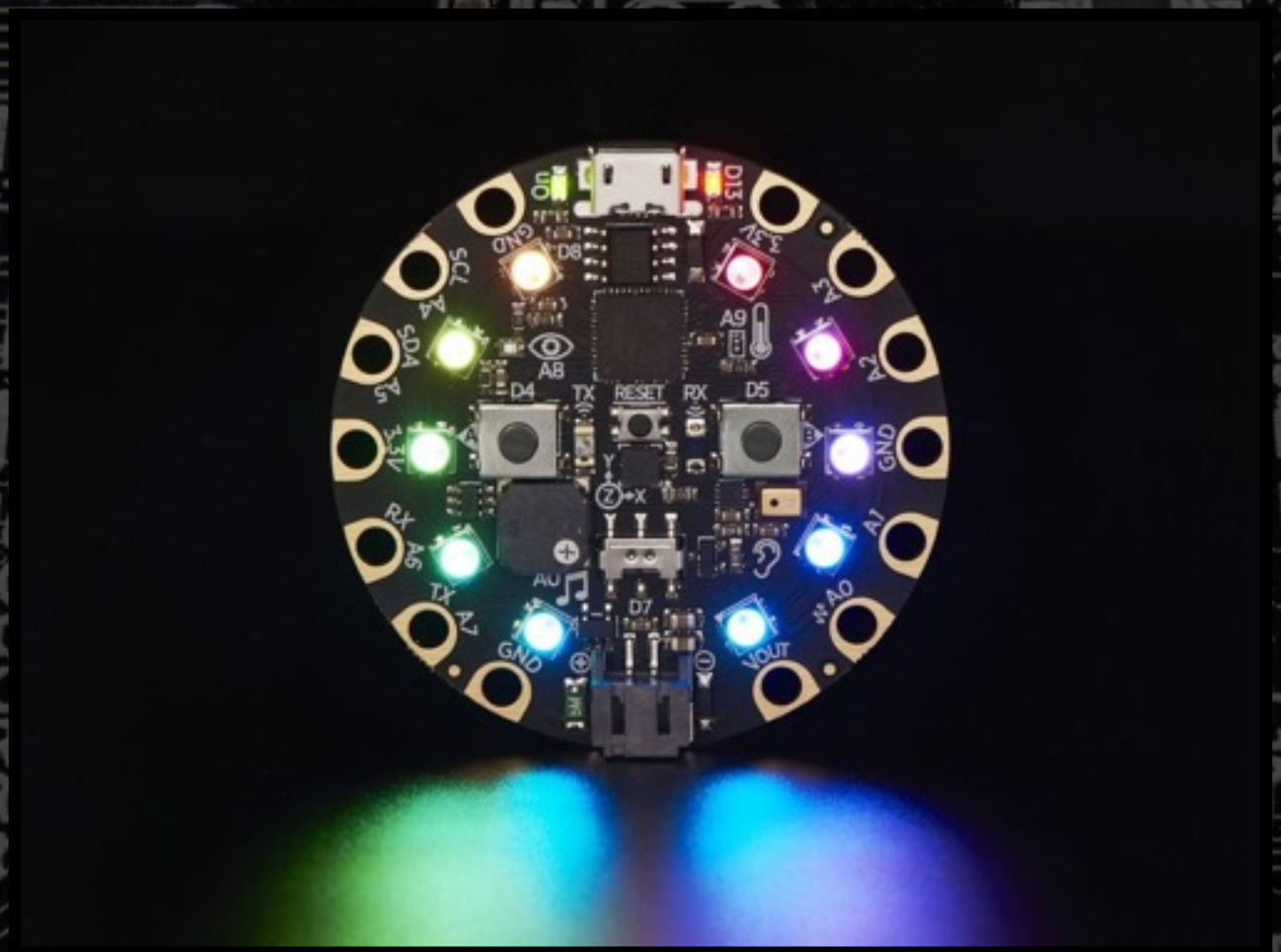
MAKE WITH PYTHON

TONY DICOLA

WORLD MAKER FAIRE 2017

ABOUT ME

- Tony DiCola, @tdicola, tdicola@adafruit.com
- Engineer for Adafruit Industries
- Adafruit creates hardware and tutorials to make electronics accessible to anyone.


GND
SCL
SDA
3V
RX
TX
GND
3V
A9
A8
D4
RESET
D5
GND
A1
A0
VOUT
GND
A7
A6
A5
A4
A3
A2
D8
D7
AU
TX
RX

DEMO

WHAT IS PYTHON?

- Programming language: http://www.python.org/
- Programming languages tell a computer what to ‘do’.
- Python is one of many programming languages!

```
# Main loop:
while True:
    # Check if slide switch is off
    if not circuitplayground.slide_
        # Turn off pixels and sleep
        # but for now it just spins
        pixels.fill((0,0,0))
        pixels.write()
        time.sleep(0.01)
        continue
```

WHY USE PYTHON?

- Focus on readability and expressiveness. **Great for beginners!**
- ‘Batteries Included’
- Interpreted language.
- Run Python code from a terminal (REPL). No compiler or other tools needed!

WHY USE PYTHON?

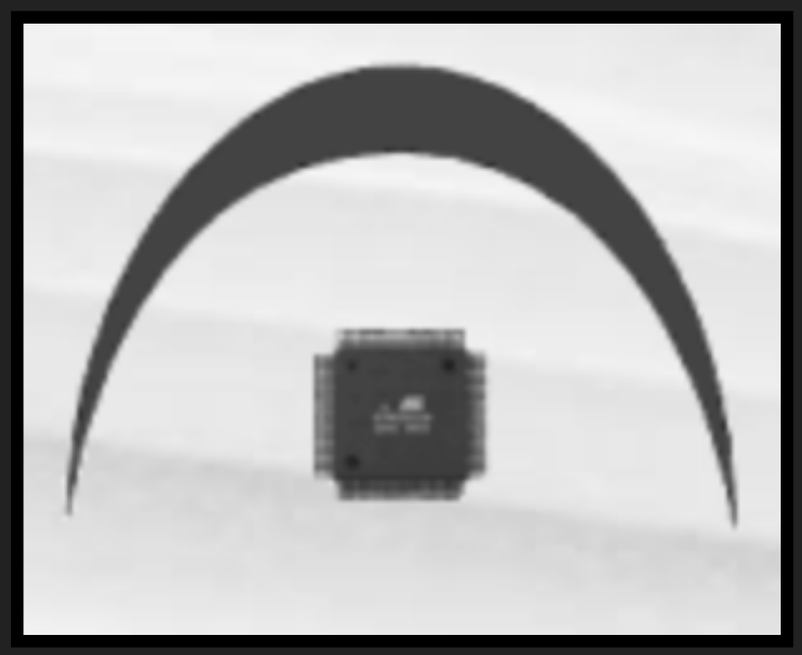
- Runs anywhere!
- Desktop (Windows, Mac, Linux)
- Mobile (Pythonista on iOS, QPython on Android)
- Browser (pythonanywhere.com, skulpt.org)
- Hardware?

WHY USE PYTHON?

- Easy to learn! Good free resources online:
  - Hitchhiker's Guide to Python: http://docs.python-guide.org
  - Code Academy Learn Python course: http://www.codecademy.com/learn/learn-python
  - Google's Python class: https://developers.google.com/edu/python/
  - *Automate the Boring Stuff with Python* & *Invent Your Own Computer Games with Python* by Al Sweigart (http://inventwithpython.com)
  - MIT 6.00.1x Introduction to CS with Python

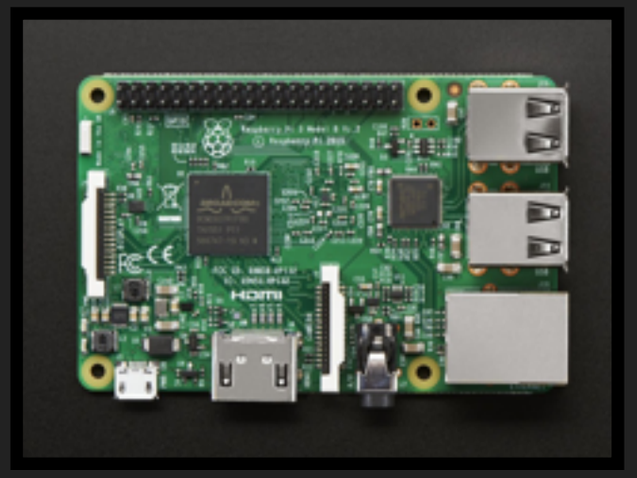
PYTHON ON COMPUTERS

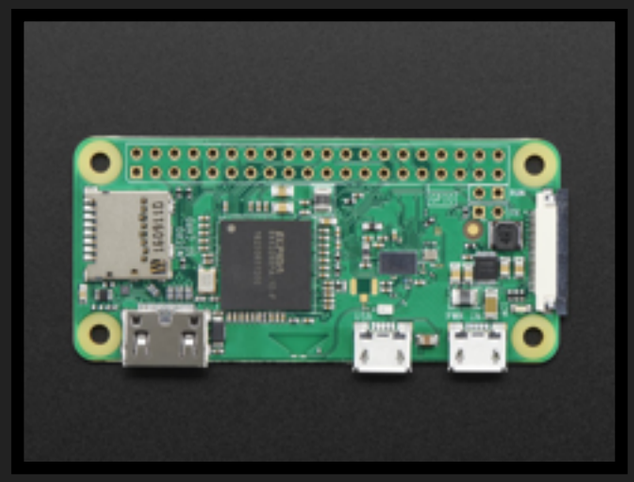
- Python can talk to hardware like Arduino using a protocol called Firmata.
- http://firmata.org/
- Full power of desktop python, but must **always** be connected to hardware!

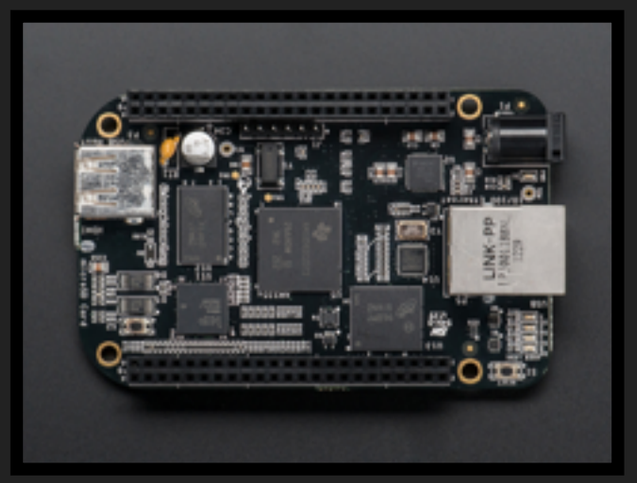


PYTHON ON (SMALL) COMPUTERS

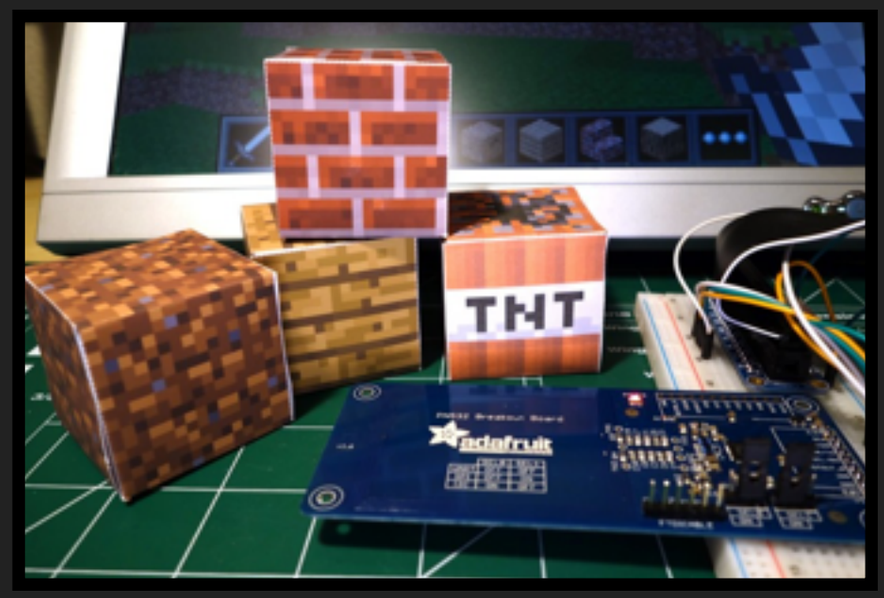
- Raspberry Pi, Beaglebone Black, etc. are small computers that run Linux and Python.
- Look for Python libraries for hardware:
  - https://learn.adafruit.com/category/raspberry-pi
  - https://www.raspberrypi.org/blog/

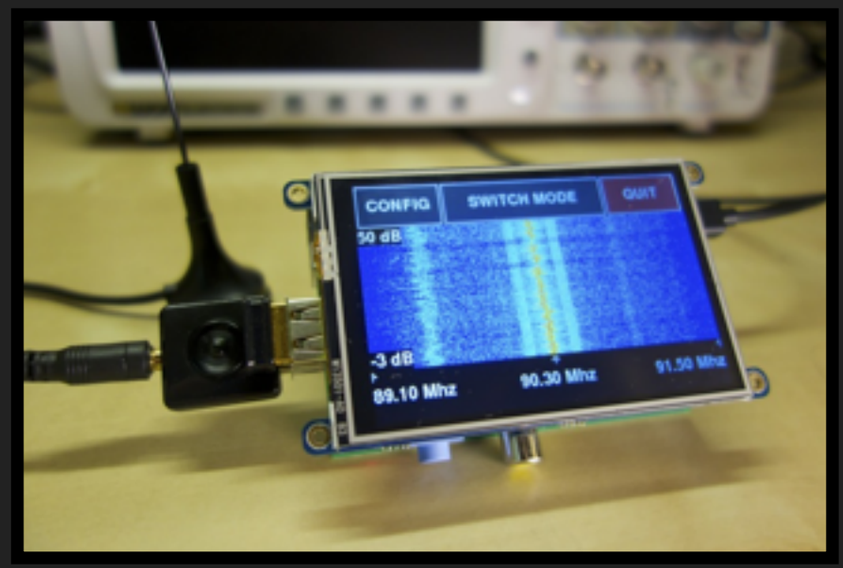


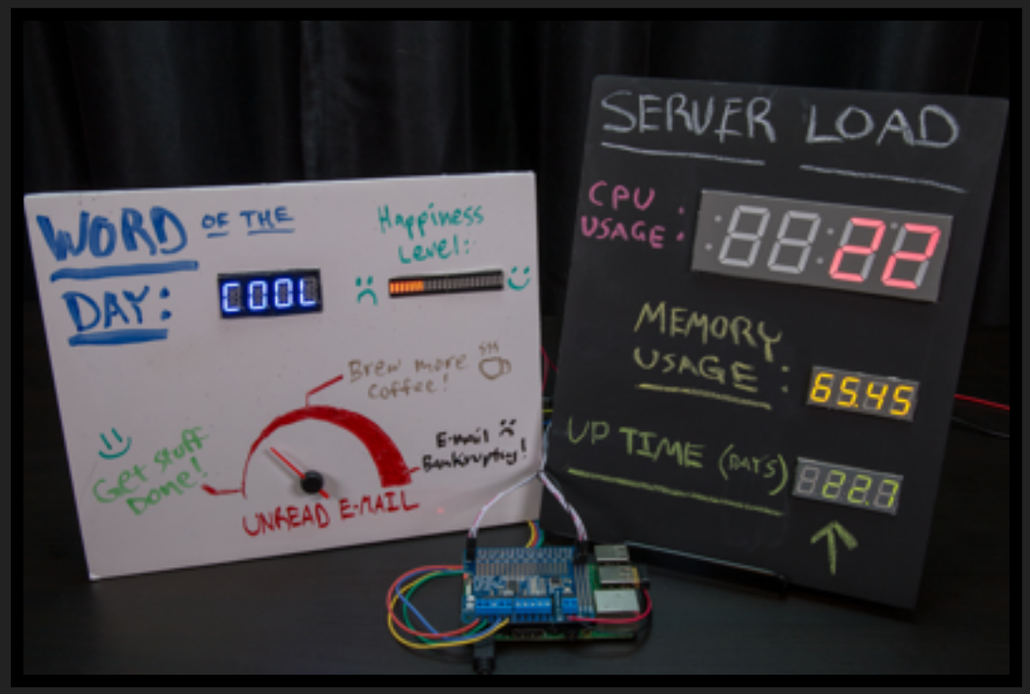


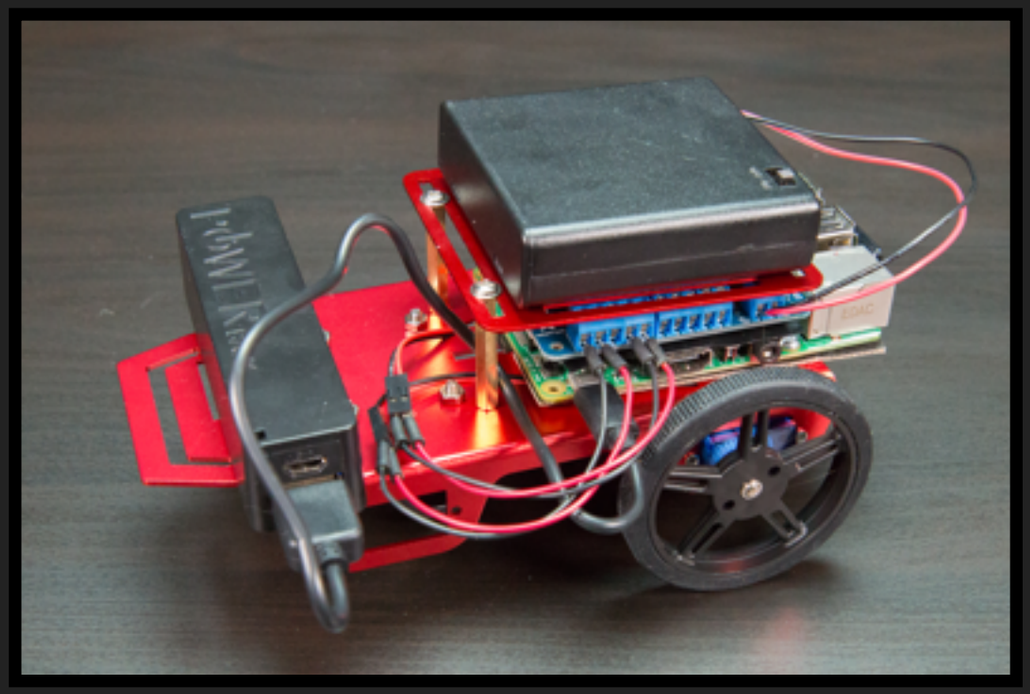


PYTHON ON (SMALL) COMPUTERS



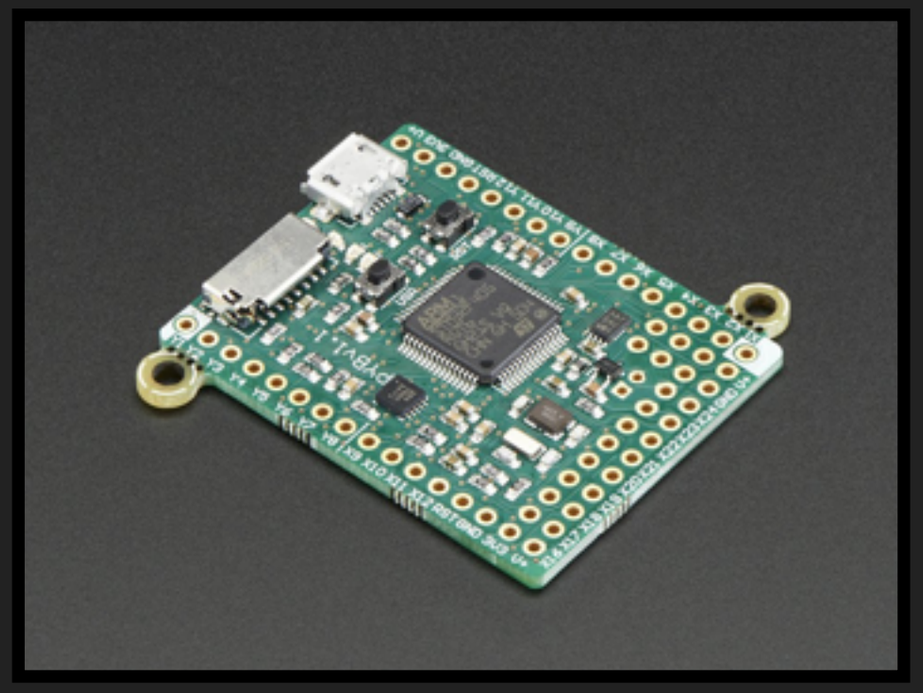






PYTHON ON MICROCONTROLLERS

- MicroPython
  http://www.micropython.org/
- Small version of Python that runs on microcontrollers.
  - Nearly full Python language.
  - Interactive REPL.
- Open source, created by Damien George.

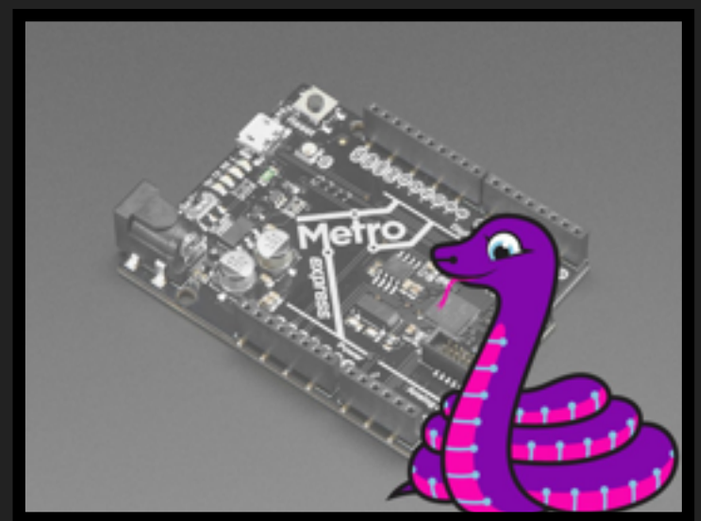


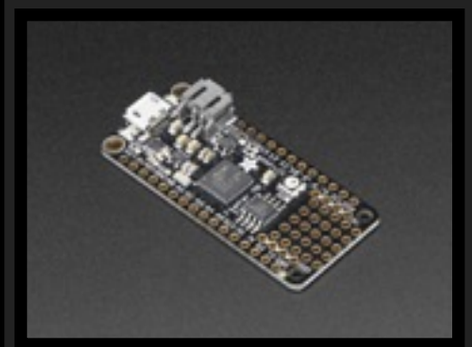
PYTHON ON MICROCONTROLLERS

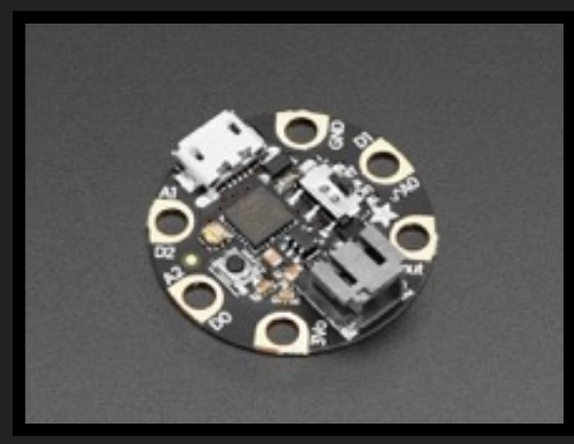
- MicroPython on BBC micro:bit
- Control the micro:bit directly with Python code!
- Access hardware like LED display, sensors, buttons, and more from Python code.

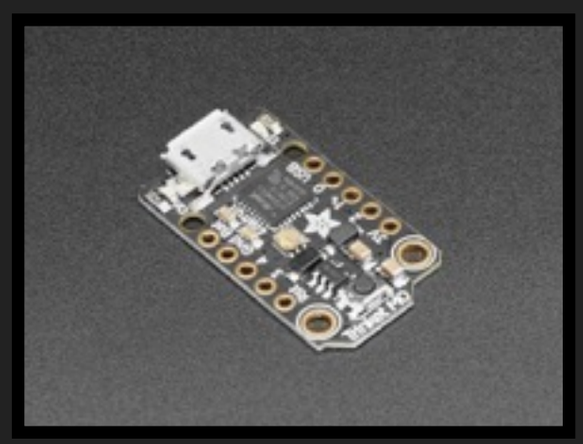
PYTHON ON MICROCONTROLLERS

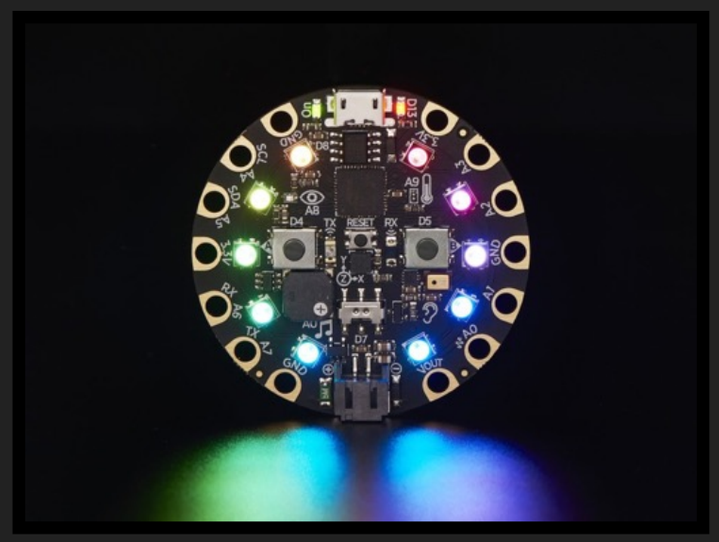
- CircuitPython - Adafruit's customized version of MicroPython for learning electronics.
- Circuit Playground Express and Feather/Metro/Gemma/Trinket M0 boards can run CircuitPython!
- Boards appear as USB drive, edit and run code with any tool.

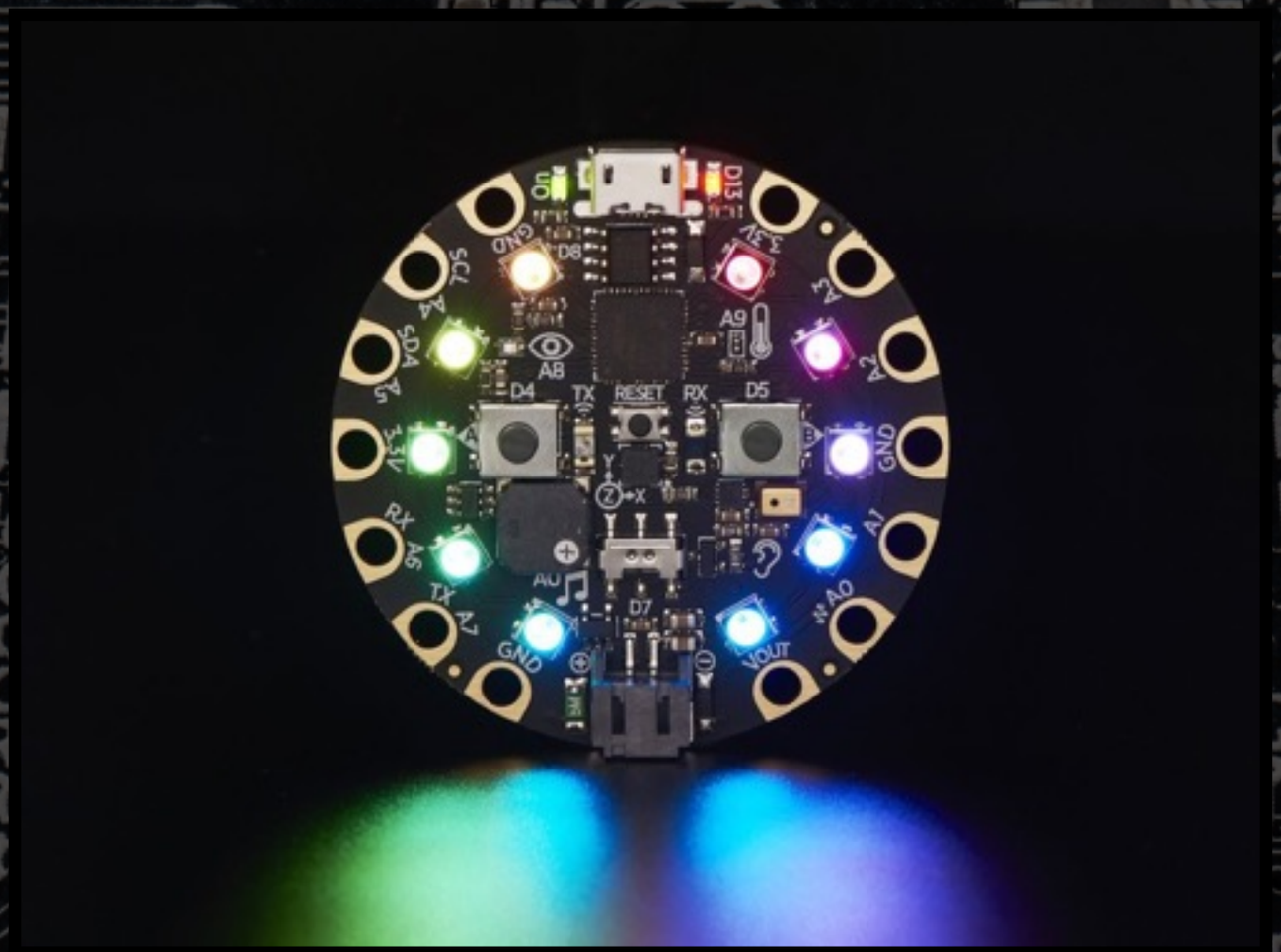











GND
SCL
SDA
3V
RX
TX
GND
3V
A9
A8
D4
RESET
D5
GND
A1
A0
VOUT
GND
A7
A6
A5
A4
A3
A2
D8
D7
AU
TX
RX

DEMO

LEARN MORE

- Python: http://python.org & http://docs.python-guide.org/
- MicroPython: http://www.micropython.org/
- Adafruit CircuitPython: http://discord.gg/adafruit
- Presentation slides: http://bit.ly/makepython

QUESTIONS?